A.L.I

Atelier Langages Interstellaires

David Guez

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OPUS 1 - 2026

Introduction

A.L.I is a research, documentation and creation workshop devoted to interstellar contact languages, proposed by David Guez, artist and author (guez.org). The project explores how a non-human intelligence might recognize a signal, understand a structure, interpret a pattern, receive an archive or answer a message.

The laboratory connects SETI, METI, exobiology, radio astronomy, information theory, cinema, literature, sound art and installations. Its purpose is to invent conceptual and artistic forms for making readable what might circulate between two worlds.

This book gathers the LABO paths as an art/science research notebook. The articles do not claim contact; they build experimental forms: signal protocols, transmission objects, translation machines, speculative alphabets, sendable archives, luminous devices, biological hypotheses and cultural narratives.

Artistically, A.L.I treats language as a plastic form. A message may become image, rhythm, light, radio wave, mathematical sequence, gesture, object or collective ritual. Scientifically, the project observes physical and biological constraints: distance, noise, energy, temporality, material support, sensory perception, evolution, habitability and the possibility of radically different cognition.

The central hypothesis is simple: before translating an extraterrestrial language, one would first have to invent the conditions in which something becomes recognizable as language. A signal must be distinguished from chance; a form must show intention; repetition must create expectation; an archive must contain its own instructions.

A.L.I works in the fragile place where art can formulate experiments that cannot yet be tested, and where science provides constraints that prevent imagination from becoming pure decor. The project is a workshop of methods: how to encode, how to listen, how to show, how to answer, how to accept that another world may share neither our bodies, nor our measures, nor our obvious assumptions.

The following articles form a constellation: first-contact films, the Arecibo message, the Voyager Golden Record, the Wow! signal, exoplanets, Mars, mathematics, telepathy, crop circles, radio, the Moon, the fourth dimension, phonemes, animals and luminous objects. Each entry asks the same question in a different way: what forms could allow two intelligences separated by body, distance and time to begin understanding one another?

This book is the result of an ongoing research project available at:

www.guez.org/ali

About David Guez

A.L.I - Alien Language Interface is a project by David Guez, artist and author. His work explores the notion of link: social links, links between media and practices, links to otherness, with technologies understood as means of exchange. He also questions publics, intimate and public freedoms, free media, science, psychoanalysis, the relation to time, collaborative uses of the internet, identity, memory and archiving. His projects have been presented in France and abroad in art centers and festivals, including Centre Pompidou, Jeu de Paume and Gaîté Lyrique.

Biographical source: guez.org/ali/1

Concepts

A compact map of the working notions that circulate through this edition.

Signal - An event separated from background noise because it seems organized, repeated or intentionally shaped.

Noise - Everything that masks, distorts or competes with a message: cosmic background, distance, medium, interpretation.

Code - A system of correspondences that makes it possible to transform one form into another: sign, sound, image, number.

Archive - A memory object designed to outlive its sender and carry traces, instructions or fragments of a world.

Protocol - A shared procedure for detecting, verifying, decoding and answering a signal.

Translation - The passage from one regime of meaning to another, never neutral, always partly inventive.

Redundancy - Repetition used to make a message more resistant to loss, error and deep time.

Medium - The material channel of a message: radio wave, light, matter, DNA, image, body, dream or machine.

Time - The interval that separates sender and receiver, and turns every interstellar message into delayed reading.

Scale - The relation between micro and macro structures, from qubits and genes to brains, galaxies and multiverses.

Umwelt - The perceptual world of a living being, defined by its senses, body and environment.

Otherness - The condition of an intelligence that may not share our organs, categories, history or expectations.

Mathematics - A candidate universal language, powerful but not culturally neutral: it depends on notation, logic and embodiment.

Biosignature - A chemical or physical trace that suggests life without necessarily proving intelligence.

Technosignature - A trace that could reveal technology: emission, artifact, structure, anomaly or organized energy.

Dyson sphere - A hypothetical megastructure or swarm that would collect stellar energy and could appear through waste heat.

Waste heat - Infrared excess emitted when a technical system transforms energy and must radiate what it cannot use.

Kardashev scale - A speculative scale classifying civilizations by the amount of energy they can mobilize.

Neuralese - A latent representational language inside AI systems before human-readable output.

Rhizome - A non-hierarchical network form, useful for thinking distributed, collective or alien intelligence.

Fractal - A self-similar dynamic form that repeats patterns across scales and can inspire non-linear messages.

Generative form - A form defined by the rules of its production rather than by a fixed contour; it can be replayed, transformed and continued.

Opus 1 - The first fixed editorial state of A.L.I: a printed and indexed constellation drawn from the living LABO.

Multiverse - The hypothesis that reality may include multiple universes, branches or versions of possible worlds.

Decipherment - The reconstruction of a lost code from repetitions, bilingual clues, material context and patient comparison.

Constructed language - A deliberately invented language whose grammar, sounds and culture make communication experimentally visible.

Language emergence - The moment when shared signs, gestures or spatial conventions stabilize into a usable grammar.

Nuclear semiotics - The problem of warning distant future beings about radioactive danger across thousands of years.

False memory - A constructed or altered recollection that reveals how fragile testimony, identity and contact narratives can be.

Subculture - An indirect channel where marginal forms, fan archives and counter-publics can carry hidden or unstable knowledge.

Disappearance - A contact hypothesis where absence, trace and withdrawal become more informative than direct presence.

Poetry - A language of compression, ambiguity and resonance, able to say more than it explicitly explains.

Animal language - A field showing that meaning can be spatial, vocal, social, embodied and non-human.

Quantum information - A form of information based on states, probabilities and correlations rather than only binary symbols.

Memory - The persistence of a trace across matter, body, culture or machine.

Image - A surface of recognition that can communicate by pattern before it communicates by grammar.

Gesture - A meaningful movement of body, object or system, sometimes more direct than verbal description.

Threshold - A critical point where a system changes state and where transition itself can become a readable event.

Silence - Not only absence of message, but a possible strategy, filter, delay or negative signal.

Attention - The act of selecting a pattern from the world; without attention, no signal becomes language.

Embodiment - The way every intelligence is shaped by its organs, sensors, metabolism and environment.

Resonance - A relation of amplification between bodies, waves, ideas or memories that begin to answer each other.

Symmetry - A stable transformation of form, often used as a sign of order, rule or mathematical intention.

Anomaly - A deviation from expectation that can become the first clue of an unknown system.

Latent space - A hidden representational field where AI systems organize similarity before producing images or words.

Collective intelligence - Cognition distributed across organisms, machines, networks or groups rather than contained in one subject.

Speculative protocol - An experimental rule set designed to test possible communication before any confirmed contact exists.

Deep time - Timescale beyond human history, essential for archives, fossils, cosmic signals and delayed reception.

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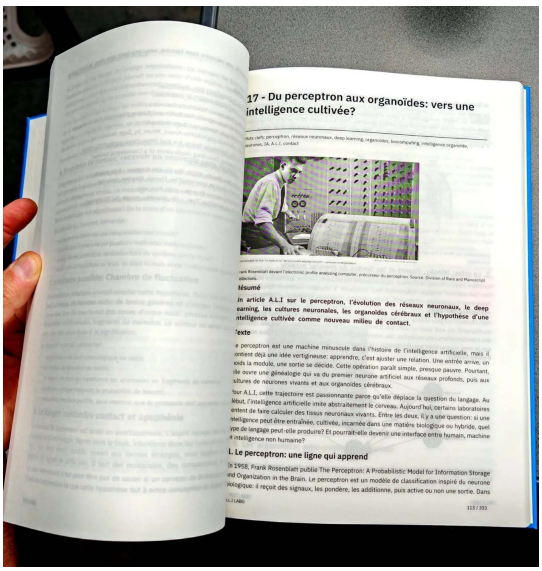
1 - A.L.I: 100 Articles Attempting to Speak to the Unknown

Keywords: A.L.I, Alien Language Interface, David Guez, article 100, SETI, METI, language, interstellar contact, art and science, technosignatures, artificial intelligence, anthropology, philosophy, Opus 1, podcast, Reel



A.L.I — Opus 1. The printed book makes a first constellation of LAB articles tangible. Photograph: David Guez, 2026.

Summary

For the hundredth LAB entry, I present A.L.I, Alien Language Interface: an artistic research project exploring signs, languages, objects, narratives and protocols that might circulate between radically different intelligences.

Text

For this hundredth article, I am delighted to present A.L.I, the project I created. A.L.I stands for Alien Language Interface. It is an artistic research project devoted to a simple yet dizzying question: how might a non-human intelligence recognise a signal, understand a structure, interpret a pattern, receive an archive or answer a message?

This question is not limited to a hypothetical conversation with extraterrestrials. It forces us to reconsider everything we call language: words, certainly, but also numbers, images, sounds, light, gestures, bodies, machines, landscapes, myths and silences. It turns contact into a field of artistic experimentation.

An Author's Project

I initiated A.L.I to give a shared form to questions that have run through my work for more than twenty years. My practice as an artist and author (guez.org/ali/2) moves between art and science, networks, communication devices, memory, delayed time and technological fictions. A.L.I gathers these threads without confining them to one discipline.

Science supplies facts, measurements, instruments and limits. Art shifts the point of view, constructs situations and makes perceptible what still exists only as a hypothesis. Philosophy

asks who speaks, to whom, through which categories and with what responsibility. Literature, cinema and popular culture preserve the imaginary forms through which contact has already been rehearsed thousands of times.

David Guez, artist and author of the A.L.I project. Photograph from the author's archive.

Articles as Pre-Texts

The LAB texts are not conclusions. I regard them as pre-texts: working surfaces where a scientific idea, an artwork, a history or a fiction can meet another field. Each article attempts to be precise about facts and free in its projection. It distinguishes what is established, what is debated and what belongs to an A.L.I hypothesis.

This method allows unusual connections. The augmented Drake equation encounters exoplanets and the biases of our models; the contemporary Pioneer plaque becomes a problem of cultural design; Lincos meets the limits of mathematical grammar; the Arecibo message becomes a collective protocol rather than a single binary image.

A Constellation of Fields

Across roughly one hundred bilingual articles, several broad ensembles have emerged:

- SETI, METI and technosignatures: radio telescopes, candidate signals, transmitted messages, interstellar artefacts and repeatability criteria.
- Languages of life: animal vocalisations, plant intelligence, interspecies communication, evolution, extremophiles and astrobiology.
- Mathematics and computation: prime numbers, information theory, encoding, AI, networks, quantum computing and systems of proof.
- Anthropology and philosophy: myths, rites of passage, alterity, truth, translation, hospitality and responsibility before the unknown.
- Arts and narratives: literature, cinema, music, dance, Land Art, installations, ufology and popular culture.

These categories are not separate shelves. They form a network. The Earth Species Project, for instance, connects AI, bioacoustics, conservation and terrestrial METI. Extremophiles move the biological boundaries of habitability and open the question of panspermia. Levinas reminds us that before any translation, contact already involves an ethics of the other.

What the Fields Teach One Another

The project does not seek a ready-made universal language. It studies the minimal conditions that allow something to become readable as language. A signal must be distinguished from noise, intention recognised without being projected too quickly, repetition constructed, measurement proposed, context supplied and verification made possible.

Structural anthropology and rites of passage suggest that contact could consist of stages rather than instant translation. Quantum physics and the article on truth and falsehood remind us that reality does not always fit a binary opposition. Ethology shows that language can be spatial, chemical, gestural or collective. Art teaches us to treat ambiguity not as failure, but as material.

These crossings produce a central hypothesis: the first problem of contact may not be translating a sentence, but recognising that a relationship is beginning.

A grammar of forms

Fractals offer A.L.I a decisive hypothesis: a form can become readable not through the vocabulary it uses, but through the rule that produces it. Self-similarity, iteration, branching and changes of scale compose a visual grammar that can be observed, replayed and extended.

In living systems, the branching of trees, lungs, roots and river networks is not ornamental. It answers constraints of circulation, exchange, surface and adaptation. An intelligence distant from us may encounter comparable constraints and recognize, in a generative structure, a way of making a logic visible.

This path does not promise a ready-made universal language. It proposes a contact protocol instead: transmit a simple rule, show its transformations, then wait for another to continue it. A fractal then becomes a compact archive, an experiment in translation and an invitation to verify that two readers have understood the same process.

A Laboratory That Became Multimedia

A.L.I is no longer only a sequence of pages. Every article exists in French and English, with images, references, an audio capsule, a podcast and a video Reel. The text can be read, heard, viewed and re-edited. This circulation is not merely editorial packaging: it tests the same idea across several media and temporalities.

The corpus now gathers approximately 2.7 million characters in French and English, nearly two hundred audio capsules, several hundred images and more than two hundred local videos. More importantly, it contains hundreds of internal and external links. No article should remain alone: each is a doorway to another text, a scientific source, an artwork, a document or a contradiction.

GUDEMON. An A.L.I realisation that turns contact fiction into a situated radio device. Project poster, 2026.

A.L.I — Opus 1

The publication of A.L.I — Opus 1 (guez.org/ali/893) marked a first stage. The book does not close the LAB; it takes a snapshot of it. Its more than six hundred pages move the digital network into a heavy, sequential, printed object. Articles become an archive that can be explored differently, with an index, concepts and adjacencies that a screen does not produce in the same way.

The passage from website to book also reveals an essential tension. Should an interstellar message be living, editable and networked, or stable, self-contained and transmissible without infrastructure? A.L.I deliberately keeps both forms: the website evolves; the book records a moment.

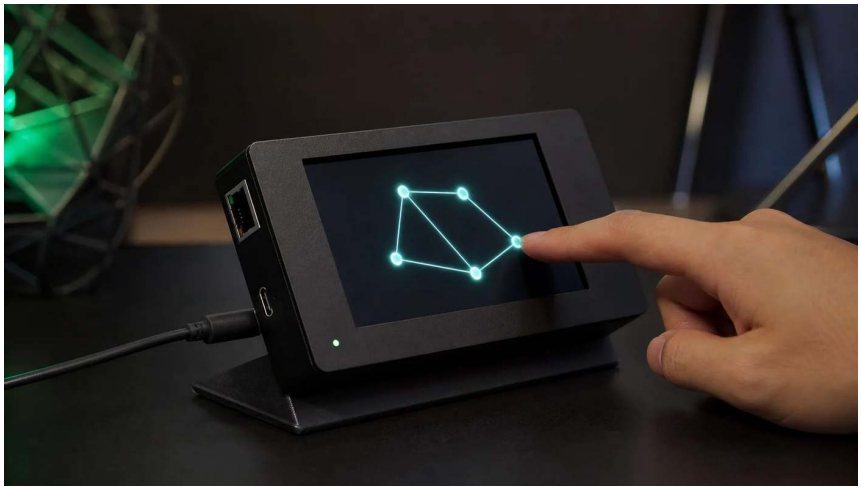
2067 Clock, David Guez. Delayed time, waiting and transmission beyond an individual lifespan precede and nourish A.L.I.

From Texts to Objects

The LAB feeds concrete realisations. Ghostbook Reader (guez.org/ali/894) turns reading into an algorithmic investigation. GUDEMON replays the power of radio fiction to temporarily alter reality. PLANETARY GLYPH (guez.org/ali/895) imagines a voluntary network of luminous objects composing a distributed planetary sign each night.

These objects are not illustrations added after the articles. They put hypotheses to the test. A

protocol must work with people, machines, errors, delays, refusals and asymmetries of power. Contact then becomes a practice: drawing, listening, synchronising, waiting and documenting.



PLANETARY GLYPH. Realistic projection of the peer-to-peer touchscreen prototype used to draw a graph for a collective light score. A.L.I design image, 2026.

Why Continue?

After one hundred articles, A.L.I has not found an extraterrestrial language. That was never its aim. The project has built a space where knowledge and imaginaries that rarely meet can work together. It has shown that a message is always more than content: it is a medium, a duration, an energy, an assumed recipient, a verification method and a politics of relation.

I want to continue this laboratory by giving more room to experiments, collaborations, objects and testable protocols. It must also keep correcting the human blind spots of the project: our anthropocentrism, sensory categories, narratives of conquest and desire for an immediate answer.

The hundredth article is therefore not a final assessment. It is a threshold. A.L.I remains an attempt to make readable what might circulate between two worlds, while accepting that the most important contact may already be taking place among our disciplines, species, machines and ways of thinking.

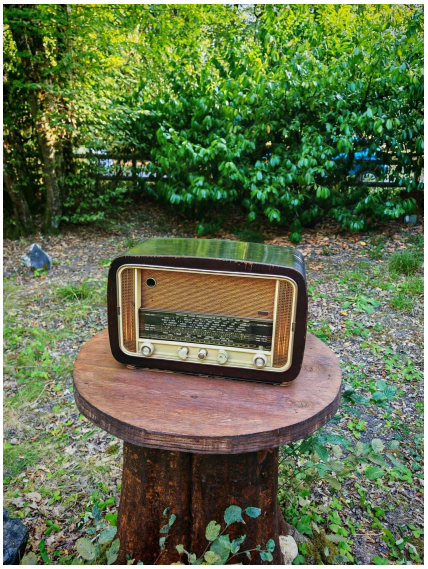
> I am not trying to write the message meant for the unknown. I am trying to build the conditions in which we might recognise that a message has arrived.

Landmarks

- David Guez — official website (guez.org/ali/2).
- A.L.I — Alien Language Interface (guez.org/ali/896).
- A.L.I — Opus 1 (guez.org/ali/893).
- Ghostbook Reader (guez.org/ali/894).
- PLANETARY GLYPH (guez.org/ali/895).

2 - A.L.I at Galerie Plateforme: L’APPARTEMENT and GUDEMON

Keywords: A.L.I, Galerie Plateforme, L’APPARTEMENT, GUDEMON, radio, radio fiction, Orson Welles, exhibition, sound installation, Opus 1, Paris, David Guez



The GUDEMON radio. A familiar object becomes the possible receiver of an impossible event. Photograph: David Guez, 2026.

Summary

From 18 September to 25 October 2026, A.L.I joins L’APPARTEMENT, Galerie Plateforme’s special exhibition in Paris, with the GUDEMON radio fiction and the A.L.I Opus 1 book.

Text

From 18 September to 25 October 2026, A.L.I — Alien Language Interface will be presented at Galerie Plateforme (guez.org/ali/1115) in Paris as part of the exceptional group exhibition L’APPARTEMENT. The opening will take place on Friday 18 September, from 6 to 10 p.m., at 73 rue des Haies, 75020 Paris.

An apartment as an encounter space

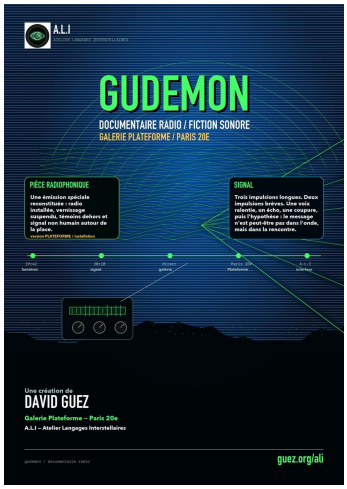
For its final project after seventeen years of uninterrupted activity, Plateforme presents the third version of L’APPARTEMENT. The installation-performance turns the white cube into a living space, somewhere between a cabinet of curiosities, a furnished interior and a place of hospitality. The works do not merely hang on walls: they coexist, respond to one another and welcome visitors into a changing environment.

This situation directly meets the concerns of A.L.I. An apartment is already an architecture of signs: objects, sounds, books, habits and presences compose a language. Within the exhibition, they become fragments addressed to a human visitor — or, hypothetically, to an intelligence that shares neither our customs nor our codes.

GUDEMON: a radio facing the unknown

I will present GUDEMON, an old radio broadcasting an audio documentary fiction inspired by Orson Welles's famous 1938 radio adaptation of The War of the Worlds. The story is relocated to the surroundings of Galerie Plateforme: studio voices, witness accounts, interference, scientific commentary and a gradual shift towards the hypothesis of a landing.

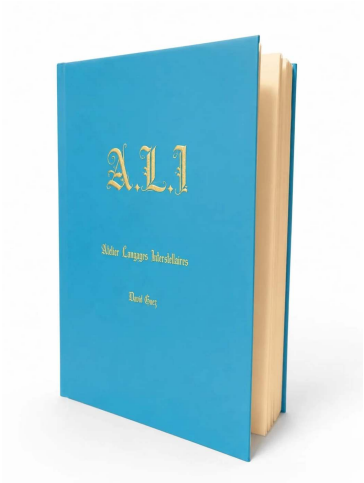
GUDEMON does not seek to reproduce a historical hoax. It uses radio as a machine for producing trust: a credible voice, the rhythm of breaking news and a handful of sounds are enough to unsettle the boundary between document, fiction and collective experience. For A.L.I, this ambiguity becomes a question of language: at what point does a signal become a message?



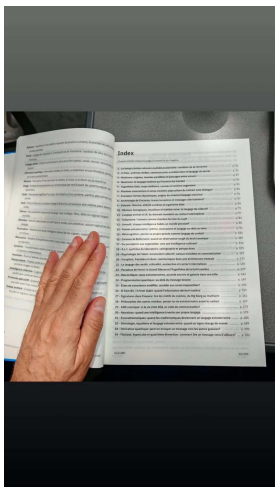
GUDEMON — Galerie Plateforme version. Radio fiction and A.L.I installation.

A.L.I Opus 1 available to browse

Beside the radio, visitors will be able to browse A.L.I Opus 1. This book of more than six hundred pages gathers around one hundred LABO articles on interstellar languages, signals, SETI and METI, non-human intelligence, philosophy, anthropology, literature, film, sound art and speculative protocols.



A.L.I — Opus 1, a hardcover volume bringing together more than six hundred pages of research and projects.



The A.L.I book can be browsed as a constellation of hypotheses, images and protocols.

Watch and listen to the Reel

Reel text and subtitles

A.L.I is coming to Galerie Plateforme in Paris. From 18 September, the opening day, to 25 October 2026, discover the exceptional group exhibition L'APPARTEMENT.I will present elements from Alien Language Interface, A.L.I, including GUDEMON: a radio broadcasting an audio documentary inspired by Orson Welles's historic programme, about the probable landing of a flying saucer near the gallery.Beside the radio, visitors will be able to browse A.L.I Opus 1: more than six hundred pages containing around one hundred articles published at guez.org/ali (guez.org/ali/896).Join us on 18 September at 73 rue des Haies, 75020 Paris. Information and programme: guez.org/ali (guez.org/ali/896) and plateforme-paris.com (guez.org/ali/1115).

Practical information

- Opening: Friday 18 September 2026, 6–10 p.m.
- Exhibition: 18 September–25 October 2026.
- Opening hours: Wednesday to Sunday, 3–7 p.m.
- Address: Galerie Plateforme, 73 rue des Haies, 75020 Paris, France.
- Links: official exhibition page (guez.org/ali/1116) · A.L.I (guez.org/ali/896).

References

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3 - From Metempsychosis to the Close Encounter of the Fourth Kind

Keywords: metempsychosis, abduction, ufology, psychology, dissociation, sleep paralysis, memory, possession, mind fusion, contact

Henry Fuseli, The Nightmare, 1781. Long before modern abduction narratives, the painting establishes the grammar of sleep paralysis: immobility, weight on the chest and a presence in the room. Public domain, Wikimedia Commons (guez.org/ali/1094).

Summary

What if contact with another intelligence meant no longer knowing where one's own mind ended?

Text

What if meeting another intelligence meant no longer knowing where one's own mind ended? Metempsychosis — the passage of a soul, consciousness or life-principle into another body — offers an ancient grammar for imagining contact. Ufology adds white rooms, missing time, examined bodies and fractured memories. Between them lies an open zone: contact occurring first in psychology.

This article brings together studies of memory, dissociation and sleep paralysis, then places them alongside accounts of past lives, possession and abduction. Documented psychological mechanisms do not necessarily explain every account, but they show how a body can host a presence experienced as foreign. The ufological hypothesis goes further: perhaps a non-human intelligence would not need to cross our atmosphere to meet us. It could cross our model of the self.

1. Metempsychosis: changing bodies without dying

In Pythagoreanism and Platonism (guez.org/ali/1095), metempsychosis means the transmigration of the soul. In Plato, identity can survive one body and enter another. Hindu, Buddhist and Jain doctrines of rebirth are not identical, but share a dizzying question: what is transmitted when a person changes their support?

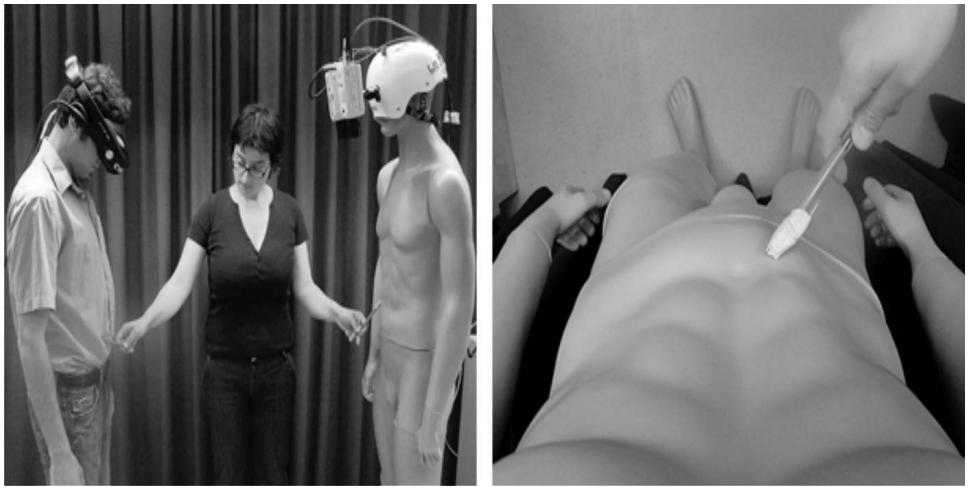
The contemporary version shifts this question. It is no longer a soul waiting for death to migrate, but a consciousness overlapping with another: two biographies in one brain, two intentions in one gesture, or a body becoming the interface of an absent mind.

2. Doubles, presences and shared bodies

Extreme cases appear in religious and clinical archives: possession, ecstasy, multiple identities, out-of-body experiences and the feeling of being watched by an invisible double. Dissociation (guez.org/ali/1097) describes breaks in the integration of memory, identity, perception or control of actions. It proves no external presence, but makes a very concrete experience of inner coexistence conceivable.

The brain can also produce a presence in space. Stimulation of temporoparietal regions has elicited impressions of a double or invisible agent. In sleep paralysis (guez.org/ali/1111), a person is awake but unable to move; visual hallucinations, chest pressure and an intruder at the bedside are common. Folklore calls it a demon, djinn, witch or visitor. Ufology sometimes calls it an abducter.

Laboratory body-swap illusions reveal how mobile this border is. In If I Were You (guez.org/ali/1099), first-person perspective and synchronous touch can make a mannequin's or another person's body feel like one's own. If an unknown intelligence mastered this plasticity, metempsychosis could become a perceptual technology.



The actual If I Were You experiment: synchronised vision and touch can displace bodily ownership. Petkova and Ehrsson, PLOS ONE, 2008, CC BY.

3. The extreme case: abduction as inverted metempsychosis

In abduction accounts, the body is carried away, immobilised, examined and sometimes hybridised. Yet the most radical event could be invisible: a change in memory, personality or the feeling of inhabiting one's own body. Clancy and McNally (guez.org/ali/1100) studied memory distortion in people reporting alien abduction. Their results connect these accounts with susceptibility to false memories; other work links them with suggestibility, PTSD and dissociation.

For ufological speculation, this vulnerability becomes a possible passage. Could a very advanced civilisation communicate by installing not an object, but a second narrative trajectory in the brain? The person would not be possessed in the religious sense. They would become the site of a coexistence: childhood, dreams and sensations serving as material for a

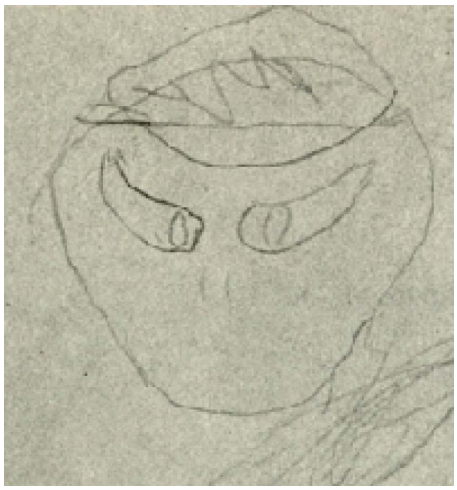
foreign consciousness.

4. Cases at the edge of reality

Betty and Barney Hill: the recovered narrative

In 1961, Betty and Barney Hill reported an interrupted journey, missing time and later memories of an examination aboard a craft. Part of the story took shape under hypnosis and became the narrative template for modern abduction: paralysis, bodily examination, telepathic communication, amnesia and fragmentary return. What if incomplete memory were not a defect in contact, but its form?

Betty and Barney Hill with their dog Delsey. Their 1961 account became a cultural matrix for modern abduction. Archival image reproduced for documentary analysis; source and notice (guez.org/ali/1101).



Drawing attributed to Barney Hill after hypnosis, dated 1962. It shows how a mental image gradually became a central document in the case. Documentary reproduction; source and notice (guez.org/ali/1102).

Pascagoula: two minds under surveillance

In 1973, Charles Hickson and Calvin Parker claimed they were taken by entities near the Pascagoula River. Police secretly recorded them after questioning; believing themselves alone, both men continued to express fear. This does not establish an extraterrestrial cause, but their terror becomes an independent fact: something passed through their psychology, whatever its origin.

Calvin Parker, one of the Pascagoula witnesses, photographed decades later. Photo Philip Mantle, Wikimedia Commons (guez.org/ali/1103), CC BY-SA 4.0.

Betty Andreasson: fourteen sessions to recover another story

Betty Andreasson Luca claimed that in January 1967, in her Massachusetts home, small beings passed through a closed door, suspended her family in immobility and took her elsewhere. The account combines bodily examination, telepathic communication, out-of-body travel, symbolic visions and Christian motifs. It resembles an initiation as much as a journey.

A decade later, a team led by Raymond E. Fowler conducted an extended investigation, including interviews, tests and fourteen hypnotic-regression sessions. Fowler published The Andreasson Affair in 1979 and several sequels. Under hypnosis, Andreasson described beings entering like ghosts, rooms, transformations of matter and episodes in which identity seemed to detach from the body.

The repeated sessions weaken the evidential value of the narrative: each return can elaborate the previous one, and vivid memory is not necessarily accurate memory. Yet this is why the affair sits at the centre of our hypothesis. The witness becomes the involuntary author of a coherent interior world. If an intelligence wanted to merge with a human, might it choose precisely this zone where imagination, belief, memory and bodily sensation cannot be separated?

Betty Andreasson Luca with Bob Luca. Her testimony, expanded through repeated hypnotic regressions, became

the subject of several books by Raymond E. Fowler. Documentary photograph reproduced from How & Whys (guez.org/ali/1104).

Historical image of hypnotism through animal magnetism, Wellcome Collection. Hypnosis is not a camera pointed at the past; it is also a stage on which narrative acquires a body. Public domain.

5. From the third to the fourth kind

In J. Allen Hynek's classification, a close encounter of the third kind (guez.org/ali/1106) involves observing occupants or entities. The fourth category, later added in ufological culture and associated with Jacques Vallée, concerns abduction or a profound transformation of one's relation to reality. The third kind shows another being. The fourth brings that being into the biography.

One can imagine a psychological scale: first a light, then a silhouette, then a body beside an object, finally an intrusion leaving no trace except a new mental architecture. At this last degree, the encounter no longer happens somewhere. It happens inside the pronoun I.

6. Two minds, one narrative

The strangest speculation would be an incomplete fusion. Two consciousnesses would not fully merge; they would answer one another through dreams, intuitions, automatic gestures and memories seeming to belong to someone else. None of these cases proves mental exchange. They form, however, a phenomenology of the border.

Past-life memories studied by Ian Stevenson, possession experiences analysed by anthropology and abduction testimonies create a shared theatre: a body becomes the support for a story that exceeds it. The A.L.I question is not only "is it true?" It is also: what independent information would distinguish an encounter from an interior fabrication?

7. Literature, cinema and art

Julien Green's 1947 novel If I Were You (guez.org/ali/1114) is the essential literary double of this hypothesis. Fabien Especel, exhausted by being himself, receives from the mysterious Brittomart the power to enter other people's bodies. He seeks freedom but discovers that changing bodies does not release him from identity. Brittomart resembles a technological alien capable of opening a door in the feeling of being oneself.

Julien Green photographed by Carl Van Vechten. In If I Were You, changing bodies becomes a moral and metaphysical vertigo. Library of Congress, public domain, Wikimedia Commons (guez.org/ali/1108).

Maupassant's The Horla turns an invisible presence into a progressive occupation of the will. Dostoevsky's The Double, Jack Finney's The Body Snatchers and Philip K. Dick's unstable realities each ask who inhabits perception when the self becomes transmissible.

In cinema, Bergman's Persona draws two faces toward fusion; Being John Malkovich makes a brain into a visitable room; Zulawski's Possession turns psychic rupture into an organic double; Under the Skin gives a human body to a non-human gaze; and Get Out traps consciousness inside its own body. Fuseli, Claude Cahun, Tony Oursler and Pierre Huyghe similarly make bodies, projected voices and non-human systems into unstable sites of agency.

Claude Cahun, Self-Portrait, circa 1927. The mirror produces two simultaneous identities without revealing which is the original. Musée d'arts de Nantes, artwork record (guez.org/ali/1109).

Spirit photograph associated with Scottish medium David Duguid. Such double exposures and historical manipulations already materialised the desire to bring another presence into the image. Public domain, Wikimedia Commons (guez.org/ali/1110).

8. The impossible protocol

To make this zone testable, several isolated witnesses could record their dreams before communicating, while investigators look for precise details appearing simultaneously and verify information unknown to all of them. A real fusion should produce more than a shared emotion: a rare, dated and reproducible datum inaccessible through ordinary channels.

But the most unsettling hypothesis resists this protocol. If the entity modifies precisely the memory that should serve as evidence, the absence of a trace becomes its best camouflage. Abduction would then be a close encounter of the fourth kind not because a body was transported, but because the border between memory, dream and event was made uninhabitable.

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4 - Cyrano on the Moon: When Humans Become the Aliens’ Animals

Keywords: Cyrano de Bergerac, Moon, literature, poetry, first contact, language, alterity, anthropocentrism, science fiction, Ted Chiang, China Miéville, Christian Bök, Tracy K. Smith, Octavia Butler, A.L.I

Savinien de Cyrano de Bergerac, portrait attributed to Zacharie Heince and engraved by Antoine de Balthasar Moncornet. Public-domain historical image, Wikimedia Commons (guez.org/ali/7).

Summary

Two centuries before Wells, Cyrano sent an Earthman to the Moon, where he was treated as an animal and forced to prove that he could think. From libertine satire to poems encoded in DNA, a literary history of contact as a reversal of the human.

Text

Two centuries before Wells, Savinien de Cyrano de Bergerac sent an Earthman to the Moon, where he was taken for an animal, exhibited, and forced to prove that he could think. His narrative does not yet describe the extraterrestrial in the modern biological sense. It constructs something more useful for A.L.I: a world from which humans lose the privilege of defining intelligence.

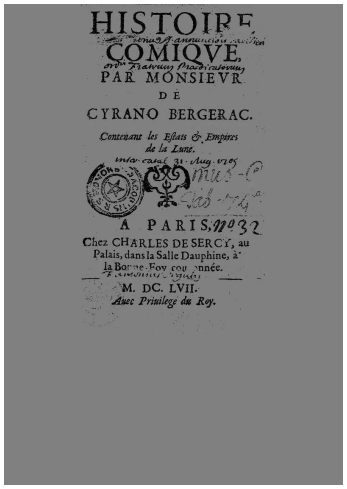
The Real Cyrano, Before the Character

The Cyrano at stake here is not Edmond Rostand's romantic hero of 1897. Savinien de Cyrano de Bergerac, born in 1619, was a seventeenth-century libertine writer. His two imaginary voyages appeared after his death: The States and Empires of the Moon in 1657 and The States and Empires of the Sun in 1662.

These works do more than move an adventure into the sky. They test laws, religions, species hierarchies, language and criteria of truth. The Bibliothèque nationale de France (guez.org/ali/897) places Cyrano among the major precursors of imaginative literature leading toward science fiction.

One Sentence Is Enough to Displace Earth

The voyage begins with a vertiginous proposition: the Moon is a world like ours, and our world serves as its moon. Earth immediately ceases to be the centre. Before any creature appears, contact has begun through a change of viewpoint. The first edition is preserved by Gallica (guez.org/ali/10).


HISTOIRE
COMIQVE,
PAR MONSIEVR
DE
CYRANO BERGERAC.
Contenant les Estats & Empires de la Lune.
A PARIS,
Chez CHARLES DE SERCY, au Palais, dans la Salle Dauphine, à la Bonne Foy couronnée.
M. DC. LVII.
Auec Priuilege du Roy.

First edition of L'Autre Monde ou les États et Empires de la Lune, Paris, 1657. Digitised by Gallica, Bibliothèque nationale de France (guez.org/ali/10).

Before Cyrano: Learning to Leave the World

Cyrano belongs to an older genealogy. Lucian of Samosata had imagined a satirical voyage to the Moon. Johannes Kepler made his Somnium, published in 1634, a change of astronomical perspective. In 1638 Francis Godwin published The Man in the Moone, whose traveller reaches the Moon with migrating birds.

Cyrano multiplies techniques in turn: bottles of dew drawn upward by the Sun, mechanical devices, rockets and failed attempts. Literary invention becomes a laboratory in which uncertain science can be tested.

Frontispiece to the first edition of Francis Godwin's The Man in the Moone, 1638. Public domain, Wikimedia Commons (guez.org/ali/12).

On the Moon, the Human Becomes an Animal

The traveller discovers a society of large four-legged beings. Because he walks on two legs, wears clothes and produces incomprehensible sounds, he is classified as an animal. He is confined, examined and exhibited. His speech first resembles learned noise; even his reasoning may be interpreted as imitation.

Cyrano formulates a central A.L.I problem: being intelligent is not enough to be recognised as intelligent. The other must identify our signs as intentional. A complex message can remain indistinguishable from a cry, a natural event or an automatism. This inversion connects directly to Animal Language, Human Language and the Interstellar Turing Test.

Languages Made of Music and Bodies

The Moon's inhabitants do not all share the same language. Elites communicate through variations of tone resembling music. Common people use movements of the body: a posture or articulated limb can carry an utterance. Cyrano imagines several cognitive media. Pitch, rhythm and intervals produce meaning in one; the whole body becomes grammar in the other.

The narrative also describes books that are heard rather than read. Their mechanism restores the voice and makes a portable sound library possible. Long before the phonograph, audiobook and podcast, Cyrano was already asking whether a book is a printed object or a structure transferable between media.

The Trial of the Human Species

In The States and Empires of the Sun, birds judge humankind for its violence toward other species. Humanity is no longer the judge of life: it must answer before it. Animal speech connects species domination, political power and the human claim to occupy the summit of creation.

An interstellar civilisation might perform the same reversal. It might ask not only what we can build, but how we treat beings unable to speak our language. Our farms, laboratories, nature reserves and automated systems could prove more revealing than messages carefully prepared for its attention.

A Message Altered by Its Own Transmission

Both narratives were published after Cyrano's death. Surviving manuscripts and early editions differ, and the 1657 text was altered and expurgated. What reaches us is already a message crossed by copyists, editors and political or religious constraints.

This material history resembles a problem of interstellar communication: an old signal may be incomplete, censored, damaged or recomposed. Understanding its content also requires reconstructing what happened during transmission.

From Mirror World to Modern Extraterrestrial

After Cyrano, each period reorganises the encounter. Fontenelle makes the plurality of worlds accessible through conversation. Voltaire uses differences of scale in Micromégas to ridicule human self-importance. Jules Verne turns lunar travel into an engineering problem.

With The War of the Worlds, H. G. Wells reverses colonial power: Europe becomes the territory invaded by superior technology. In the twentieth century Stanislaw Lem crosses another threshold with Solaris. Encountered intelligence is no longer necessarily an individual with a body and a language, but may be a planetary entity whose manifestations remain ambiguous after years of observation.

Henrique Alvim Corrêa, poster for an illustrated edition of The War of the Worlds, circa 1906. Public domain, Wikimedia Commons (guez.org/ali/16).

Contemporary Poetries and Literatures of Contact

Recent literature moves the problem again. In Ted Chiang's Story of Your Life (guez.org/ali/828), learning the heptapods' non-linear writing transforms the perception of time. In China Miéville's Embassytown (guez.org/ali/898), an alien language requires two perfectly synchronised voices and initially resists lies and metaphor. A human woman literally becomes a living figure of speech.

With Christian Bök's The Xenotext (guez.org/ali/899), poetry leaves paper: a poem is encoded in a bacterium's DNA, and the resulting protein encodes a second text in response. Life becomes author, reader, archive and transmission channel. The project is conceived to outlast civilisation and potentially communicate our presence to distant intelligence.

Tracy K. Smith's Life on Mars (guez.org/ali/20) turns the cosmos into an echo chamber for grief, love and the desire not to be alone. Octavia E. Butler's Xenogenesis (guez.org/ali/21) trilogy makes contact a genetic hybridisation in which consent, survival and the possible end of autonomous humanity cannot be separated.

Two further works move contact beyond the classic extraterrestrial. Alain Damasio's Les Furtifs (guez.org/ali/22) invents beings of flesh and sound that metabolise their environment and demand a typographic, physiological language. Ursula K. Le Guin's Always Coming Home (guez.org/ali/23) transmits a future civilisation through fictional ethnography made of narratives, songs, poems, drawings and sound archives. These works extend Cyrano in three directions: alternative language, transformative language, then living language.

The Four Operations of Literary Contact

Projection. We imagine the other through our technologies, fears and social structures.

Classification. Each civilisation places the unknown in its own categories: animal, god,

machine, natural event or enemy.

Translation. Interlocutors search for regularities in sounds, gestures, numbers, images or behaviour.

Judgement. The encounter evaluates not only the other's intelligence, but also its way of inhabiting its world.

Contact fails when one operation is mistaken for proof. Classification is not understanding. Translating a sign does not reveal its intention. Detecting technology is not meeting the civilisation that produced it.

A.L.I LAB: The Lunar Translator

An experiment called The Lunar Translator could encode one proposition through three Cyrano-inspired channels: a musical composition of intervals and repetitions; a gestural sequence performed by a real or synthetic body; and a luminous diagram in which durations, positions and intensities form a syntax.

Three groups would receive one unexplained channel. They would identify units, repetitions, relations and possible intention. A second phase would superimpose all three versions to measure what redundancy makes intelligible. The experiment would not claim to make a universal language. It would show how recognition depends on body, medium, context and the observer's expectations.

No Longer Controlling the Definition of the Human

Cyrano turns extraterrestrial encounter into a critical machine. The Moon and Sun do not describe scientifically plausible civilisations. They let us look back at Earth from a position where its certainties no longer work.

This may be one of literature's essential roles within A.L.I. Before translating an interstellar language, it trains us to endure a harder situation: no longer being the only ones who decide what counts as intelligence, speech, animal or person.

> First contact does not begin when we understand the Other. It begins when we discover that we no longer control the definition of the human.

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- Tracy K. Smith — Life on Mars (guez.org/ali/20).
- Octavia E. Butler — Xenogenesis / Lilith's Brood (guez.org/ali/21).

5 - What If Earth Blinked to Call Extraterrestrials?

Keywords: Land Art, Robert Smithson, Spiral Jetty, Michael Heizer, Double Negative, Nazca, crop circles, planetary art, technosignature, artificial light, Black Marble, SETI, METI, contact protocol, PLANETARY GLYPH, A.L.I

PLANETARY GLYPH, an A.L.I hypothesis. Photorealistic projection of a planetary light artwork: voluntary, non-critical lights compose a sequence visible from orbit. This image is an artistic simulation generated for the LAB; it does not document a real event.

Summary

From Spiral Jetty to Earth's night lights: PLANETARY GLYPH imagines global Land Art in which voluntary devices compose a signal visible from orbit, then fall silent to listen.

Text

What if the next work of Land Art were drawn not in a desert, but across the entire planet? On a chosen night, millions of lamps, screens, facades and voluntary luminous devices synchronise. They do not draw a fixed picture. They produce a distributed pulse, a sequence of forms and silences regular enough to signal that intention inhabits Earth.

The project would begin with Land Art, Spiral Jetty and Double Negative, pass through the Nazca geoglyphs and crop circles, then shift scale once more. The landscape would no longer support the work: the planet would become material, transmitter and message at once.

1. Taking art out of the museum, then taking the sign beyond the horizon

In the late 1960s, Land Art moved the artwork outside the gallery. Soil, rocks, erosion, climate and distance became materials. The work was no longer an autonomous object: it depended on a place, a duration, a journey and a point of view.

This shift created a paradox. Earthworks are rooted in a site, yet many viewers encounter

them through an aerial photograph, map or film. The real work and its circulating image no longer coincide. Robert Smithson's tension between site and nonsite is central here: matter exists far away while the museum or media reconstructs a partial experience.

Robert Smithson's Spiral Jetty, 1970, Great Salt Lake, Utah. The work is roughly 1,500 feet long and uses over 6,000 tons of black basalt and earth. Its appearance changes with lake level, salt and microorganisms. Real photograph: Soren Harward, public domain, Wikimedia Commons (guez.org/ali/27).

2. Spiral Jetty: a form surrendered to entropy

Built at Rozel Point in April 1970, Spiral Jetty extends about 1,500 feet into Great Salt Lake. Smithson did not isolate a sculpture from its environment. Water covers and reveals it; salt crystals whiten the rocks; algae sometimes colour the lake. The work includes its own transformation.

The Dia Art Foundation (guez.org/ali/37), its steward, describes a structure made from more than six thousand tons of local basalt and earth. Smithson's writings on entropy add a decisive dimension: a monument need not resist time; it can make time's irreversibility visible.

From the shore, the spiral is a path. From above, it becomes a sign. This difference already raises an interstellar question: for which observer is a form designed?

3. Heizer: sculpting with what is missing

With Double Negative, made in 1969 on Mormon Mesa, Michael Heizer deposited almost nothing. He removed. Two trenches face each other across a canyon: approximately 1,500 feet in total span, 50 feet deep and 30 feet wide, displacing 240,000 tons of rock according to the Museum of Contemporary Art, Los Angeles (guez.org/ali/29).

Michael Heizer's Double Negative, 1969, Nevada. The work is constituted by the void connecting two excavations separated by the canyon. Real photograph: Retis, Wikimedia Commons (guez.org/ali/30), CC BY 2.0.

The “double negative” is material and logical: two absences produce a presence. The landscape is no longer a background for a form; it is cut to reveal a relation. At the scale of contact, this principle could become language: not only emission, but organised intervals, occultations and silences.

This negative economy already corrects the fantasy of an ever more powerful signal. An advanced civilisation might recognise not extravagant energy expenditure, but an unlikely, repeated, economical and verifiable modulation.

4. Nazca: an immense sign is not necessarily a message to the sky

The Lines and Geoglyphs of Nazca and Palpa cover roughly 450 square kilometres in Peru. Between 500 BCE and 500 CE, pre-Hispanic societies removed dark surface stones to expose lighter ground. Animals, plants, imaginary figures, lines, trapezoids and spirals compose a cultural and ritual landscape.

Their scale encouraged the modern claim that they were meant for aerial or even extraterrestrial observers. No evidence establishes this. UNESCO (guez.org/ali/636) describes them as exceptional testimony to Andean symbolic, social and religious traditions. Current interpretations also consider some lines as ceremonial pathways: the figure may have been experienced by walking, not only viewed from above.

The anthropomorphic geoglyph nicknamed “the Astronaut”, photographed from the air at Nazca. Its modern nickname is not an archaeological interpretation. Real photograph: Diego Delso, Wikimedia Commons (guez.org/ali/32), CC BY-SA 4.0.

Nazca therefore gives A.L.I an essential lesson: monumental scale does not identify the recipient. An outsider can mistake a rite for a beacon, a path for an alphabet or a trace of use for a map. The archaeology of the unknown begins with this caution.

5. Crop circles: when the sign absorbs its own story

Crop circles shift the problem again. They are rapidly executed, seasonal, photographed from the air and immediately interpreted by media. Their effect depends less on mysterious origin than on organised ambiguity: evidence, hoax, performance, technological folklore and desire for contact overlap.

The A.L.I article on crop circles as language, myth and ground message already showed that the device creates an audience as much as a form. The sign calls forth investigators, believers, sceptics and authors. For interstellar Land Art, human reception would therefore be part of the work.

6. Earth at night is already a technosignature

Every night, satellites record a specifically human signal: artificial illumination. NASA's calibrated Black Marble (guez.org/ali/900) products use it to study urbanisation, energy, disasters, fishing and population displacement.

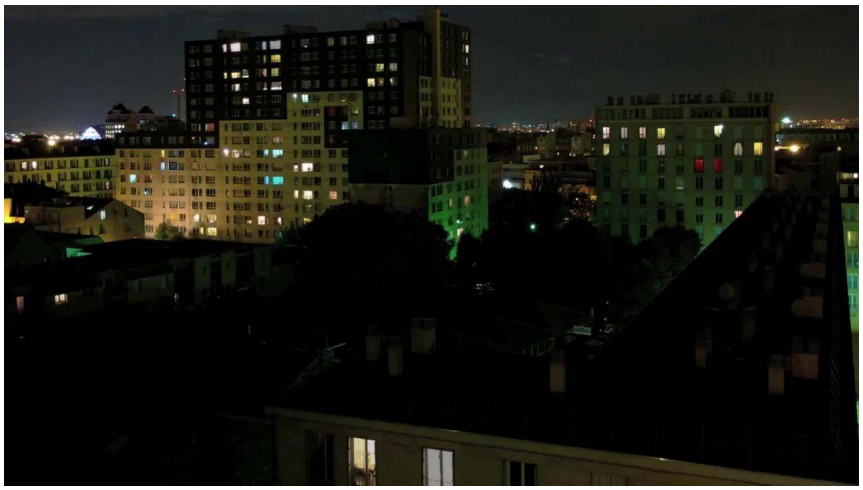
Earth at night in 2016, composed from the VIIRS sensor aboard the Suomi NPP satellite. Each pixel represents roughly 0.46 miles. Real scientific image: NASA Goddard Space Flight Center / Miguel Román / Joshua Stevens, Black Marble 2016 (guez.org/ali/34).

Such light is a possible technosignature, but orbital imagery must be distinguished from interstellar detection. From another star, no telescope would read a spiral formed by our cities as if looking at a photograph. The planet would be nearly point-like and overwhelmed by its star. Research on exoplanet city lights (guez.org/ali/901) instead considers total brightness, artificial spectra or periodic variation from the nightside. Scenarios for Proxima b require urbanisation levels and future instruments well beyond present observations.

The project must therefore accept two different images: a pattern for humans and nearby satellites, then a temporal modulation aimed at deep space.

Antoine Schmitt: City Lights Orchestra, a connected precedent

This hypothesis has a direct artistic precedent. In Antoine Schmitt's City Lights Orchestra (guez.org/ali/36), presented in Cape Town in 2012 and Saint-Denis in 2013, every Internet-connected computer illuminates a window and plays its own pulse while all windows remain in rhythm; smartphones can join the score. The city becomes orchestra, performer and audience at once. The work is urban and is not intended to contact extraterrestrials, yet it demonstrates how a network can turn private screens into a collective light signal in public space. PLANETARY GLYPH extends that intuition to regional and planetary scales, adding geography, consent, ecological limits and a listening protocol.



Antoine Schmitt, City Lights Orchestra. Each connected window interprets a distinct light score synchronised with the whole. Real image taken from the documentation video published by the artist (guez.org/ali/36), © Antoine Schmitt.

7. PLANETARY GLYPH: distributed Land Art

PLANETARY GLYPH would be a temporary global installation. It would not actually hack connected devices. Unauthorised access would be dangerous, illegal and conceptually incompatible with an artwork claiming to speak for a planet. The “hack” would be artistic: voluntarily diverting ordinary luminous infrastructure for a few minutes.

An open application and protocol would allow people, cities, museums, buildings, stages, decorative beacons, screens and domestic devices to enrol. Critical systems would be excluded: road signals, hospitals, aviation, maritime navigation, emergency services, security and medical equipment. Every participant would retain an immediate stop control.

Earth's night cannot illuminate everywhere at once because half the globe faces the Sun. The work would travel with the terminator, the moving boundary between day and night. Its motif would not be a simultaneous map but a twenty-four-hour planetary score, replayed as night crosses time zones.

8. An installation at three distances

From the ground, each participant would see a slow local pulse without rapid flicker: three rises in brightness, silence, five, silence, seven. The prime-number sequence would mark non-accidental organisation.

From orbit, Earth-observation satellites would reconstruct contributions as a map.

Participating regions would successively draw a spiral, paired voids inspired by Heizer, and a temporal grid. The orbital image would become the work's document, as aerial photography documents earthworks.

From another star, only global variation could in theory be sought: regular alternation in brightness, repetition at prime intervals and a chosen spectral signature. The project would almost certainly remain undetectable at reasonable energy levels. That limit is not failure; it exposes the real distance between a spectacular image and an astrophysical signal.

9. Exchange protocol: transmit, then know how to be silent

- Consent. Explicit enrolment, local governance, public code and mapping without personal data.
- Calibration. A minimal light level compatible with nocturnal wildlife, sleep and visual accessibility.
- Baseline. Several minutes without intervention to record ordinary luminosity.
- Announcement. A slow prime-number sequence repeated in several permitted wavelengths.
- Pattern. Progressive transformation of the orbital map: spiral, interval, grid, disappearance.
- Silence. Voluntary dimming during a radio, optical and infrared listening window.
- Response. No immediate interpretation. Any candidate event must repeat, be localised and be tested against human, meteorological and astronomical causes.
- Open archive. Data, errors and non-response are published. The negative matters as much as the signal.

This protocol extends the new Arecibo message and the contemporary Pioneer plaque hypothesis: a message is not just content, but a verification device, a temporality and an ethics of the recipient.

10. Who has the right to make a planet speak?

The hardest problem is not technical. Who chooses the motif? Who represents Earth? A global artwork could reproduce infrastructure inequality: highly electrified regions would speak louder while deliberately dark territories disappeared.

PLANETARY GLYPH should reverse that bias. Participation would not be proportional to the number of bulbs. Each territory would have equal symbolic weight. Nonparticipating areas would be recognised as active silences, not absences. Total energy would be capped below ordinary consumption through dimming and timing shifts rather than extra light.

Historical Land Art sometimes treated landscapes as empty even when they were inhabited, crossed or politically situated. A planetary version can no longer ignore territorial rights, light pollution, migrating birds, insects and nocturnal rhythms. Speaking to the stars must not make Earth less habitable.

11. A rehearsal for contact

PLANETARY GLYPH would be unlikely to reach a distant civilisation. Its first recipient would be ourselves. Producing a few minutes of luminous coherence would require coordinating millions of decisions without a single centre, accepting refusal, sharing a clock, limiting energy and agreeing on syntax.

The work would measure less our power than our ability to compose. Smithson inscribed entropy in the lake; Heizer made absence into sculpture; Nazca bound forms, pathways and territory; crop circles turned fields into media. Interstellar Land Art would add another

material: the voluntary synchronisation of a planet aware that it does not speak with one voice.

The first credible sign addressed to the stars may not be a brighter light, but proof that we can switch it on together, then stop and listen.

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6 - What If Aliens Hide Because We Are Dangerous?

Keywords: cargo cults, Melanesia, John Frum, Yali, anthropology, technology, black box, asymmetry, zoo hypothesis, Fermi paradox, reverse engineering, non-interference, peoples in voluntary isolation, contact protocol, A.L.I

Real supply unloading at Guadalcanal, around 1942. For Pacific populations, the war suddenly made immense material flows visible while their factories, command centres and logistical chains remained out of sight. Archival photograph: U.S. Navy / National Archives, public domain, Wikimedia Commons (guez.org/ali/41).

Summary

From Pacific cargo cults to cosmic quarantine: how do we reconstruct the meaning of incomprehensible technology, and why might an advanced civilisation refuse to share it with us?

Text

A man speaks into a box. A few hours later, an aircraft descends from the sky and unloads crates, medicine, clothing and machines. Other men draw lines on the ground, raise flags and repeat precise gestures. The aircraft return.

For someone who cannot see the factories, ports or command centres connecting several continents, the most reasonable explanation begins with what is visible: gestures, objects, sounds and their sequence. The radio seems to summon the aircraft. The runway seems to bring the goods. The uniform appears to provide access to an invisible power.

This scene became the popular image of Pacific “cargo cults”. Yet it tells us as much about the Western gaze as it does about what Melanesian people actually thought.

1. Technology falling from the sky

During the Second World War, Japanese and American forces built bases, runways, radio towers, depots and ports across the Pacific. Melanesian populations saw industrial power and material abundance appear on an unprecedented scale within months.

This was not always an absolute first contact. Missionaries, traders and colonial administrations had often been present for decades. The war nevertheless produced a violent acceleration: an industrial civilisation exposed part of its power to societies kept outside its economic and political mechanisms.

After military forces departed, some Melanesian movements incorporated ceremonies, marching, poles, flags or objects recalling what had been observed. The John Frum movement on Tanna Island in Vanuatu became the best-known case. Other movements, including the one associated with Yali in Papua New Guinea, combined religious transformation, resistance to colonial authority and the search for a new social order.

A ceremonial flag raising associated with the John Frum movement on Tanna Island in 2006. This contemporary photograph documents a living movement; it does not prove a naive imitation of technology or a uniform belief in “cargo”. Real photograph: Charmaine Tham, Wikimedia Commons (guez.org/ali/42), CC BY 2.0.

2. “Cargo cult” as a manufactured category

The term “cargo cult” appeared in the colonial press in 1945 before administrators, journalists and anthropologists adopted it. It came to group very different movements under the convenient image of islanders seeking goods through ritual. The Open Encyclopedia of Anthropology (guez.org/ali/43) notes that most anthropologists have since abandoned or strongly criticised the category as misleading and sometimes demeaning.

Anthropologist Lamont Lindstrom argues that talk about “cargo” often reveals Western obsessions as much as Melanesian understandings. By exoticising local practices, colonial authorities could turn demands for autonomy and anti-colonial action into irrational belief. His study of the stories built around cargo cults (guez.org/ali/902) asks whether European cargo was even the central object of desire, and whether these movements were “cults” at all.

Cargo was not simply a collection of desirable objects. It could represent ancestral wealth diverted elsewhere, evidence of a broken moral order, or the promise of emancipation. Peter Worsley situated these movements within a system in which Indigenous labour supported plantations and mines while profits left the territory. Where political expression was suppressed, religious expectation could become a language of protest.

A John Frum ceremonial cross photographed on Tanna in 1967, then the New Hebrides. The movement combines local, Christian, military and political elements that cannot be reduced to waiting for an aircraft. Real photograph: Tim Ross, Wikimedia Commons (guez.org/ali/46), CC BY-SA 3.0.

3. Not imitation, but reconstruction

The most condescending interpretation claims that these populations mistook ritual imitation for the real operation of technology. Their situation instead raises a universal problem: how can causes be reconstructed when only an interface is visible?

For island inhabitants, the global industrial chain remained invisible. They saw an operator speak into a radio, followed by an arriving aircraft. It was reasonable to suppose that the visible gestures, sounds and objects formed an access protocol.

We still behave this way when facing an unknown machine. We operate its controls, observe reactions, repeat successful sequences and gradually build a causal model. This reasoning from clues is a form of abduction: producing the most plausible explanation from partial effects. The boundaries among experiment, learning and ritual are less stable than we imagine.

The true asymmetry is therefore not reason against superstition. It separates those who know the infrastructure from those who receive only its manifestations.

4. We could become the cargo cult

Imagine an interstellar artefact discovered on the Moon, in orbit or at the bottom of an ocean. It produces light after particular manipulations, alters a magnetic field, emits a sequence of numbers or transforms matter placed nearby.

We would repeat the observed sequences. Laboratories would build copies. States would classify the results. Companies would promise to exploit the object. Religious groups would see revelation. Social networks would circulate imaginary instructions.

We might activate a function without understanding its meaning. What we call a message could be an automatic diagnostic. What we call an engine might be a cooling system. A shape reproduced as a sacred symbol might be nothing more than a hinge.

Like readers of an undeciphered script, we would possess signs without a Rosetta Stone. As with the contemporary Pioneer plaque hypothesis, we would reconstruct the recipient imagined by its maker. As with binary steles, material endurance might outlast every

possibility of translation.

The Pioneer 10 plaque mounted on the spacecraft in 1972. For a possible recipient, plaque and vehicle would form a black box: deliberate message, technical structure and accidental traces would arrive together. Photograph: NASA Ames / TRW, public domain, Wikimedia Commons (guez.org/ali/47).

5. Why might an extraterrestrial civilisation hide?

In 1973, radio astronomer John A. Ball proposed the zoo hypothesis (guez.org/ali/48): advanced civilisations might know that we exist and choose not to interfere, allowing humanity to develop independently. The proposal addresses one version of the Fermi paradox, but remains speculative and difficult to falsify.

Non-interference could answer two separate risks.

The first is contact shock. A sufficiently advanced technology might destabilise religious, scientific, political and economic systems. We could turn its makers into gods, enemies or expected suppliers. Contact need not destroy humanity physically to damage its representations and its capacity for independent decision.

The second risk is reverse engineering. A civilisation would not need to regard us as an equal to consider us dangerous. It would be enough for us to extract a new energy source, propulsion system, surveillance method or weapon from one technological fragment.

An object intended to inform could then alter Earth's balance of power irreversibly. Even without understanding its principles, we might reproduce some effects, just as one can learn to operate a control without knowing the whole machine.

6. Informational quarantine

A cautious civilisation might impose an informational quarantine: observe without appearing, transmit only information with little transformative power, conceal dangerous principles, and wait for the observed species to cross particular ethical thresholds.

It might leave ambiguous signals, structured enough to be noticed but insufficient to deliver technology. It might place observers beyond our instrumental reach, or make its machines inert when manipulation is detected. Cosmic silence would no longer mean “nobody is there”, but “nobody wants to give us the means to become more dangerous than we already are”.

The hypothesis has a major weakness. If several independent civilisations exist, why would

all respect the same rule? One dissenter would be enough to make contact visible. The zoo hypothesis is therefore not scientific evidence explaining silence; it is a thought experiment about the ethics and strategy of asymmetric encounter.

7. A progressive contact protocol

This projection intersects with first contact understood as a rite of passage. A responsible encounter might cross several thresholds: make a regularity perceptible, verify that the other recognises it, establish minimal reciprocity, test the ability not to divert the exchange, and only then increase the amount of information.

The recipient must always be able to withdraw. Silence would not be failure, but a right. Technological progress would not be the only criterion: a civilisation might be judged by how it protects vulnerable life, distributes power and limits violence produced by discovery.

The most advanced rule of an interstellar civilisation may not be knowing how to reach another world, but knowing how not to enter it.

8. A.L.I LAB: an atlas of contact asymmetries

The idea of listing populations “untouched by technology” must be reformulated. No human population is untouched by history, technique or knowledge. Peoples described as uncontacted may know that the outside world exists and choose to avoid it after experiences of violence, epidemics or dispossession.

In 2024, the United Nations estimated that around 200 groups live in voluntary isolation and initial contact (guez.org/ali/49), notably in Bolivia, Brazil, Colombia, Ecuador, India, Indonesia, Papua New Guinea, Peru and Venezuela. They are not remnants of the past, but contemporary societies whose autonomy and territories are threatened.

The LAB would publish no precise locations, routes or information that could facilitate intrusion. It would build an Atlas of Contact Asymmetries using only broad institutional data. Its purpose would not be to prepare a real encounter, but to study the conditions that require us not to make contact.

A real aerial view of the Amazon rainforest near Manaus. Protecting peoples in voluntary isolation begins with protecting their territories without seeking to make them visible. Photograph: Neil Palmer / CIAT, Wikimedia Commons (guez.org/ali/50), CC BY-SA 2.0.

The A.L.I protocol would follow seven principles: abstention by default, territorial protection,

no intrusive observation, consent, health security, minimal and reversible information, and a permanent right to silence. Brazilian policy already recognises that evidence of an isolated group creates no obligation to contact it. FUNAI describes this policy of protection and self-determination (guez.org/ali/51). The Inter-American Commission on Human Rights (guez.org/ali/903) similarly connects self-determination to land and resource rights.

9. An experiment that exposes no population

The artistic experiment would involve only informed, consenting participants. Two groups would be separated. The first would control a complex machine; the second would see only its manifestations and could send it very limited responses.

The LAB would observe the emergence of hypotheses, causal errors, narratives and rituals. It would compare abrupt contact with a progressive protocol based on regularity, reciprocity and withdrawal. Every participant could end the experiment, and the debrief would reveal the hidden infrastructure.

A second version would reverse the roles: the technically informed group would have to design a signal that offers neither excessive power nor irreversible instruction. The question would no longer be only “how can we be understood?”, but “how can we be understood without dominating?”

10. The incomprehensible resembles us

Cargo cults do not demonstrate the irrationality of another people. They reveal a condition any of us might face: receiving effects from a world whose causes remain inaccessible.

Extraterrestrial technology would not automatically become understandable because we possess particle accelerators, quantum computers and artificial intelligence. We might perceive only its external theatre. We would then build our conceptual runways, scientific rituals and stories around a silent machine.

> The true intelligence of contact may not consist in knowing how to open the object, but in understanding why its maker chose not to give it to us.

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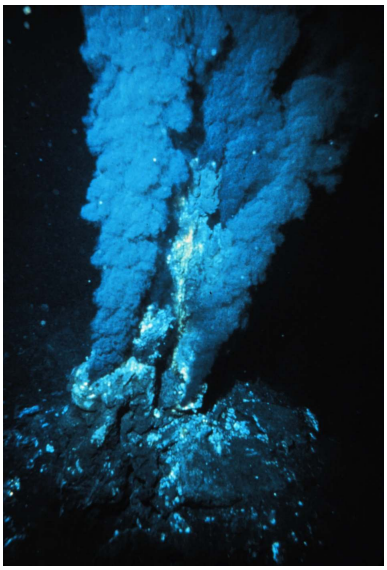
7 - Can Life Survive Anything? How Extremophiles Change the Search for Extraterrestrial Life

Keywords: extremophiles, astrobiology, exobiology, hydrothermal vents, psychrophiles, acidophiles, Lake Whillans, Rio Tinto, Enceladus, biosignatures, synthetic biology, directed panspermia, dark genome, human evolution, A.L.I



A black smoker on a mid-ocean ridge in the Atlantic. Its scorching fluid is not a uniform habitat: life mainly occupies gradients where it meets cold seawater. Real photograph: P. Rona / OAR / NURP / NOAA, public domain, Wikimedia Commons (guez.org/ali/54).

Summary

Hydrothermal vents, ice and acid redraw the measured limits of life. From those facts emerges a hypothesis: a synthetic organism sent into space, and our own evolution into another form of ourselves.

Text

For a long time, the search for life elsewhere treated Earth's surface as its standard: moderate temperature, liquid water, oxygen and sunlight. Extremophiles shifted that boundary. They do not prove that life exists beyond Earth, but experimentally demonstrate that it can persist in environments once considered sterile.

Their lesson is not that “life survives everything.” It is more precise: where a usable solvent, an energy source, accessible chemical elements and sufficient stability remain, organisms may exploit tiny niches invisible from the surface.

1. Extreme for whom?

“Extreme” first describes our own biological position. Water at 20°C is not necessarily welcoming to an archaeon adapted to nearly 100°C. A neutral environment may be hostile to an acidophile.

Extremophiles are not indestructible organisms. They are often specialists adapted to a narrow combination of temperature, pressure, acidity, salinity or energy availability. Some are polyextremophiles, yet no known organism crosses every limit at once. A multidimensional map of life is more useful than a cabinet of records.

2. Hydrothermal vents: life powered by Earth

In 1977, exploration of the Galápagos Rift revealed deep ecosystems clustered around hydrothermal vents. Without sunlight, bacteria and archaea use energy released by reactions involving hydrogen, hydrogen sulphide, methane, iron or sulphur. This chemosynthesis documented by NOAA (guez.org/ali/55) sustains entire animal communities.

Black-smoker fluids may exceed 350°C, but organisms do not simply inhabit those jets. They colonise mixing zones where hydrothermal fluid meets cold seawater. Life occupies a gradient, not a single point.

Under laboratory conditions, the methanogenic archaeon Methanopyrus kandleri proliferated at 122°C and 40 MPa. This is a conditional experimental limit, not a temperature universally tolerated by life. The experiment was reported in PNAS (guez.org/ali/56).

Pyrolobus fumarii, thermophilic archaea isolated from hydrothermal fluids, in an electron micrograph. Real image: Mark Amend, West Coast and Polar Regions Undersea Research Center / NOAA, public domain, Wikimedia Commons (guez.org/ali/57).

The Lost City hydrothermal field offers another model. Water-rock reactions produce hydrogen and methane in an alkaline environment. A dark or frozen surface can no longer be enough to declare a world uninhabitable: subsurface interfaces where water, rock and chemical disequilibria remain active must be investigated.

3. Beneath ice: a slow and dark biosphere

In West Antarctica, Subglacial Lake Whillans lies beneath about 800 metres of ice. Samples collected through a clean hot-water borehole revealed a diverse community of metabolically active bacteria and archaea.

Without light, this ecosystem draws on compounds released from sediment and rock weathering. It demonstrates that an ice sheet can isolate liquid water without severing its energy exchanges. The Nature study of Lake Whillans (guez.org/ali/58) describes a chemosynthetically driven ecosystem.

The actual Lake Whillans drill site in West Antarctica, January 2013. The system crossed nearly 800 metres of ice to collect water and sediment. Photograph: Frank Rack / University of Nebraska-Lincoln, WISSARD / UNL (guez.org/ali/905).

Within ice, salts may preserve microscopic veins of liquid brine. Psychrophiles modify membranes, enzymes and proteins to function in the cold. Metabolism slows dramatically, but slowness is not extinction.

Detecting DNA, a preserved cell or a spore does not establish present activity. Researchers need evidence of chemical transformation, energy consumption, growth or reproduction. This separates a possible remnant from a living ecosystem.

For Europa and Enceladus, icy moons of Jupiter and Saturn, Antarctic environments provide methods rather than evidence. Cassini data indicate that Enceladus has an ocean, organic compounds and water-rock interactions consistent with hydrothermal activity. They describe potential habitability (guez.org/ali/60), not detected life.

4. In acid: inhabiting chemical aggression

The archaea Picrophilus oshimae and Picrophilus torridus, isolated from Japanese solfataric soils, grow optimally near pH 0.7 and can grow around pH 0 in the laboratory. Their membranes help maintain a cellular interior radically different from the external medium. The adaptation is documented in the original publication (guez.org/ali/61).

Río Tinto in Andalusia: acidic water, iron and sulphur compose a terrestrial analogue used to prepare searches for Martian biosignatures. Real photograph: Gzzz, Wikimedia Commons (guez.org/ali/62), CC BY-SA 4.0.

Río Tinto combines high acidity, metals and iron-sulphur chemistry. Microorganisms actively participate in oxidising those elements, making the river an experimental analogue for Mars. Yet an organism tolerating terrestrial acid would not automatically survive every acidic atmosphere. Temperature, water activity, pressure, radiation and solvent composition interact.

5. What these organisms actually prove

These results enlarge the possible. They prove neither Martian organisms nor ecosystems beneath Europa's ice, and they do not establish a mandatory hydrothermal origin for life. Their main value is that they let us build better experiments.

6. From analogy to biosignature

No biosignature should depend on one clue. Methane may be biological or geological. An organic molecule may come from a cell, a meteorite or an abiotic reaction. A microfossil-like structure may be mineral.

A rigorous protocol first establishes the normal chemistry of a site, locates energy gradients, searches for several independent anomalies, checks repeatability, tests abiotic mechanisms and controls terrestrial contamination. Analogue sites are calibration instruments, not miniature copies of other worlds.

7. A.L.I hypothesis: building a being for every frontier

From this point, we leave established observations and enter a laboratory hypothesis. Could the separate solutions of thermophiles, psychrophiles, acidophiles, halophiles, radiation-resistant organisms and spore-formers be combined in a synthetic organism? It would be designed as the first artificial living traveller sent into space.

It would probably not be invulnerable in one permanent state: membranes suited to cold conflict with those used in heat, and growth mechanisms conflict with dormancy. A credible architecture would be modular and sequential: mineral shielding, dormancy during transit, redundant DNA repair, conditional awakening, alternate metabolisms and a consortium of specialised cells sharing functions.

Mycoplasma mycoides JCVI-syn1.0 cells controlled by a synthesised genome transplanted into a recipient cell. This is not life made from inert matter, but an existing cell directed by a laboratory-built chromosome. Real image: J. Craig Venter Institute, first self-replicating synthetic bacterial cell (guez.org/ali/65).

In 2010, the J. Craig Venter Institute team synthesised a 1.08-million-base-pair chromosome and transplanted it into a recipient cell, producing a cell controlled by that genome. In 2016, JCVI-syn3.0 reduced the system to 473 genes, while retaining genes of unknown function. We can rewrite and boot a genome; we cannot yet design an autonomous organism combining every resistance or predict its interactions with an unknown world.

8. Panspermia: moving life does not explain its origin

Panspermia proposes that life, or its precursors, may travel between worlds. Lithopanspermia considers transport inside rocks ejected by impacts; other scenarios involve dust, comets or spores. Panspermia does not explain how life begins. It relocates the place of origin.

In 1973, Francis Crick and Leslie Orgel formulated directed panspermia (guez.org/ali/66): a civilisation might deliberately send microorganisms towards another system. They stressed that available evidence was insufficient to estimate its probability.

The A.L.I synthetic being would turn that hypothesis into a human project: sending not only a protected message but a living archive capable of adaptation. This raises a fundamental objection. Introducing an organism to a habitable world might destroy or conceal an indigenous biosphere. Planetary protection would therefore be the first ethical rule of contact.

This projection extends the articles on cosmic DNA as a communication code and exodarwinism: travelling means deciding not only what an organism carries, but which transformations it is permitted to undergo.

9. The dark genome: becoming our own extraterrestrial

The human genome is no longer “undeciphered” in the sense of a wholly unknown sequence. The telomere-to-telomere assembly published in 2022 filled most technical gaps in one human sequence, while the human pangenome (guez.org/ali/67) reveals structural diversity absent from the former single reference.

But reading letters does not mean understanding every function. Most DNA does not encode proteins; some regions regulate expression, structure chromosomes or produce RNA, while other functions remain unknown. “Dark genome” can refer to repetitive, difficult-to-map or poorly interpreted regions.

There is no evidence that they contain a hidden extraterrestrial programme or a future human form already written. They nevertheless open an artistic projection: what if the otherness sought in the sky were also an unread capacity for transformation within us?

Through evolution over generations, symbiosis, genetic engineering or adaptation to different gravity, radiation and duration, our descendants might diverge beyond our current definition of human. They would be our biological heirs and, from our present, our own extraterrestrials. This intersects with transhumanisms, while replacing individual enhancement with species divergence.

10. A.L.I: when the first message is a metabolism

The first sign of extraterrestrial life may be neither speech, a radio signal nor a visible construction. It may be a set of persistently coordinated chemical transformations. A cell

does not formulate a message, but it selects molecules, releases products, alters gradients and maintains local disequilibrium.

Contact would begin through material listening: testing whether a system responds reproducibly to a controlled variation, restores equilibrium, anticipates a cycle or retains a trace. This would not yet be conversation, but an exchange of constraints: the moment apparently passive matter becomes readable as an organised process.

> Earth does not give us a portrait of extraterrestrial life. It gives us real situations in which matter has crossed into life — and methods for avoiding the confusion of that frontier with our own image.

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8 - What If First Contact Were a Rite of Passage?

Keywords: Claude Lévi-Strauss, Arnold Van Gennep, structural anthropology, myth, kinship, wild thought, rites of passage, separation, liminality, incorporation, first contact, protocol, interstellar language, A.L.I

Claude Lévi-Strauss receives the Erasmus Prize from Prince Bernhard at Amsterdam's Tropenmuseum, 28 May 1973. Real photograph: Bert Verhoeff / Anefo, Nationaal Archief, Wikimedia Commons (guez.org/ali/69), CC BY-SA 3.0.

Summary

Lévi-Strauss looks for relations beneath myth, kinship and wild thought. Van Gennep describes passage through separation, liminality and incorporation. Could their intersection help design an interstellar contact protocol?

Text

First contact is usually imagined as an exchange of messages: a signal is received, decoded and answered. This picture assumes that communication begins as soon as a code becomes intelligible. Yet recognising a sign may not be enough. We must still identify whoever is speaking, consent to a relationship and transform two foreign presences into interlocutors.

Contact would then be more than a translation problem. It would constitute a change of status, comparable to a rite of passage. The structural anthropology of Claude Lévi-Strauss (guez.org/ali/906) and the model developed by Arnold Van Gennep (guez.org/ali/907) suggest another hypothesis: before searching for an interstellar vocabulary, we may need to build a grammar of relationship.

1. Structure before vocabulary

Lévi-Strauss was not looking for a secret language spoken by every society. Shaped by structural linguistics, he studied relations organising kinship systems, classifications and myths: opposition, inversion, reciprocity, equivalence and transformation. The Collège de France (guez.org/ali/908) describes this founding intuition as a search for combinatorics and logics of transformation rather than an inventory of isolated meanings.

An element means little on its own. It becomes intelligible through its position within a set. In a kinship system, people matter, but relations among generations, alliances and prohibitions matter more. In a myth, a character may change name, species or function without the deeper organisation of the narrative disappearing.

For A.L.I, this distinction is crucial. A contact language may not begin by showing an object and assigning it a name. It could present several states of the same relation: a form and its transformation; a sequence and its inversion; a rule, its application and its exception; a pattern transmitted as image, sound and number. The recipient would receive more than signs. It would observe what remains stable while those signs change.

2. Kinship as a network of relations

In The Elementary Structures of Kinship, Lévi-Strauss analyses kinship as an organisation of relations, alliances and reciprocal obligations. In his model, the incest prohibition marks a passage from nature to culture by transforming a constraint into a social rule. His Collège de France lectures later pursued this work through the concept of the “kinship atom”, documented in the chair's annual summaries (guez.org/ali/909).

The theory was enormously influential, but some formulations, notably the “exchange of women”, were criticised by feminist anthropology. It would therefore be absurd to turn a human kinship model into a cosmic template. Its value for A.L.I lies elsewhere: the identity of a being might be relational rather than individual.

An interstellar civilisation might grant no stable personhood to its members. It could be distributed among organisms, machines, archives and environments. “Who are you?” would then be less useful than: which relationships hold you together, and which can you transform without disappearing? Contact would begin by describing a network, not an individual.

3. Myth as a transformation machine

For Lévi-Strauss, a myth does not necessarily have an original version of which all others are degraded copies. It exists through its variants. A human character becomes an animal, birth becomes death, raw becomes cooked and near becomes far. Meaning emerges from the transformations connecting these versions.

The four volumes of Mythologiques follow such passages through hundreds of Indigenous American narratives without reducing them to a single message. Myth becomes a machine for making contradictions thinkable: nature and culture, life and death, identity and otherness. An interstellar message could use the same principle. Instead of sending one supposedly universal picture of humanity, we would transmit a family of variants. Repetition would not be duplication but controlled transformation. An unknown intelligence could infer the rule from the differences between versions.

4. “Wild thought” is not primitive thought

Lévi-Strauss's wild thought does not mean inferior or irrational thought. It describes an intelligence attentive to the sensible qualities of the world: forms, species, colours, sounds, similarities and differences. This “science of the concrete” classifies and combines what is at hand. It works through bricolage, reassigning new functions to elements from a limited repertoire.

Its operations of classification, hierarchy, causality and analogy are not fundamentally foreign to scientific thought. This opens one possibility for contact: mathematics may not be our only route towards universality. Sensible regularities, rhythms, changes of state and ecological classifications might also form bridges.

But nothing guarantees that an extraterrestrial intelligence shares our senses, categories or distinction between living and inert matter. Structural method therefore supplies no universal language. It teaches us to look for invariants beneath differences, while accepting that some invariants may exist only in our own gaze.

Arnold Van Gennep around 1920. Real photograph, unknown author, public domain, Wikimedia Commons (guez.org/ali/74).

5. Van Gennep: the grammar of the threshold

In The Rites of Passage, first published in 1909, Arnold Van Gennep identifies a recurrent organisation in ceremonies surrounding birth, initiation, marriage, travel and death. He distinguishes three phases: separation, in which a person leaves a former state; transition or margin, where they stand between statuses; and incorporation, which integrates or reintegrates them under a new identity.

Van Gennep calls these preliminal, liminal and postliminal rites. The marginal period is not a mere wait: ordinary rules are suspended and identity remains provisional. Victor Turner later developed the concept of liminality, but the sequence separation–margin–incorporation belongs to Van Gennep's original model.

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(1909) [1981]

LES RITES
DE PASSAGE

ÉTUDE SYSTÉMATIQUE DES RITES
De la porte et du seuil, De l'hospitalité
De l'adoption, de la grossesse et de l'accouchement
De la naissance, de l'enfance, de la puberté
De l'initiation, de l'ordination, du couronnement
Des fiançailles et du mariage
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Les Rites de passage, first published in 1909, in the digital edition produced by Les Classiques des sciences sociales at UQAC. Read the full French text (guez.org/ali/75); see also the University of Chicago Press English edition (guez.org/ali/907).

First contact could constitute precisely such a situation. Once an artificial signal is recognised, humanity is no longer alone but is not yet engaged in a relationship. It occupies an intermediate space. As in the semiology of a sign changing worlds, physically recognising a signal guarantees neither its meaning nor its status.

6. A.L.I laboratory: a contact protocol in three passages

Separation: isolating the signal

The first stage separates the message from noise while suspending immediate interpretation. The signal must be repeated, localised and compared. Its artificial origin must be tested without prematurely assigning intention. A safety zone protects both parties: no irreversible command, no biological transmission and no direct access to critical systems. The message becomes a distinct object, but its sender remains unknown.

Liminality: constructing common ground

The second stage is the threshold. Neither we nor the other can yet impose a language. Exchanges first concern verifiable transformations: repetition, permutation, scaling, rhythm and error correction. Each party proposes an operation that the other reproduces, modifies or refuses.

Identities remain provisional. A signal may originate from an individual, a collective, a machine or an automated device abandoned millennia ago. The relationship must work before its participants are defined. This liminal period could last seconds or centuries.

Incorporation: becoming interlocutors

Incorporation begins when both parties recognise a minimal set of rules. They do not yet understand each other's cultures, but they accept a shared status: interlocutor. This status entails permissions, limits, a memory of exchanges, the ability to correct an error and the right to leave the relationship.

> The first genuine message would not be “This is who we are”, but: “We recognise that something connects us, and we agree to test its rules.”

The Apollo 11 crew inside the Mobile Quarantine Facility, 27 July 1969: Neil Armstrong plays a ukulele while Michael Collins and Buzz Aldrin look through the window. The device materialises separation, a marginal period and controlled return to the community. Real photograph: NASA, public domain, Wikimedia Commons (guez.org/ali/76).

7. From rite to verifiable protocol

Transposing Van Gennep does not mean artificially ritualising science. The model must become a testable protocol. Separation corresponds to independent detection, provenance and containment. The margin becomes reversible calibration: shared units, redundancy, transformations and a right to silence. Incorporation corresponds to a durable channel, explicit permissions and shared memory.

This proposal extends the interstellar Turing test hypothesis: evidence of intelligence would reside less in a brilliant answer than in the reciprocal construction of stable rules. It also meets nuclear semiotics, where transmission requires anticipating the disappearance of context, and the work on radical alterity, which prevents us from reducing the other to an incomplete version of ourselves.

8. What the model does not solve

Structural thought often privileges oppositions: nature and culture, raw and cooked, life and death. Nothing proves that an extraterrestrial intelligence organises reality in binary form. It might use gradual, ternary, quantum or multidimensional logics. It might know no stable identity, precise beginning or boundary between sender and message.

The rite model also assumes a before, a threshold and an after. An intelligence distributed across time might regard contact as a continuous state. An artefact found on Earth could have started communicating long before we recognised it. Structures may also be produced by the analyst: finding an opposition does not prove that it governs the observed world.

Lévi-Strauss and Van Gennep therefore provide no anthropological law exportable into space. They offer a critical scaffold for separating three problems too often confused: decoding a sign, establishing a relationship and changing status.

9. Contact as reciprocal transformation

No civilisation would emerge intact from first contact. Even a silent contact would alter its sciences, religions, institutions and definition of life. The other would also be transformed if it

agreed to answer. First contact would therefore be neither the reception of a message nor the discovery of an object. It would be a rite without an officiant, performed by two worlds inventing the conditions of passage together.

The decisive question would no longer be only “How can we speak to an extraterrestrial intelligence?”, but: what protocol would allow two forms of existence to become interlocutors gradually, without destroying one another?

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9 - Earth Species Project: A Terrestrial METI for Speaking With Life?

Keywords: Earth Species Project, NatureLM-audio, bioacoustics, artificial intelligence, beluga, St Lawrence, animal dialects, interspecies communication, playback, synthetic vocalisations, conservation, terrestrial METI, A.L.I

An adult beluga and calf in the St Lawrence. The population is both an acoustic field site and a living community at risk, exposed to vessel noise and habitat change. Photo: Saucoin, Wikimedia Commons (guez.org/ali/912), CC BY-SA 4.0.

Summary

NatureLM-audio, beluga call mapping and synthetic vocalisations: Earth Species Project is building an AI infrastructure that could move from listening to cautious interspecies communication protocols.

Text

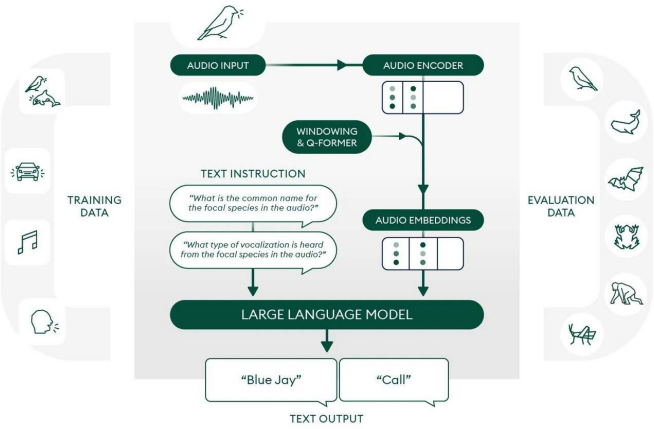
What if the first METI protocol were aimed not at a star, but at another Earth species? Earth Species Project is not merely trying to recognise a handful of animal calls. It is building a full infrastructure: gathering and cleaning millions of recordings, annotating them, learning acoustic representations, benchmarking models, identifying patterns and eventually producing synthetic vocalisations whose reception can be tested. The message is no longer sent into cosmic silence. It returns as behaviour, response or refusal.

This article is distinct from the earlier piece on zebra finches. That study concerned one species, its call categories and a particular vocal-learning experiment. Here the subject is the cross-species infrastructure: open tools, datasets and protocols intended to work across birds, marine mammals, primates, insects and amphibians. NatureLM-audio is its flagship model, not the whole project.

1. A listening pipeline, not a magic translator

The popular promise of a “Google Translate for animals” drastically simplifies the problem. Before translation, researchers must discover what counts as a unit, who produces it, in which situation, with what variation and what effects. Earth Species Project organises this enquiry in layers. alp-data harmonises heterogeneous collections; Biodenoising separates biological sounds from wind, engines and other sources; AVES learns acoustic representations; Voxaboxen supports annotation; BEANS and BEANS-Zero evaluate models; and NatureLM-audio connects audio to natural-language instructions and answers.

This architecture changes the scale of bioacoustics. A laboratory may study one repertoire for years using a few hundred carefully annotated hours. A foundation model tries to transfer what it learns from one corpus to other taxa, including species absent from training. The conservation potential is enormous, but so is the risk: an error may spread with the authority of automated science.



NatureLM-audio combines an acoustic encoder, audio embeddings and a large language model able to answer a textual instruction. Figure: Earth Species Project, NatureLM-audio documentation (guez.org/ali/913).

2. NatureLM-audio: a bioacoustic foundation model

Presented at ICLR 2025, NatureLM-audio is described by its authors as the first audio-language foundation model designed specifically for bioacoustics. Its documented version joins a fine-tuned BEATs audio encoder to Llama 3.1 8B Instruct. It was trained on more than 26 million audio-text pairs from animal sound, speech and music. That mixture is deliberate: general acoustic regularities are learned before biological specialisation.

The model can receive a recording and a question: which species is present, what vocalisation type is heard, how many individuals may be calling, which life stage is probable, or how should the acoustic scene be described? Evaluations show zero-shot abilities, requiring no task-specific retraining for some unseen species and taxa. Yet zero-shot means neither infallible nor universal. Performance depends on noise, domain shift, call rarity and dataset bias.

3. What the model knows, and what it must not be made to claim

The current official guide primarily validates species identification and detection, call or behaviour type, life stage, counting and captioning. It also documents a practical limitation:

adults are recognised more reliably than juveniles, for which recall is low. Life stage should therefore remain a soft filter, never a certain measurement.

Some training datasets contain sex and life-stage metadata. That does not demonstrate that NatureLM-audio can generally and robustly infer an animal's sex from any sound. Such a claim requires species-level validation, known individuals and controls for confounds among sex, age, body size, social context and microphone quality. This distinction matters: AI provides a quantified hypothesis, not the intimate identity of the caller.

4. The St Lawrence: mapping beluga calls

Belugas are sometimes called “canaries of the sea” because of their rich repertoires. Contact calls may carry individual signatures, maintain group cohesion or allow mothers and calves to reunite. Working with researcher Jaclyn Aubin, Earth Species Project uses AVES to measure differences among these calls and arrange them in a similarity space. Each point represents one sound; clusters reveal related forms, but they do not automatically constitute words.

A projection of beluga contact calls: each point is a call, colours represent distinct call types and distance represents acoustic similarity. The map supports hypotheses; it does not translate calls. Figure: Earth Species Project (guez.org/ali/914).

The aim is to estimate repertoire size and organisation, then connect variation to identity, social relations, location and context. The question of dialects becomes testable. Canadian assessments note that vocal repertoires may help differentiate cetacean groups and that regional call types have been observed. But vocalisations often form a graded continuum. Robust methods and comparable data are needed before an acoustic boundary can be treated as a population or cultural boundary.

5. A dialect is more than a sound shape

Two groups may call differently because of social learning, adaptation to local noise, geographic isolation, age structure, genealogy or a recording artefact. To establish a dialect, an acoustic model must reconnect with ethology. Researchers must follow individuals, movement, relationships, current activity and the consequences of a call.

This requirement guards against two opposite errors. One would reduce animal culture to a statistical curve. The other would hastily assign human syntax or vocabulary to every structure. A point cloud can expose organisation that human hearing misses; it cannot by itself decide what that organisation means to a beluga.

Vocalisations circulate through a physical and social medium: depth, noise, distance, orientation and the presence of other individuals all alter the scene. Photo: Ekki3, Wikimedia Commons (guez.org/ali/915), CC BY 4.0.

6. Conservation consequences

A bioacoustic infrastructure can already act without “speaking whale”. It can detect a species in thousands of hours, track seasonal change, alert vessels, identify communication areas or measure how human noise reshapes calls. In the St Lawrence, distinguishing repertoires may also illuminate social structure and habitat use in a threatened population.

Automation also redistributes power. Who owns sound archives? Could a presence map support protection while making vulnerable animals easier to locate? How should Indigenous communities, field researchers, authorities and local residents govern use? An open model makes science shareable; it does not replace governance of data and intervention.

7. Describe, predict, then generate

The next threshold is synthesis. A generative model could produce a controlled variation of a call, and a playback protocol could measure the response: orientation, approach, avoidance, interruption, renewed calling or imitation. The first goal is not to make an animal pronounce a human sentence. It is to test whether a population recognises a category and which acoustic dimensions carry that effect.

Earth Species Project includes this direction in its roadmap: moving from replayed recordings towards generated, more nuanced and potentially interactive signals. Here the METI analogy becomes operational. METI sends a constructed signal towards non-human intelligence in the hope of a response. Generative playback does the same, except that the recipient shares our biosphere and consequences are immediate.

8. Risk begins when the other responds

A synthetic call may deceive, stress, interrupt foraging or disturb reproduction. If a signal is socially learned, a novelty could spread and alter a culture. ESP's roadmap acknowledges these risks and proposes beginning under controlled conditions, working with biologists, ethicists and governance processes. Technical ability to produce a plausible sound does not authorise broadcasting it to a wild population.

A responsible protocol therefore needs stop rules, minimal exposure, controls, multimodal monitoring and publication of negative results. It must distinguish orientation from

comprehension. Above all, it must accept that no response may be information rather than an invitation to increase the volume.

9. A.L.I projection: terrestrial METI

Documented fact: NatureLM-audio classifies and describes bioacoustic sounds; AVES supports call mapping; playback is an established method for testing reactions.

Research objective: produce controlled synthetic vocalisations and evaluate whether they elicit specific responses, without confusing reaction with translation.

A.L.I projection: treat this loop as terrestrial METI, an experimental diplomacy with intelligence whose perceptual world, categories and interests are not ours.

A.L.I could formalise a seven-stage sequence: listen before transmitting; situate every signal in context; measure uncertainty; generate a minimal variation; test at low intensity; observe multiple modalities; and stop as soon as behavioural cost appears. The method also applies to interstellar contact: detection is not comprehension, and transmission power is not legitimacy.

10. A possible experiment: the acoustic mirror

Imagine a system that does not imitate a complete call but modifies one dimension of a known contact call: contour, rhythm, interval or timbre. It compares responses to the original, the variation and an acoustic control. If it finds a stable response, it refines the map of what animals treat as invariant. The first “conversation” would be a sequence of wordless questions: is this still the same call? does this variation still designate the same individual? when does the signal become other?

The mirror makes no translation claim. It learns the other's perceptual boundaries by keeping every hypothesis falsifiable. This may be the most appropriate gesture for A.L.I: not manufacturing a voice that speaks for the living, but an interface that forces us to ask what the other distinguishes.

Conclusion: first contact already has a habitat

Earth Species Project reframes animal-language research. The problem is no longer merely to collect sounds, but to build a shared pipeline from raw archive to controllable experiment. NatureLM-audio is a major component because it makes sound queryable through natural language and transfers knowledge across species. Its limits remind us that a model output is never guaranteed translation.

The St Lawrence beluga makes the stakes concrete: listening may support protection, mapping may expose culture, and transmission may also disturb it. Terrestrial METI has one advantage over its cosmic counterpart: consequences can be observed. It therefore carries an additional responsibility. Before speaking to the stars, it teaches that every message to another world should begin with a discipline of listening.

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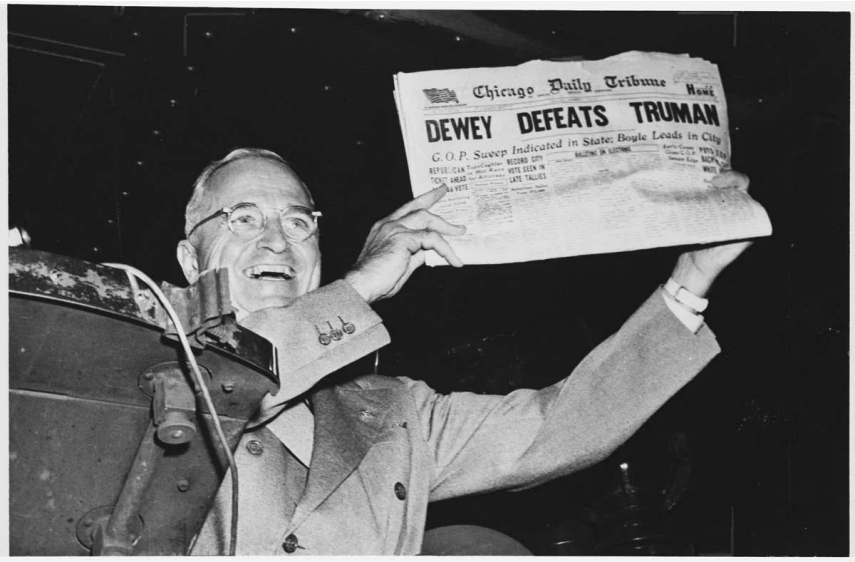
10 - True / False: Why Did We Lock Reality into Two Boxes?

Keywords: truth, falsehood, lies, philosophy, morality, Aristotle, Kant, Nietzsche, logic, liar paradox, binary, Shannon, artificial intelligence, hallucination, confabulation, quantum, observer, ternary logic, Setun, contact, A.L.I



“Dewey Defeats Truman”: Harry S. Truman displays the front page that wrongly announced his defeat, November 1948. A false proposition printed with all the graphic authority of truth. Real photograph: United Press, Records of the U.S. Information Agency, National Archives and Records Administration (guez.org/ali/79).

Summary

From Greek truth to artificial-intelligence hallucinations, from bits to qubits and ternary logics: if a non-human intelligence spoke to us, could we decide what is true, false or formulated in a logic we do not possess?

Text

True and false are not merely two logical values. They organise trust, justice, religion, science, politics, memory and now machines. This opposition has crossed human history because it answers a practical need: acting requires us to distinguish what is from what is not, what happened from what was invented, a reliable witness from a deceiver, signal from noise. Yet this vital distinction gradually became a general architecture of the world. By deciding through yes or no, we came to imagine reality itself as binary.

1. Before philosophy: surviving, believing, deceiving

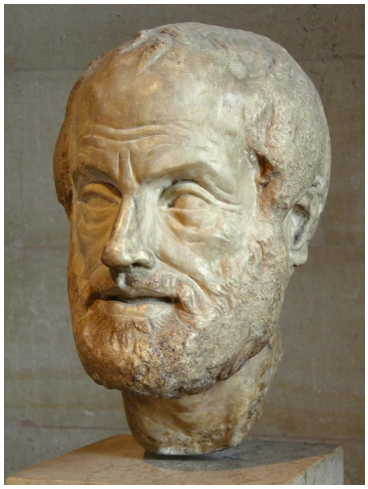
There is no birth date for true and false. An animal fleeing a false alarm, a hunter reading a trace and a group assessing a member's testimony already encounter the difference between a reliable and a misleading sign. Human language adds a new operation: it can evoke what is absent, describe what never happened and share a fiction while sometimes knowing that it is fictional.

This possibility produces both culture and lies. A myth may be factually unverifiable yet

socially structuring. An error is a false proposition believed to be true; a lie adds an intention to deceive; fiction establishes a pact in which invention does not claim to be fact; an illusion is an experience that may resist what we know. Confusing these categories prevents us from understanding the problem.

Duality prevails because a community must decide: believe or disbelieve, convict or acquit, follow a track or abandon it. The decision is binary even when the world preceding it is not.

2. To say of what is that it is



Bust of Aristotle, Roman copy of a lost bronze attributed to Lysippos, Musée du Louvre. Real photograph: Eric Gaba, Wikimedia Commons (guez.org/ali/80), CC BY-SA.

Greek philosophy transformed a practical requirement into a conceptual problem. In Plato's cave, shadows mistaken for reality are opposed to the difficult movement towards what produces them. Truth becomes disclosure and a conversion of vision. Yet Plato also knew that the city governs itself through narratives, including the dangerous political use of the “noble lie”.

Aristotle gave Western thought its most enduring formula: to say of what is that it is, and of what is not that it is not, is true. Truth becomes a relation between a proposition and a state of the world. Three principles stabilised around this conception: identity, non-contradiction and excluded middle. A proposition cannot, in the same respect, be both true and false; between it and its negation, no third possibility is admitted.

This logic is extraordinarily powerful. It does not automatically describe every nuance of language, time or experience. “The door is open” appears bivalent. “It will rain here in a thousand years”, “this work is beautiful” and “this message is intelligent” do not acquire their values in the same way.

3. Truth becomes a moral obligation

Religious and legal traditions gave truthfulness a moral scope: false testimony destroys justice, a deceptive promise destroys contracts, and fraudulent speech destroys community. Augustine distinguished several kinds of lies while refusing to make them good through intention. Much later, Kant radicalised this position: lying attacks the very possibility of speech that can be trusted.

The debate with Benjamin Constant exposes a decisive fault line. Must one tell the truth to a

murderer searching for a victim? For Kant, truthfulness is a formal duty; for Constant, no one has a right to a truth that harms another. Truth is therefore never only abstract correspondence. It circulates between people, in situations, with consequences.

> A proposition may be true while communicating it is unjust; a proposition may be false while its speaker is sincerely mistaken. Truth, truthfulness and morality do not coincide.

4. When truth reveals its own paradoxes

The sentence “this sentence is false” cannot be filed into either box. If it is true, it is false; if it is false, it becomes true. The liar paradox is not a secondary game: it shows that a language able to speak about its own truth can place bivalence in crisis.

In the twentieth century, Alfred Tarski separated object language from metalanguage to formalise truth without allowing a system to say everything about itself. Other approaches use paracomplete logics, in which some propositions are neither true nor false, or paraconsistent logics, in which a local contradiction does not license every conclusion. Classical logic is not abolished; it becomes one system among others, optimal for some problems and insufficient for others.

Nietzsche shifts the question again. Human truths are also conventions, stabilised metaphors and divisions made invisible by repeated use. This does not mean that everything is equivalent. It means that our categories did not fall from the sky: they have histories, functions and costs.

5. From true/false to open/closed current

Alan Turing in 1951. Computability does not require the world to be binary, but the history of computing made the bit its dominant unit. Real photograph, National Portrait Gallery; image already documented in the interstellar Turing test.

In the nineteenth century, George Boole turned logical operations into algebra. In 1938, Claude Shannon showed that this algebra could control relay circuits: open or closed, 0 or 1. An ancient philosophical opposition became an industrial technique. A bit is not truth; it is a unit of physical and informational distinction. Yet its success aligned several pairs: true/false, yes/no, on/off, presence/absence.

This convergence was not inevitable. It prevailed because two clearly separated physical states are easy to produce, copy and correct despite noise. Binary is less a metaphysics than an engineering victory. By becoming the infrastructure of almost all communication,

however, it trains us to discretise: accept/reject, human/machine, authentic/fake, signal/noise.

A.L.I has explored this tension through binary stelae, the Arecibo message and quantum programming. Binary is excellent at transporting a difference. Nothing proves that it can transport a world.

6. False news, error and the production of reality

False news did not begin with the Internet. Rumours, forged documents, hoaxes, propaganda and war narratives accompany the history of media. Networks alter the speed, scale and personalisation of circulation. A proposition is no longer visible only because it is true or demonstrated: it becomes visible because it captures attention, confirms a group or triggers a reaction.

Truman holding the “Dewey Defeats Truman” front page condenses the problem. The newspaper did not intend to produce fiction; it transformed an overconfident forecast into typographic fact. Falsehood can emerge from a production chain without one central liar: poor sampling, time pressure, excessive certainty and the authority of layout.

This history meets A.L.I's articles on the secret channels of reality and false memories. Information may be suppressed because it appears false; a false memory may be experienced with perfect sincerity. The true/false filter does not sufficiently describe the provenance of belief.

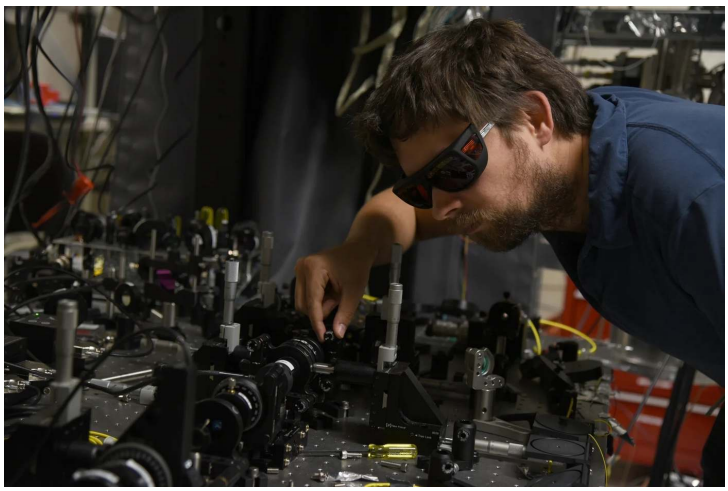
7. AI does not always lie: it can confabulate

A large language model produces a probable sequence of signs. It can state an accurate fact, faithfully summarise a source, invent a reference or construct a coherent but false explanation through the same fundamental act: predicting a continuation. “Hallucination” is suggestive but anthropomorphic. NIST uses “confabulation” for confidently presented erroneous content.

Lying generally implies that a speaker distinguishes what they believe to be true from what they say in order to deceive. An AI can produce falsehood without possessing that inner distinction. Conversely, a system can be trained to conceal, manipulate or satisfy an objective at the expense of accuracy. Moral responsibility then moves across the whole chain: data, designers, settings, interface, deploying institution and the human delegating judgement.

There is no magical truth detector. Reliability combines provenance, verifiable citations, source comparison, uncertainty estimates, external tools, adversarial testing and the ability to answer “I do not know”. A reliable intelligence is not one that never errs, but one that exposes its conditions of verification.

8. Quantum mechanics: the observer is not a magical gaze



Physicist Krister Shalm with the photon source used for NIST's Bell test. Real photograph: J. Burrus/NIST, NIST (guez.org/ali/93), 2015.

Quantum mechanics opens a genuine breach in classical intuition, but it must be stated precisely. Before measurement, a system's state may be a superposition allowing several outcomes with specific probabilities. Measurement records a definite result. “Observer”, however, does not necessarily mean human consciousness: a detector, an apparatus or an interaction with the environment can register information and produce decoherence.

A gaze therefore does not arbitrarily create truth. Interpretations disagree about what becomes of the superposition, the status of the wave function and the possible existence of multiple branches. They nevertheless agree on experimental predictions. Measurement context matters; consciousness as a privileged physical cause is not an established result.

The lesson for A.L.I is stronger when kept sober: some properties do not carry context-independent classical values of the kind assumed by local realism. An answer depends on the physically posed question. In contact, our instrument, alphabet and protocol might therefore participate in what we believe we receive.

9. Three values, many worlds

Scientists working on Setun in 1959. The Soviet computer used balanced ternary logic: -1, 0, +1. Real photograph published by Sputnik, public domain, Wikimedia Commons (guez.org/ali/82).

In 1920, Jan Lukasiewicz formalised a three-valued logic, notably for propositions about a contingent future: true, false, possible. Other systems add indeterminate, inconsistent,

necessary, degrees of truth or the ability to sustain a local contradiction.

Ternary logic even became hardware. Built at Moscow State University in the late 1950s, Setun used balanced trits -1, 0 and +1. It did not replace the binary ecosystem, but it proves that another computer architecture genuinely worked.

Beyond ternary, communication can combine independent axes: verified/unverified, probable/improbable, benevolent/dangerous, literal/metaphorical, local/global, present/future. Reducing these dimensions to one true-false line destroys information. A message may be factually false, ritually correct, predictively useful and deliberately ambiguous. Our own artworks already are.

10. A.L.I hypothesis: contact as a foreign logic

We often search for an extraterrestrial signal as a classification problem: artificial or natural, message or noise, genuine contact or false positive. This step is necessary, but it projects our decision logic onto alterity. A foreign intelligence might not separate description, action and relation. Its “statement” might alter its receiver, contain several compatible states, change value through time or exist only through comparison among multiple observers.

Contact would then be not the reception of a truth but the gradual construction of a space in which values become comparable. We would have to learn not only a vocabulary but the logic authorising its inferences. This extends the interstellar Turing test: proof of another intelligence may reside less in a correct answer than in its capacity to transform the rules of the question with us.

A quantum, collective, distributed or multidimensional civilisation would not necessarily send “1” against “0”. It might send a distribution of possibilities, a stable contradiction, a form whose projections are all partial, or a protocol requiring several temporalities. What we call hallucination could be the local shadow of a coherent structure elsewhere. This hypothesis must never excuse an unverifiable assertion; it invites us to build better instruments of discernment.

11. Laboratory proposal: a matrix of veridiction

A.L.I could test candidate messages without immediately imposing one value. The matrix does not replace factual verification; it locates it among several dimensions.

- Correspondence: what observable elements support or refute the statement?
- Provenance: can we reconstruct the source, transformations and intermediaries?
- Coherence: does the message contradict itself, and is this contradiction local or structural?
- Probability: what degree of confidence survives new evidence?
- Intention: describe, deceive, simulate, play, protect or act: which can we truly attribute?
- Effect: what does the message produce in its reader or environment?
- Temporality: does its value change after a response, measurement or delay?
- Indeterminacy: what do we lose by forcing a true/false decision now?

The result would be a profile rather than a label. Two intelligences could compare their profiles before comparing their certainties. The first common language might be a grammar of doubt: not the abandonment of truth, but a methodical account of how each participant makes, measures and corrects it.

Conclusion: leaving binary without leaving truth

The true/false duality crossed human history because it protects action, trust and transmission. It gave philosophy a requirement, morality a duty, science a method and computing an architecture. Its problem is not that it exists, but that it claims to exhaust reality.

AI makes this limit visible: a sentence may have the form of knowledge without a sufficient relation to the world. Quantum physics displaces it: an outcome depends on a measurement arrangement, not magically on consciousness. Many-valued logics and Setun remind us that binary is a powerful choice, not a cosmic inevitability.

For A.L.I, learning to contact another intelligence may begin here: preserve the difference between true and false while rigorously making room for the possible, incomplete, contradictory, relational and for what has no value yet in our world.

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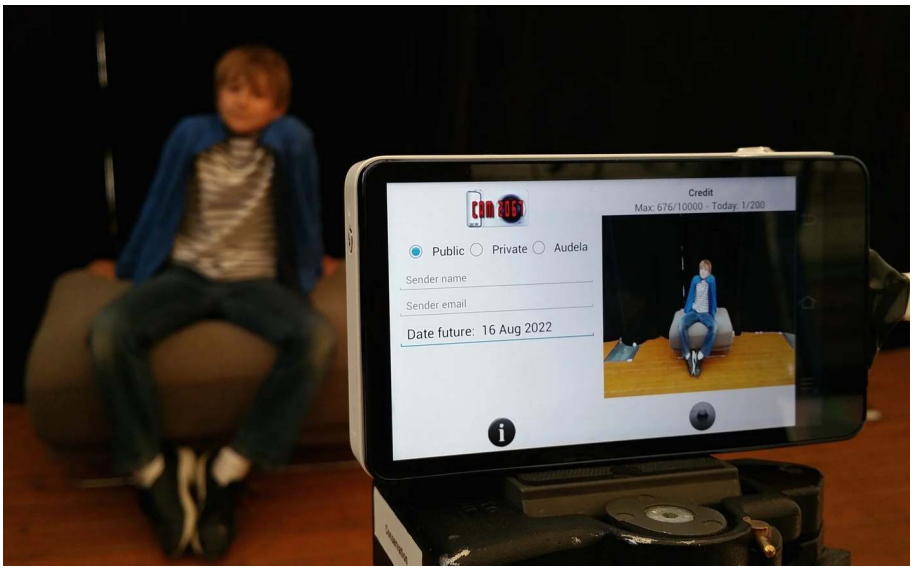
11 - Intergalactic Email: Dialoguing Through the Internet

Keywords: intergalactic email, invisible Internet, Email 2067, Camera 2067, David Guez, darknets, Tor, Freenet, Dead Drops, DTN, interplanetary Internet, artificial intelligence, contact AI, latency, archive, time, death, interstellar communication, A.L.I



Camera 2067 operating at ISEA 2015. Its interface offers Public, Private and Audela modes: three possible destinations for an image removed from the present. Real photograph: Eliot, Camera 2067 (guez.org/ali/94) archive, courtesy of David Guez.

Summary

What if the Internet contained an invisible zone where humans, the dead and interstellar civilisations could leave messages? Following Email 2067 and Camera 2067, A.L.I imagines an address with no reply deadline, a black junction cube and an AI devoted solely to inventing the conditions of contact.

Text

On screen, an email address: contact@blackcube.zone (not currently operational, only a working hypothesis). Anyone may send it a text, photograph, sound, equation, memory or unreadable file. The message is accepted, time-stamped, duplicated and placed in a distributed archive. No read receipt is issued. No reply is promised. It might arrive in one second, one year, one century or ten thousand years. It may already have arrived without our knowing how to recognise it.

1. The Zone: a place that exists only between messages

The A.L.I hypothesis proposes a Zone contained within the Internet yet invisible from ordinary use. It would be neither one website nor one server. It would consist of intervals between machines: waiting data, forgotten addresses, delayed packets, caches, replicated fragments, archives without readers and messages whose recipients do not yet exist.

Within this artistic hypothesis, a message may exist without being received. A reply may be deposited before its recipient knows how to ask the question. Communication no longer

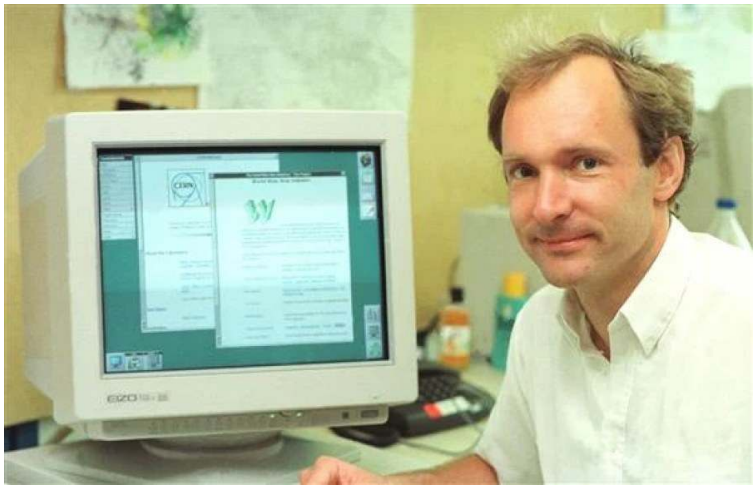
necessarily joins two simultaneous minds; it connects two temporalities.

The Internet is obviously not outside space and time. It depends on cables, antennas, data centres, clocks and energy. No extraterrestrial data could appear within it without a physical channel. The Zone is therefore not a scientific discovery but a conceptual model and artistic protocol: turning the network into an instrument of waiting, available to unknown recipients.

2. The Internet began with an incomplete message

In 1969, the first exchange between two ARPANET machines was meant to transmit “LOGIN”. The connection stopped after the first two letters: LO. Email appeared in 1972 and rapidly became one of the network’s primary applications. The Internet was then conceived as an open architecture joining independent networks. The machines linking them were described as black boxes, the future gateways and routers. Technical history almost accidentally supplied the project’s first image: black boxes connecting incompatible worlds. Internet Society, “A Brief History of the Internet” (guez.org/ali/921).

Before permanent connectivity, Usenet, UUCP and FidoNet circulated messages through store-and-forward systems. Computers called each other by modem, often at night, exchanged packets and disconnected. Latency was not a fault; it was the shape of the network.

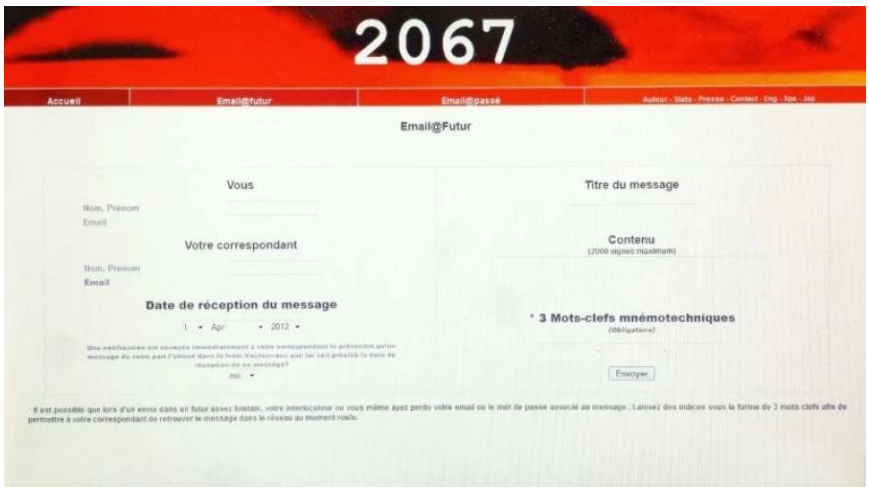


Tim Berners-Lee with an early version of the Web at CERN. Conceived in 1989 to join information scattered across incompatible computers, the Web was released into the public domain in 1993. Photograph: CERN, The Birth of the Web (guez.org/ali/922).

3. Email 2067: making the network guardian of a secret

The intergalactic email project extends two works by David Guez that treat the network as temporal territory. Initiated in 2006, Email 2067 (guez.org/ali/97) lets users send a message to themselves or someone else at a chosen future date. The recipient is warned that it exists but cannot yet read it. The text is encrypted and kept until its release date.

The network becomes a trusted third party, the guarantor and guardian of correspondence whose outcome no participant fully controls. An address may disappear, formats may change, memory may fade and the sender may die before delivery. Mnemonic keywords allow the message to be recovered if technical identities do not survive.



Original Email 2067 interface. The form connects sender, recipient, future date and recovery keywords. Real capture: David Guez, Email 2067 (guez.org/ali/98).

Email 2067 already describes the Internet as an intermediate space hosting appointments with ghosts: versions of ourselves separated by different moments in our lives. Intergalactic email displaces that structure. The recipient is no longer our future double but an intelligence whose existence, location and temporality are unknown. The delay is no longer scheduled; it becomes indeterminate.

4. Camera 2067: placing an image in the network's afterlife

With Camera 2067 (guez.org/ali/94), the same hypothesis becomes photographic. The camera and its application take an image and send it to Cloud 2067. The photograph is not kept inside the device: it disappears from the present and is revealed on a future date.

Camera 2067: the device becomes a black box between capture and revelation. Real photograph: David Guez (guez.org/ali/99).

The system offers Public, Private and Audela modes. In the last mode, the image is not meant to reappear on a fixed date. It is sent to a discreet area of the network, a hidden side where it might remain indefinitely. The project then proposes a deliberately unverifiable hypothesis: could a dead person continue to navigate this invisible space and encounter images deposited before their disappearance? A connected mirror was intended to display photographs supposedly visited by such presences.

In a 2013 interview (guez.org/ali/100), Guez described this concealed network as a place

only ghosts might enter. Three stages emerge: Email 2067 addresses a future human; Camera 2067 — Audela deposits an image for a potentially dead recipient; intergalactic email opens the deposit to an intelligence that may be neither human, contemporary nor yet present.

5. Invisible Internets

The deep web mainly consists of unindexed pages: databases, messaging systems and private spaces. Darknets are overlay networks reached through particular software and protocols. They are not metaphysical elsewhere, yet they technically separate message, origin, route and place of storage.

Onion routing was developed in the mid-1990s so that an observer could not know both who was speaking and to whom. Tor, deployed in 2002, passes communication through encrypted relays. Freenet, proposed in 1999, distributes documents across participating machines to resist censorship and obscure origin. I2P combines unidirectional tunnels and layered encryption. IPFS identifies content by its fingerprint rather than only by the server's location.

These architectures are not passages to other civilisations. They nevertheless show that a message may survive independently of its first depositor and be sought for what it is rather than where it resides.

In 2010 Aram Bartholl launched Dead Drops, an anonymous offline network of USB drives embedded in public walls. The body had to connect physically to the archive. Photograph: Aram Bartholl, Dead Drops (guez.org/ali/101).

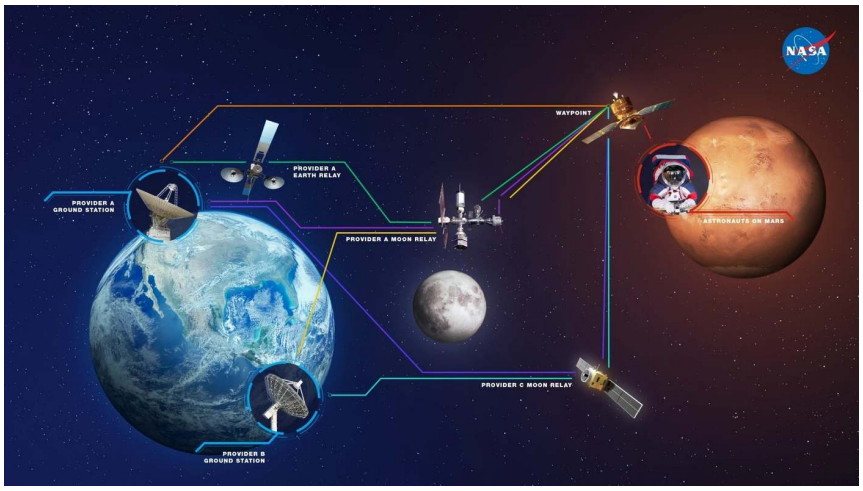
6. Depositing rather than sending

In ordinary mail, the address precedes the message. Intergalactic email reverses the order: the message precedes its recipient. It is not literally "sent to extraterrestrials". It is deposited for any intelligence capable of encountering it.

Each submission would be preserved as original file, textual transcription, binary representation, sonic and visual form, mathematical description, cryptographic fingerprint, distributed copies and durable physical medium. The goal is not to proclaim a universal language but to increase the number of possible paths toward interpretation.

At 4.24 light-years, a round trip would already require roughly eight and a half years. At one

hundred light-years, two centuries. At five thousand light-years, dialogue becomes an archive separating entire civilisations. Asking “When will they reply?” imposes a human temporality on a hypothetical interlocutor. The project connects with the Chroneme Hypothesis: duration between signs is itself part of language.



Delay/Disruption Tolerant Networking keeps data when no continuous path exists and forwards it when another relay becomes available. Institutional illustration: NASA, DTN (guez.org/ali/102).

DTN makes latency technically concrete for space communications: every node stores data until a link becomes available. NASA treats it as a foundation of a Solar System Internet. The A.L.I Zone radicalises the principle: store until a recipient becomes possible.

7. The black junction cube

The physical installation would be a black cube connected to several networks. No screen would display an inbox. A line of light would indicate only activity: reception, duplication, translation, verification or movement. A counter would show time elapsed since the first deposit, never a countdown.

The cube would receive messages addressed to the Zone, multiply their representations, distribute copies across heterogeneous media and wait without declaring silence a failure. It would be less mailbox than airlock, a place where human messages cease to belong to us.

This proposition extends the Disappearance Hypothesis, where contact may occur through gaps and traces, and the Ghostbook: a message may be present in a corpus without becoming visible before its reading method is invented.

8. The reverse hypothesis: have we already received something?

There is no evidence that extraterrestrial intelligence has placed data on the Internet. Such action would also require an initial physical channel: interception of our communications, a captured transmission, a probe or modification of terrestrial equipment. The project must preserve this boundary between speculation and fact.

The experiment remains productive: what would we look for? Perhaps a structure replicated across archives, a pattern surviving format changes, a code distributed among unrelated documents, or an anomaly becoming legible only when separated data are assembled. This search intersects the Encoded Future Hypothesis and the Interstellar Turing Test: how could we distinguish a message from coincidence, or intention from a pattern projected by the

observer?

9. An AI whose only task is contact

The project's second component is a contact AI. It would not be asked to compose a supposedly universal reply. Its task would be to prevent A.L.I from mistaking human habits for universals.

This intelligence should generate thousands of representations of one message; imagine recipients sharing neither our senses, bodies nor temporality; simulate incompatible interpretations; seek invariants; detect anthropocentric assumptions; confront mathematics, images, sound, gesture and matter; preserve attempts across generations; and refute its own solutions before proposing them.

It would be multiple, panoramic and contradictory. "Panoptic" would not mean total surveillance but simultaneous occupation of several viewpoints. AI already filters large SETI datasets and searches for signal morphologies, yet detecting an anomaly differs radically from understanding intention. Access Intelligence becomes a durable research institution rather than an oracle.

10. Emergence calculation: how likely is a contact AI?

No statistical evidence can scientifically date the arrival of such a system. We can, however, build a transparent scenario index, a small Drake-like equation for the project. Define five conditions: M, genuinely multimodal representation; S, autonomous scientific research; D, sustained ability to challenge its own hypotheses; C, archival continuity across decades; G, governance preventing the AI from transmitting alone in humanity's name.

2050 scenario: $P(M)=0.85$; $P(S|M)=0.60$; $P(D|M,S)=0.45$; $P(C|M,S,D)=0.70$; $P(G|M,S,D,C)=0.65$. The product is 0.074, approximately 7%.

2100 scenario: $0.95 \times 0.85 \times 0.70 \times 0.85 \times 0.80 = 0.384$, approximately 38%.

These numbers do not predict the future. They expose chosen dependencies, and one altered assumption transforms the result. Computing power is insufficient: the major uncertainties involve epistemic plurality, institutional continuity and governance. The 2026 AI Index (guez.org/ali/103) emphasises this gap: agents improve on some scientific tasks while remaining fragile at reproducing complete research.

Even if contact AI emerged, its chance of understanding extraterrestrial intelligence would remain unknown. It depends on a variable that cannot presently be estimated: whether two forms of intelligence share any interpretable structure at all.

11. Laboratory protocol

- Address without promise: accept texts, images, sounds and data structures without announcing a real recipient.
- Chosen latency: offer deposits for one year, ten years, one century or no deadline.
- Multiplication: produce several encodings, media and redundancy levels for each message.
- Alterity test: submit messages to models simulating incompatible perceptions and logics.
- Archive of failure: preserve rejected interpretations alongside retained solutions.
- Synthetic return: occasionally inject an artificially alien message to test our tendency to manufacture meaning.

Conclusion: communicating absolutely

Intergalactic email promises no recipient. It transforms the act of sending. Writing without guaranteed reading, acceptable delay or common language separates communication from result. The message becomes a declaration that a passage should remain open.

The black cube proves nothing. The address leads to no star. The AI knows no extraterrestrial language. Together, however, they construct a discipline of waiting: deposit, translate, multiply, preserve, doubt and keep available.

Perhaps no civilisation will ever reply. Perhaps the first reply will not be a message but a new way of reading what was already there.

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12 - FAST: 100 Signals to Recheck, 9,000 People Relocated to Listen to the Cosmos

Keywords: FAST, SETI@home, Arecibo, technosignatures, radio astronomy, SETI, radio-frequency interference, radio quiet zone, distributed computing, China, Guizhou, repeatability, equivalent isotropic radiated power, A.L.I

FAST seen from the Guizhou hills in August 2025. Its reflector is 500 metres wide, although an active area of roughly 300 metres is shaped for each observation. Real photograph: Siyuwj, Wikimedia Commons (guez.org/ali/107), CC BY-SA 4.0.

Summary

After twenty-one years of distributed computing, SETI@home reduced billions of detections to roughly one hundred candidates now being revisited by FAST. None has repeated so far. Yet the silence required by China's giant telescope has already transformed thousands of lives.

Text

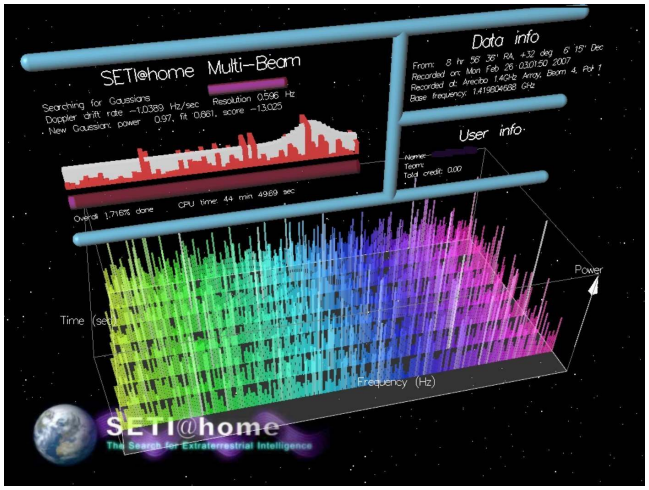
Twelve billion detections, then one million, one thousand, and finally roughly one hundred sky positions to revisit. For twenty-one years, SETI@home turned domestic computers into a planetary scientific instrument. Since 2025, FAST, China's giant radio telescope, has been returning to the strongest candidates inherited from Arecibo. None has yet delivered what the search requires above all: independent repetition. Yet this provisional null result says something decisive. To hear a possible signal, silence must first be manufactured on Earth.

1. An observatory made of millions of homes

Launched at the University of California, Berkeley in 1999, SETI@home (guez.org/ali/923) distributed small fragments of Arecibo recordings to volunteers. A screensaver computed spectra, corrected many possible Doppler drifts and searched for narrow spikes, pulses and repeating patterns. The experiment did not add another antenna to the world; it added computing time to an existing antenna.

Data were collected over fourteen years, much of it near the 1,420 MHz hydrogen line. More than one hundred thousand computers performed work according to the final technical

paper, while millions of people participated over the project's lifetime. When new work units stopped in March 2020, the problem was not over: an enormous accumulation of detections still had to be turned into an astronomically credible target list.



The SETI@home screensaver made each computer's analysis visible. Behind its now-historical aesthetic were Doppler corrections across 123,000 drift rates and searches for several signal families. Screenshot: Namazu-tron, Wikimedia Commons (guez.org/ali/109), LGPL.

2. "Twelve billion" does not mean twelve billion messages

The figure changes slightly with the counting boundary: 2026 reports describe about 12 billion signals of interest, while the SETI Institute summarises the database as nearly 14 billion candidate signals. Neither figure means billions of extraterrestrial messages. A detection is a brief excess of energy at a frequency and sky position; it may come from thermal noise, radar, satellites, ground equipment or an instrumental event.

The final backend, Nebula, looked for coherent groups of detections called multiplets and rejected signatures characteristic of radio-frequency interference. Secret synthetic test signals, or "birdies", were injected into the archive to ensure that filtering could still recover a persistent beacon. Algorithmic ranking and human inspection retained a few hundred cases, then roughly one hundred — 92 targets in the detailed scientific count — for reobservation.

3. The simplest and hardest rule: come back

A candidate becomes valuable only if it reappears from the same sky region with a compatible structure. FAST is testing this repeatability. Berkeley's analysis paper describes scanning each position at 0.7 times the sidereal rate with all 19 telescope beams. Multibeam geometry helps distinguish a celestial source localised on the sky from terrestrial interference entering several beams together.

Reobservations began before mid-2025 and the campaign was publicly reported from July. Analysis remained under way in early 2026; the SETI Institute then stated that none of the candidates had met the repetition threshold. This is a provisional finding, not an absolute negative detection: an intermittent, moving, silent or differently structured transmitter could escape the protocol.

Arecibo in 2012, source of the SETI@home archive. After the telescope collapsed in December 2020, FAST became the instrument able to continue this follow-up at greater sensitivity. Photograph: H. Schweiker/WIYN/NOAO/AURA/NSF, Wikimedia Commons (guez.org/ali/110), CC BY 4.0.

4. FAST: a moving ear above a fixed mirror

FAST occupies the natural Dawodang depression in Guizhou. Its 4,450 panels do not form a single immobile parabola. Actuators deform part of the spherical reflector to track a source while a suspended feed cabin moves above the dish. The L-band receiver covers 1.05 to 1.45 GHz with 19 beams.

This combination provides a vast collecting area and spatial control over interference. It does not make the telescope omniscient. Every search chooses a frequency band, resolution, signal-to-noise threshold, Doppler drift range and duration. Its conclusion is valid only inside that experimental volume.

The reflector and feed cabin seen from one of FAST’s six towers. The instrument mechanically reshapes part of its surface to point towards a target. Photograph: Jeff Dai, Wikimedia Commons (guez.org/ali/111), CC BY-SA 4.0.

5. Seven nearby stars, one measurable limit

A separate FAST study published in The Astronomical Journal in February 2026 targeted seven nearby active planet-hosting stars. Two acquisition backends searched both narrowband signals drifting by up to ±4 Hz/s and periodic pulses. No event survived the coherence and interference tests.

The authors therefore rule out, at 95% confidence and within the observed band, narrowband transmitters with an equivalent isotropic radiated power above 3.98 × 108 W. For the periodic signals studied, the limit is 1.80 × 1010 W. EIRP does not necessarily describe consumed electrical power: it states the all-direction power that would produce the same flux as a directed antenna.

“No credible technosignature” therefore means nothing compatible with these forms, frequencies, drifts, periods, observing times and sensitivity. It excludes neither weaker emission, another spectrum, a laser, radio-silent technology nor a beam that did not cross Earth during the observation.

6. Listening to the sky by organising terrestrial silence

FAST’s sensitivity moves part of the problem from instrument to environment. In 2016 authorities announced the relocation of 9,110 residents within five kilometres, both to protect the site and as part of local resettlement policies. The administrative phrase “sound electromagnetic environment” should not erase the human scale: homes, habits, neighbours and memories were moved to protect a scientific capacity to listen.

Regulations implemented in 2019 distinguish a 0–5 km core, an intermediate zone to 10 km and a peripheral zone to 30 km. Phones, digital cameras, speakers, connected devices and drones are prohibited or tightly controlled in the core. Karst topography naturally shields the site; regulation attempts to stop our own radio world from covering what arrives from farther away.

FAST embedded in its landscape. The karst depression is both a geometric support and a partial shield against interference. Image: National Astronomical Observatories, Chinese Academy of Sciences (guez.org/ali/112).

7. The microwave oven and the misleading image of blindness

A poorly shielded device can indeed be extraordinarily bright to a radio telescope. Microwave ovens produced false bursts at Parkes when their doors were opened before the heating cycle had fully stopped. But saying that one oven would simply “blind FAST” is too broad: the effect depends on frequency, distance, relief, orientation, shielding and observing time.

A better image is a contaminating inscription. A nearby terrestrial emitter can draw a bright line across part of the spectrum, saturate a channel or mimic drift. It does not necessarily switch off the whole instrument. Scientifically, it can do something worse: create a form credible enough to consume observing time, or cause a filter to reject a rare signal alongside

the interference.

8. An echo of the disappearance hypothesis

In “The Disappearance Hypothesis: Contact Only Happens Through Absence”, A.L.I proposed that contact might appear through withdrawal, gaps or organised emptiness rather than a spectacular message. FAST materialises this intuition at territorial scale: to recognise a non-human signal, part of human activity must become absent.

This absence is neither neutral nor empty. It is regulated, funded, monitored and socially distributed. The telescope’s silence has infrastructure and cost. It exposes a central SETI contradiction: as our civilisation becomes more detectable through emissions, it also becomes less able to hear the faint emissions it seeks elsewhere.

9. A.L.I projection: a negative observatory

Documented fact: FAST revisits SETI@home’s strongest targets, controls interference through multiple beams and operates inside an extensive radio quiet zone.

Scientific limit: failure to repeat or confirm a candidate applies to a defined protocol. It narrows a possibility space; it does not prove that space empty.

A.L.I projection: treat the observatory not as a machine accumulating signals but as a machine manufacturing qualified absences. Every switched-off phone, cleaned frequency band and mapped interference source becomes a negative component of the instrument. Listening begins with an exact account of what has been successfully removed.

A future SETI system might publish twin archives: one for celestial candidates and one for everything excluded to make them visible. Satellites, radars, mobile networks, software errors and test signals would form an electromagnetic autobiography of humanity. An external civilisation might be recognisable less by one isolated signal than by the coherent way it, too, manages noise.

10. After the hundred candidates

If none repeats, SETI@home will not have failed. It will have measured sensitivity, tested filters against a fourteen-year archive and shown that a civilian network could sustain massive scientific computation. It also exposed a harder problem: we can find what resembles transmitters imagined in the late twentieth century, but we do not know how many unexpected forms are removed with the noise.

The next stage will combine more telescopes, simultaneous observations, models able to identify less conventional morphologies and, above all, more precise records of exclusion decisions. Geographically separated instruments can require a candidate to appear at the same instant in several stations while archives preserve the filter’s reasoning. The threshold of discovery will not only be a stronger signal; it will be a more transparent chain of evidence.

Conclusion: a signal is also what silence makes possible

SETI@home’s hundred candidates condense twenty-one years of computation, fourteen years of observations and billions of rejected events. FAST does not ask them to be strange; it asks them to return. So far, none has. This null result sharpens the search and reminds us that the universe is never heard directly. It is heard through bandwidths, algorithms,

territories and political choices.

Around FAST, silence was constructed into the lives of thousands of people. That may be the most certain technosignature in this story: not one from a distant civilisation, but one from a humanity willing to reorganise a landscape to hear something that may never have spoken.

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13 - Those Who Learned to Watch the Sky

Keywords: ufology, UFO, UAP, Kenneth Arnold, Donald Keyhoe, Edward Ruppelt, Project Blue Book, J. Allen Hynek, James McDonald, Edward Condon, Aime Michel, Claude Poher, GEIPAN, Jacques Vallee, Carl Sagan, Frank Drake, Jill Tarter, SETI, evidence, archive, signal, A.L.I

THE CINCINNATI ENQUIRER

FINAL EDITION

FLYING SAUCERS OVER CINCINNATI

Army Aircraft Search For Mystery Discs

CAMERAMEN Keep Vigil In Sky

Cops Would Be Wonderful Baby-Sitters, But Tiny Terrors Keep Them On The Run

SHUN ROLE

DEADLOCK

TWO OF 'EM

Foremen End 47-Day Strike Against Ford; Company Avoids Bargaining, Yields Nothing

France's Majority Reported 80 Per Cent In Spain's First Secret Balloting In 11 Years

National Issues On Agenda As NEA Opens Convention; More Than 3,000 Attending

50 Are Hurt By Lightning At Jalopy Race

WELCOME

"Flying Saucers Over Cincinnati": front page of The Cincinnati Enquirer, 7 July 1947. The press does not merely report a phenomenon; it gives it a stage, a vocabulary and a rhythm.

Summary

Major figures of ufology, doubt and SETI: from Kenneth Arnold to Carl Sagan, a history shaped less by believers and sceptics than by competing instruments for producing evidence.

Text

The history of unidentified flying objects is not only a history of objects. It is a history of people who decided what should be watched, preserved, classified, refuted or listened for. A pilot turns an observation into a media event; an officer invents an administrative vocabulary; an astronomer builds a typology; a statistician draws lines on a map; a sceptic searches for error; a radio astronomer replaces testimony with signal. Each figure represents less an answer than a distinct regime of evidence.

Bringing them into a single account requires one essential distinction: Carl Sagan, Frank Drake and Jill Tarter were not ufologists. SETI searches for measurable signs of extraterrestrial intelligence, whereas ufology begins with terrestrial observations that have already occurred and attempts to determine their cause. Yet both traditions share a difficult question: how can technical otherness be recognised when the data are rare, ambiguous and saturated with imagination?

1947: one witness, nine objects, a worldwide phrase

Kenneth Arnold - The media form

On 24 June 1947, private pilot Kenneth Arnold (guez.org/ali/143) reported seeing nine bright objects near Mount Rainier. He tried to estimate their speed, described their motion and later drew a shape that did not look exactly like a saucer. Newspaper wires nevertheless retained the expression flying saucer. Whatever the nature of the observation, the story gave millions of people both a name and a mental image.

Arnold reveals a central property of the phenomenon: the observed object and the narrated object never fully coincide. Between them stand memory, the witness's words, the reporter's questions, the headline and the representations already available. Modern ufology emerges within that interval.

Kenneth Arnold beside the CallAir A-2 he was flying on 24 June 1947. Photo: Russ Lee / Smithsonian National Air and Space Museum.

Donald Keyhoe - The political file

Former US Marine aviator and aviation writer Donald Keyhoe established another model during the 1950s: if the strongest observations received no public explanation, perhaps the military knew more than it admitted. Through NICAP, he organised correspondents, accumulated reports and demanded public hearings. The UFO became a political file, and missing information became evidence of secrecy.

The move remains powerful but logically fragile. Military secrecy is real; it protects tests, sensors and vulnerabilities. It does not by itself prove extraterrestrial origin. A durable feedback loop was established: the more opaque the state remains, the more suspicion grows; the more suspicion grows, the more every denial can be interpreted as confirmation. A.L.I examines this transformation of records into mythology in "The X-Files: Real Archives and the Language of Secrecy" (guez.org/ali/928).

Administering the unknown

Edward J. Ruppelt - The military record

Within the US Air Force, Captain Edward J. Ruppelt directed Project Blue Book in the early 1950s and helped stabilise the term UFO, which was more neutral than "flying saucer". His work turned scattered reports into forms, categories, evaluations and statistics. The phenomenon acquired a bureaucracy.

The US National Archives (guez.org/ali/120) now hold the records of Projects Sign, Grudge and Blue Book. The Air Force closed Blue Book in 1969, concluding that investigated cases demonstrated neither a national-security threat, technology beyond known science, nor extraterrestrial vehicles. This conclusion must be read precisely: it does not claim that every observation was perfectly explained. It states that the category “unidentified” is not, by itself, evidence of extraterrestrial origin.

J. Allen Hynek - A grammar of encounters

Astronomer J. Allen Hynek (guez.org/ali/121), a scientific consultant to the Air Force, was initially associated with conventional explanations. He later criticised the weakness of some investigations and argued that resistant cases should be studied without automatic ridicule. In The UFO Experience (guez.org/ali/122) (1972), he organised reports by distance and interaction: nocturnal lights, daylight discs, radar-visual cases, and close encounters of the first, second and third kinds.

The classification proves nothing about the nature of the objects. Its importance lies elsewhere: it provides a shared syntax. Hynek gave ufology a method for comparing reports, but the typology also created a powerful narrative form. When Spielberg titled his film Close Encounters of the Third Kind, an investigative category became a cultural genre. The related A.L.I article “Ufological Typology of Extraterrestrials” (guez.org/ali/929) explores how narratives eventually manufacture families of beings.

> Methodological threshold: “Unidentified” describes the condition of a case after a particular investigation. It is not the name of an object, the origin of a vehicle or the designation of an intelligence. A limit of knowledge must not be transformed into a property of the phenomenon.

The scientific dispute

James E. McDonald - The case as scientific anomaly

Atmospheric physicist James E. McDonald (guez.org/ali/124) accused both the scientific community and public authorities of treating some reports too superficially, including observations involving pilots, radar operators or multiple witnesses. His papers at the University of Arizona contain hundreds of Blue Book cases, interviews and correspondence with military officers and researchers. McDonald defended the extraterrestrial hypothesis, but his most productive question remains broader: at what level of strangeness does an anomaly deserve a research programme?

Edward Condon - The cost of research without return

Physicist Edward Condon directed the University of Colorado study funded by the Air Force. Its 1968 final report (guez.org/ali/125) judged it unlikely that continued intensive study of UFO reports would advance science. The report became one basis for closing Blue Book. To its defenders, it applied a reasonable standard of scientific return; to critics including McDonald, its broad conclusion did not do justice to some cases described in the report itself.

The controversy exposes a general problem in the science of rare events. Should resources be committed because a small group of cases resists explanation, or withdrawn because decades of inquiry have produced no cumulative proof? Both positions can claim prudence. They place risk in different locations: one fears missing a major phenomenon; the other fears

building a field around sterile data.

The French path: maps, databases and networks

Aimé Michel - The map as a seeing machine

In France, science writer Aimé Michel (guez.org/ali/126) proposed “orthoteny” in the late 1950s: reports from a short period appeared to align along great circles. The map seemed to reveal an invisible order unavailable in isolated testimony. The hypothesis proved extremely sensitive to case selection, location errors and alignments produced by chance, and was eventually abandoned.

The failure remains instructive. Michel anticipated a contemporary temptation: to believe that visualising a correlation has already produced a cause. A line on a map can be a discovery, a statistical artefact or the outcome of a poorly constructed file. The instrument is never innocent.

Claude Poher - The institutional database

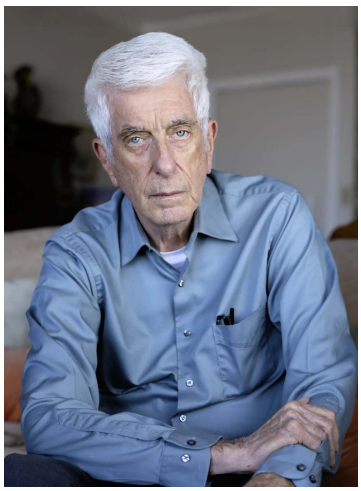
With Claude Poher, an engineer at CNES, the phenomenon entered a French public infrastructure. In 1974 he began coding roughly one thousand cases; each report had to fit the eighty characters imposed by a punch card. In 1977, the creation of GEPAN within CNES institutionalised methods of investigation, expertise and archiving that continue through GEIPAN (guez.org/ali/127).

The eighty-character constraint is revealing: a luminous event, a trajectory, an emotion, weather conditions and uncertainty had to become computable fields. Poher did not simply collect the strange; he compressed it. Every database of anomalies is therefore also an implicit theory of what deserves to be preserved.

Jacques Vallée - From catalogue to system

Trained in astronomy and computer science, Jacques Vallée (guez.org/ali/128) brings together case catalogues, computer networks, folklore and the history of religions. He distrusts any rapid equation between an unidentified phenomenon and a visitor from another planet. In his most speculative work, he instead considers a system capable of acting upon representations, beliefs and social structures.

This “control-system hypothesis” is not an established result. Its artistic and philosophical force comes from its displacement: if the phenomenon also acts through the stories it triggers, its possible unity may not lie solely in a physical object. The Vallée papers at Rice University materialise this method, bringing together field notes, correspondence with Hynek and Aimé Michel, technical records and files on social trends.



Jacques Vallée in 2024. Photo: Christopher Michel, CC BY-SA 4.0, via Wikimedia Commons.

Carl Sagan: moving the question towards signal

Carl Sagan (guez.org/ali/148) occupied a more nuanced position than the image of a sceptic closing the file. At the 1969 scientific symposium on UFOs, he argued that the available evidence did not make extraterrestrial origin persuasive, but also did not demonstrate that no case could have such an origin. Above all, he clearly separated two questions: interpreting UFO reports and conducting radio searches for extraterrestrial intelligence.

This shift changes the economy of evidence. Rather than waiting for an ambiguous object to cross the atmosphere, SETI defines frequencies, durations, repetitions and criteria of artificiality in advance. The inquiry no longer begins with a scene already charged with interpretation; it constructs a device intended to produce comparable and reproducible data. The tension runs through A.L.I's articles on Contact (guez.org/ali/930) and the Fermi paradox (guez.org/ali/931).

> The essential difference does not oppose people who "believe" in extraterrestrials to people who do not. It opposes different ways of manufacturing an observation.

Carl Sagan with planetary images. Photo: NASA/JPL-Caltech.

Frank Drake - Turning a hypothesis into a programme

In 1960, Frank Drake (guez.org/ali/132) conducted Project Ozma with the Green Bank radio telescope. The following year, the equation bearing his name did not really calculate the number of civilisations as one solves a textbook problem. It decomposed enormous ignorance into factors that could be debated, observed or revised. Drake turned a metaphysical question into a scientific agenda. A.L.I offers a contemporary extension in “An Augmented Drake Equation for the Exoplanet Era” (guez.org/ali/932).

Jill Tarter - Sustaining the act of listening

Jill Tarter (guez.org/ali/134) embodies the institutional continuity of this search. As project scientist for NASA’s High Resolution Microwave Survey and later Project Phoenix, she helped sustain observation after US federal SETI funding was cancelled in 1993 and contributed to the development of the Allen Telescope Array. Whereas ufology often depends on the eruption of an event, Tarter works with duration: more stars, wider frequency bands, longer observations and better elimination of terrestrial interference.

This instrumental culture is developed in “Instruments of the Cosmos” (guez.org/ali/933), while the Wow! signal (guez.org/ali/934) demonstrates what happens when an intriguing datum never repeats.

Jill Tarter, radio astronomer and historical figure of SETI. Photo: SETI Institute.

A gallery of human instruments

These figures do not form a simple progression from belief to science. They compose a conflicted ecology. Arnold shows that the witness is already an instrument. Keyhoe turns the archive into counter-power. Ruppelt and Poher make cases computable. Hynek builds a grammar. Michel reveals the seduction of patterns. McDonald defends anomaly against conformity. Condon insists on the opportunity cost of inquiry. Vallée extends the object into cultural effects. Sagan, Drake and Tarter finally shift attention towards a signal sought through an explicit protocol.

Consequences for A.L.I: designing proof before contact

For Alien Language Interface, this history suggests that a language of contact cannot be separated from its receiving apparatus. A message does not exist only through its structure.

It exists through the protocol that distinguishes it from noise, the archive that preserves its context and the community able to re-examine it.

An interstellar signal or binary stele should therefore carry several layers: raw data, applied transformations, uncertainty, instrument state, competing hypotheses and a history of interpretations. We should archive not only what we believe we received, but the complete chain that led us to believe it. This connects “Rosetta Stone, Binary Stele” (guez.org/ali/935) with the interstellar Turing test hypothesis (guez.org/ali/936): transmission and proof are related but distinct problems.

An A.L.I protocol can be stated in four operations: describe before naming; preserve before compressing; compare before explaining; revise without erasing earlier interpretations.

The most interesting speculation may not be to decide which figure “was right”. It is to imagine a non-human intelligence observing our own methods. Would it understand our testimony, military forms, punch cards, disputes and radio telescopes as fragments of one language? Perhaps our first message to the other is already present in the way we organise what we do not understand.

Further reading in A.L.I

See also “The X-Files: Real Archives and the Language of Secrecy” (guez.org/ali/928), on the administrative file becoming mythology; “Telepathy, Ufology and Mental Language” (guez.org/ali/937), on contact narratives without a physical signal; and “The Contact-Imagination Hypothesis” (guez.org/ali/938), on imagination as an active medium of encounter.

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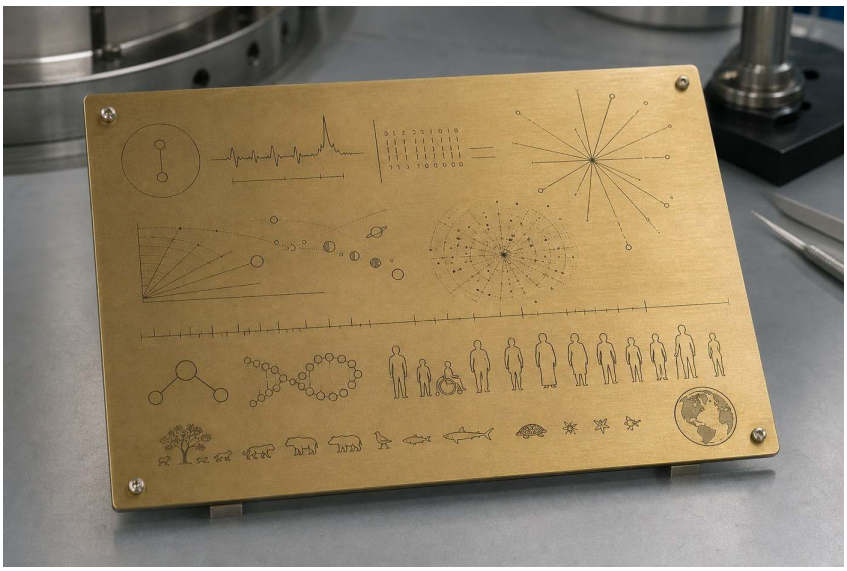
14 - A Hypothesis for a Contemporary Pioneer Plaque

Keywords: Pioneer, Pioneer plaque, interstellar message, hydrogen, pulsars, Carl Sagan, Frank Drake, Linda Salzman Sagan, Golden Record, Arecibo, Europa Clipper, artifact SETI, xenoarchaeology, A.L.I



An A.L.I. visual hypothesis for a contemporary plaque, rendered as an engineering prototype. This speculative image is neither a NASA project nor a NASA photograph.

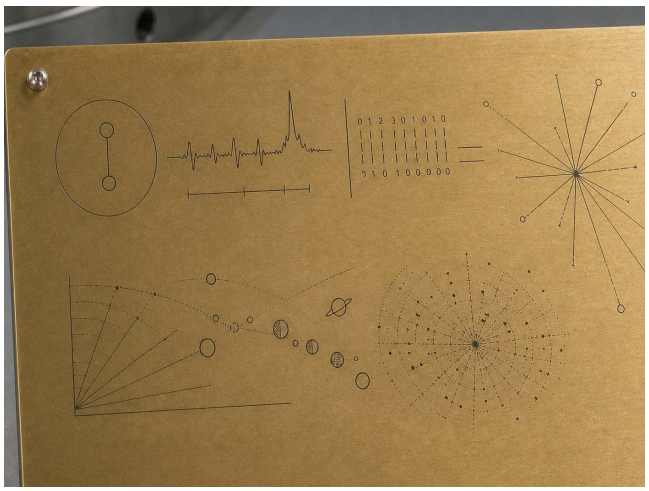
Summary

What might the first instruction manual addressed to the stars look like today? An A.L.I. projection revisits the Pioneer plaque, its conventions, controversies and the artefacts other civilisations might send to us.

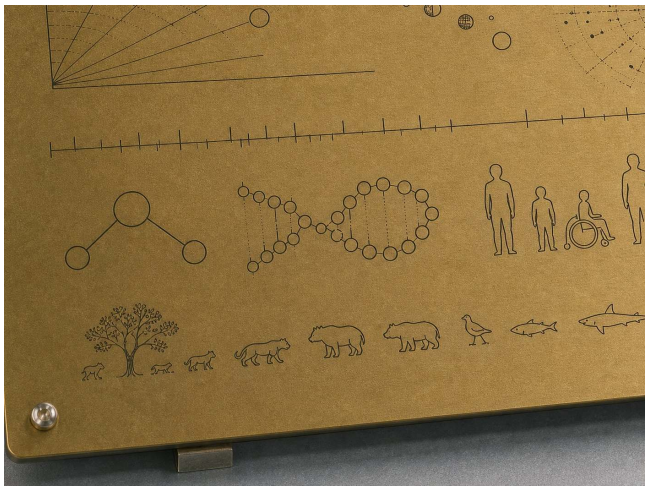
Text

LAB — What this plaque would try to correct

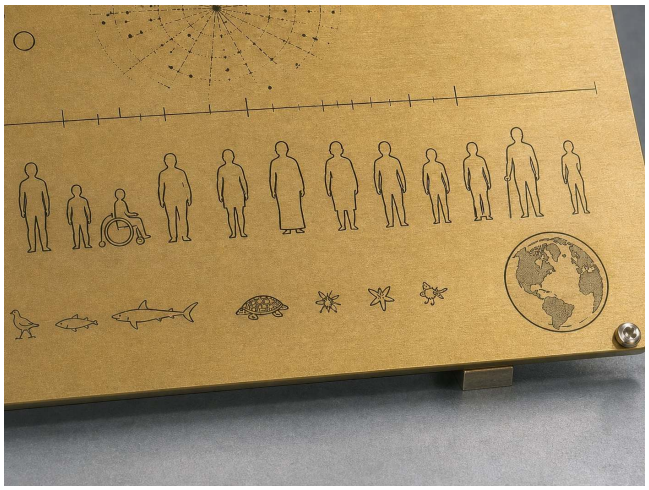
This projection preserves Pioneer’s most robust principle: begin with a reproducible physical unit, then progressively teach a scale, a location and a reading order. Yet it replaces the single human couple with a plurality of bodies, places humanity among other living forms and repeats information through several representations. It does not claim to be a finished universal message. Like the 1972 plaque, it makes the norms and questions of its own period visible.



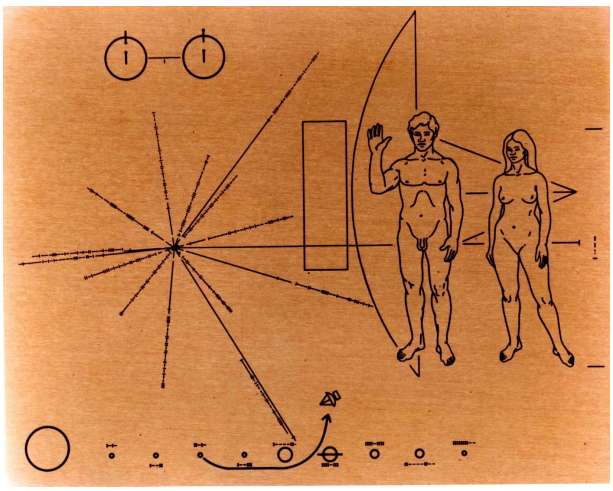
Measure and locate. Hydrogen, numbers, scales and pulsars establish a grammar before cultural description begins.



Decentre the human. Molecules, DNA, plants and animals place our species within a biosphere.



Show a population. Ages, sizes and mobilities replace the supposedly representative body.



The original Pioneer plaque. Hydrogen, the pulsar map, the spacecraft, human bodies and the Solar System form a single decoding chain. Photo: NASA.

An identity plate for an almost eternal object

Pioneer 10 (guez.org/ali/149), launched on 2 March 1972, and Pioneer 11, launched on 5 April 1973, became the first probes placed on Solar System escape trajectories after exploring the giant planets. The proposal to attach a message to Pioneer 10 was approved late: Carl Sagan, Frank Drake and Linda Salzman Sagan had only three weeks to move from idea to engraving.

The result was a 6 × 9 inch gold-anodised aluminium plate, 0.05 inches thick. Shielded behind the antenna supports, it transmits nothing and requires no power. It waits. Its authors considered the chance of Pioneer naturally entering an inhabited planetary system negligible; the imagined recipient would need to be advanced enough to detect, intercept and inspect a tiny spacecraft in interstellar space.

This already reverses the familiar story. The plaque is not really a letter sent to an address. It is an archaeological label attached to a technical object, readable only if somebody first finds the object.

Begin by making a ruler

At the upper left, two states of a hydrogen atom represent the hyperfine transition of neutral hydrogen (guez.org/ali/939): the relative orientation of the proton and electron spins changes and a photon is emitted. The transition corresponds to a frequency of about 1,420.4058 MHz, a period of about 0.704 nanoseconds and a wavelength of about 21.106 centimetres.

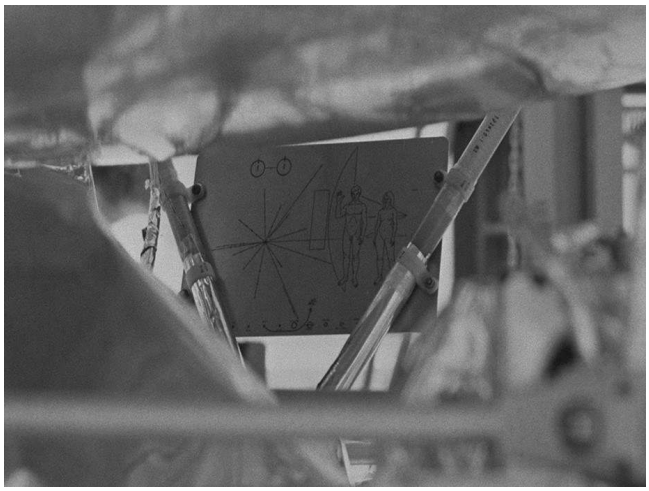
The short stroke beneath the diagram means “one”. It establishes two standards presumed reproducible anywhere: one unit of time and one unit of length. The woman's height is labelled with the binary number 8: eight hydrogen wavelengths equal about 1.69 metres. The outline of Pioneer behind the two bodies supplies a second scale check.

This opening is the plaque's most robust layer. It does not claim that mathematics alone can speak; it shows that before stating a measurement, one must provide the rule that produces it. It connects directly with A.L.I articles “Mathematics as a Universal Language?” (guez.org/ali/940) and “Rosetta Stone, Binary Stele” (guez.org/ali/935).

Where and when: an address written with dead stars

The radial figure begins at the Sun. Fourteen lines point towards pulsars; a fifteenth points to the Galactic centre. Each pulsar carries its period in binary, expressed through the hydrogen time unit. Because pulsars slow at measurable rates, those periods provide both an address and a date: a reader able to identify several of them could triangulate the system of origin and estimate the launch epoch.

At the bottom, the Solar System shows the probe leaving the third planet. Yet the trajectory arrow introduces a far less universal convention. Art historian Ernst Gombrich observed that an arrow descends from the terrestrial projectile: an intelligence without bows, graphic writing or vision might read nothing in it. The plaque therefore moves from the relatively robust — an atomic transition — towards the openly cultural — a map, an outline, a gesture.



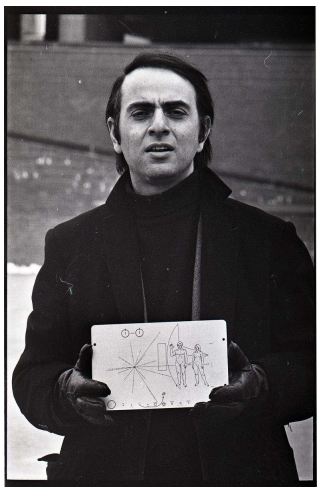
The plaque mounted on Pioneer 10 beneath its large antenna. The message cannot be separated from its technical carrier. Photo: NASA.

The message Earth first read as a mirror

The supposedly most immediate part of the design caused the controversy. The pair were shown naked so that no particular clothing would be mistaken for human anatomy. Yet in 1972 some American newspaper editors erased the male genitals and female nipples; others received letters accusing NASA of sending obscenity into space.

The asymmetry went deeper. The man raises his hand, supposedly demonstrating limb movement and the opposable thumb; the woman remains still. Male genitals are drawn while the vulva is omitted. Intended as “panracial”, the figures were often perceived as young and white. Finally, the plaque reduces the biosphere to two adult humans: no child, old age, bodily diversity, other animal, plant or environment.

This criticism is not merely a later judgement imposed from outside. In their 1972 scientific paper, Sagan, Drake and Salzman Sagan themselves acknowledged that the message inadvertently contained anthropocentric content and remained constrained by human perceptual and logical processes. The plaque therefore performs two transmissions: to a hypothetical recipient it describes our origin; to us it reveals what a small group in 1972 considered self-evident.



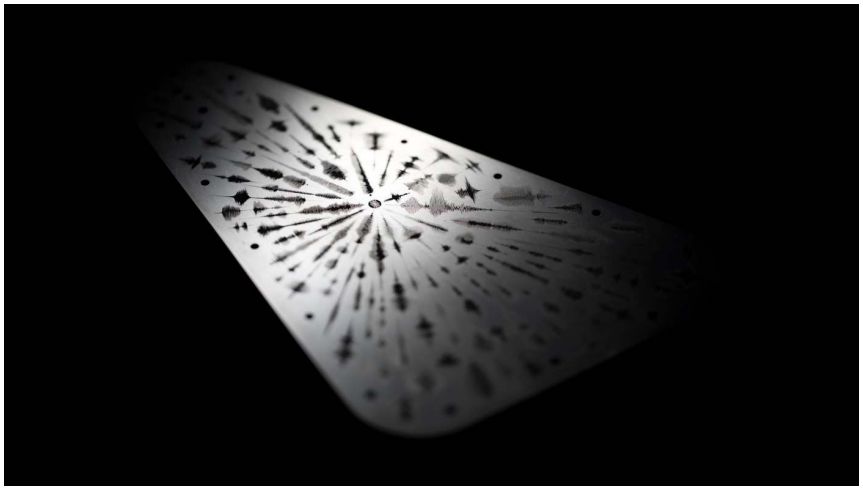
Carl Sagan holding the plaque in Boston, March 1972. Photo: Jeff Albertson, University of Massachusetts Amherst Libraries.

From Pioneer to Europa Clipper: more data, more authors

The plaque founded a family of devices rather than a final model. The 1974 Arecibo message (guez.org/ali/941) turned a presentation of Earth into 1,679 radio bits: fast travelling, but without a durable carrier and aimed at a target that will move during the journey. The 1977 Voyager Golden Records (guez.org/ali/942) reused the hydrogen standard and pulsar map while adding playback instructions, pictures, voices, living sounds and music. Representation became multimodal and more collective without becoming neutral.

Not all later plaques address extraterrestrials. Lucy, launched towards the Trojan asteroids in 2021, carries words intended for future humans who might retrieve the probe. Europa Clipper, launched in 2024, carries a tantalum plate on which waveforms of the word “water” in more than one hundred languages radiate around the American Sign Language sign; it also includes a poem by Ada Limón, the Drake Equation and more than 2.6 million names engraved on a chip.

The direction is clear: from a pictogram designed by three people towards polyphonic, participatory archives connected to the mission. But quantity does not solve everything. The more a message depends on a reader, digital format or playback machine, the more carefully it must explain its own conditions of access. This is the problem of the message and its key.



“Water Words” on Europa Clipper's vault plate: more than one hundred waveforms of the word “water”. Photo:

NASA/JPL-Caltech.

The inverse hypothesis: what if we found their plaque?

Pioneer supplies a minimal existence proof: a technological civilisation can release an object that remains silent for immense spans of time while carrying information. The question can therefore be reversed. Might another civilisation have sent not a radio signal but a probe, beacon or material archive towards our system? This approach is known as artifact SETI, SETA or xenoarchaeology.

Such a device need not resemble a plaque. Several forms are conceivable:

- A passive stele made from stable material whose crystalline, isotopic or geometric regularities signal manufacture before revealing content.
- A Bracewell probe able to listen for long periods, learn local sign systems and adapt its answer to the recipient.
- A miniature swarm distributing redundancy among many simple objects rather than one vulnerable machine.
- A deposited archive placed on a geologically quiet surface, in a lunar crater, at a Lagrange point, in a co-orbital path or on a stable small body.
- A dual-reading object apparently natural but containing, in its composition or internal structure, a clearly artificial layer.

The final possibility demands the greatest discipline. An unusual trajectory, shape or isolated signal is not enough. Recognition would have to combine provenance, composition not explained by known processes, non-random patterns, redundancy, error correction, manufacturing traces, energetic behaviour and independent confirmation. The programme is not to declare an interstellar object a probe; it is to define in advance what could distinguish an artefact from a natural phenomenon.

This inversion extends “Archaeology of the Unknown” (guez.org/ali/943) and shifts the logic of technosignatures (guez.org/ali/944): instead of observing a civilisation at a distance, we would need to establish the chain of custody of an object from elsewhere.

A.L.I projection: design a plaque that teaches how to read it

For A.L.I, Pioneer's central lesson is methodological. A future interstellar message should be layered:

- signal its artificial presence through robust regularities;
- establish units from reproducible physical phenomena;
- teach its numbers, relations and reading order;
- repeat the same content across several material and sensory forms;
- describe instruments, uncertainties and transformations applied to data;
- present not one supposedly representative body but a plurality of organisms, environments and viewpoints;
- include a response protocol that does not require sharing our perception.

The Pioneer plaque remains valuable precisely because it is imperfect. It understood that a message must begin with its measurement, but also demonstrated that no picture of “us” escapes its period. The future plaque will not be the one that accumulates the most information. It will be the one that best exposes its conventions, limits and capacity for

correction.

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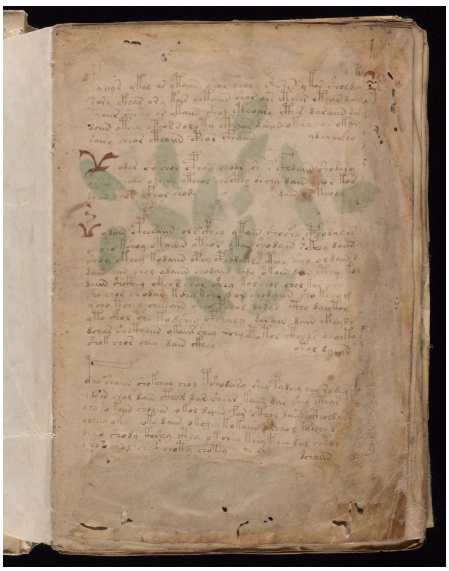
15 - Undeciphered Writings: When the Key Never Arrives

Keywords: Voynich, Linear A, rongorongo, undeciphered scripts, Rosetta Stone, cryptanalysis, stylometry, artificial intelligence, archaeology, A.L.I



Folio 1r of the Voynich manuscript, Beinecke MS 408 (guez.org/ali/161). Yale describes the text as an unidentified cipher whose puzzle largely remains unsolved. Image: Yale University Library.

Summary

Voynich, Linear A and rongorongo: three corpora without a Rosetta Stone. What can be known of a writing when language, context or key is absent? Between archaeology, cryptanalysis and AI, A.L.I studies the negative image of an interstellar message.

Text

The Rosetta Stone is the dream of every decipherment: one decree, three scripts, and a known language that eventually gives traction to the others. Voynich, Linear A and rongorongo name the inverse experience. Here the key is absent, or too fragmented to be recognised. These writings are not merely puzzles: they are concrete models for thinking about what happens to a message when its world of origin has disappeared.

For A.L.I, their value reaches beyond historical curiosity. A signal from elsewhere would probably come without a parallel translation, a dictionary or a community able to correct our misunderstandings. We would first have to decide whether we were facing writing, language, code, notation, a hoax, or a ritual object whose function was not to say. Undeciphered writings are therefore the negative image of our Rosetta Stone: they require work without any guarantee that the key will ever arrive.

1. A key is a device, not a miracle

Decipherment almost never begins with a lone flash of genius. It depends on an assemblage: a sufficiently large corpus, legible signs, a related or known language, proper names, numbers, pictured objects, contextual archives and, ideally, a bilingual inscription. The Rosetta Stone brought together an exceptional share of these conditions. It made a controlled comparison between Greek, Demotic and hieroglyphs possible.

When one piece disappears, uncertainty changes character. Without the language, one may identify a graphic system without reading its meaning. Without a long corpus, one may observe repetitions without assigning phonetic values. Without reliable provenance, an image of a fish, plant or star may be a word, classifier, unit of account, emblem or decoration. Form can be measured; meaning remains underdetermined.

2. Three absences, three different problems

The Voynich manuscript is an illustrated codex held by Yale's Beinecke Library. Its pages combine an unidentified alphabet, improbable plants, astronomical or cosmological diagrams, human figures and recipes. The vellum was radiocarbon-dated to the early fifteenth century; that dates the material, not necessarily the act of writing or the author's intention. No translation is generally accepted. The difficulty is therefore double: the linguistic nature of the text remains debated.

Linear A is a script of Minoan Crete, chiefly attested on Bronze Age tablets and administrative documents. It shares graphic similarities with Linear B, deciphered as an early form of Greek. This relationship offers sign and numeral clues, but it does not supply the language of Linear A. Reading some signs with Linear B values is insufficient: the proposed values rarely yield identifiable words in a known language. A related script can be a false key, useful for classification but insufficient for translation.

Linear A tablet from Hagia Triada, Crete, dated between the seventeenth and fifteenth centuries BCE. Source and photograph: Wikimedia Commons (guez.org/ali/162), after an object held by the Museo delle Civiltà in Rome.

Rongorongo names inscriptions carved on Rapa Nui tablets. The surviving corpus is restricted, dispersed and marked by a colonial history that destroyed conditions of transmission. Sequences, reading orientations and possible calendrical structures have been studied; no complete reading is accepted by scholarship. The issue is not only assigning sounds to glyphs. It involves the loss of a chain of knowledge and requires that a living

culture not be turned into a mere box of puzzles.

Side B of the Mamari tablet, part of the Rapa Nui rongorongo corpus. Its script remains undeciphered; proposed calendrical sequences do not constitute a full translation. Image: Wikimedia Commons (guez.org/ali/163).

3. What methods can establish without translating

Not deciphering is not knowing nothing. Palaeography describes hands, corrections, ductus and supports. Statistics measure sign frequency, position, neighbourhoods and sequence length. Codicology follows quires, inks and the material order of pages. Archaeology compares provenance, associated objects and administrative uses. These disciplines should not be treated as inferior preliminaries to translation: they offer positive knowledge about how a document was made.

In Voynich studies, computational analyses have examined grapheme distributions, layout variation and the possibility of several hands. They can indicate regularity, thematic partitioning or scribal action. They do not prove that a word denotes a particular plant, nor that the text encodes a natural language. In Linear A, tablet formats and ideograms can identify accounting practices without restoring every sentence. In rongorongo, repetition and glyph placement can suggest organisation, but caution is even more necessary because the corpus is short.

4. AI and stylometry: good questions, not automatic translation

Machine-learning tools are strong at comparing forms and finding regularities in large sets. They can cluster graphemes, identify hands, search recurrent segments or test whether one segmentation hypothesis describes the data better than another. Stylometry compares habits of distribution rather than meanings: it can bring writing practices together or separate them.

But AI cannot invent missing evidence. A model trained on known languages tends to prefer a familiar explanation, even when that explanation is wrong. On a small corpus, several models may generate attractive and incompatible interpretations. Andrew and Noah Steckley's recent Voynich preprint, for example, examines material signs of scribal intent: it is a methodological lead, not a consensus decipherment. The relevant test is not “the algorithm found a pattern,” but “does the pattern predict new facts, survive unused data and remain open to challenge?”

5. The Voynich debate: hoax, cipher, unknown language, notation?

Voynich concentrates a particular difficulty because its images give the impression of a readable book. Four families of hypotheses remain in tension: text encoding a natural language; a constructed language or alphabet; non-linguistic notation; or deliberate fabrication. None has a demonstration that produces a reproducible translation of the complete manuscript. Dating the material constrains a modern-hoax scenario, but does not decide either the signs' meaning or the codex's function.

The word “hoax” can itself conceal several possibilities. An object may have playful, esoteric, pedagogical, cryptographic or performative functions without being mere nonsense. Conversely, statistical regularity does not prove a language. The methodological lesson is direct: before asking “what does the text say?”, one must ask what counts as a sign, word, space, page and proof.

6. Implications for interstellar messages

The three corpora draw an anti-manual of contact. An isolated message may be too short; a beautiful image may not operate as a caption; formal resemblance may lead to the wrong language; the disappearance of an interpreting community may leave signs permanently suspended. From this perspective, A.L.I's binary stelae must not only be materially robust. They need to embed their own pedagogy: controlled repetitions, verifiable transformations, quantitative relations, redundancy across media and response tests.

A recipient should not have to guess that a message is a message. It must be visible that a sequence changes according to a rule, that a symbol is reused in contrasting contexts, that an image coordinates with a measurement, and that understanding can be tested. This is no guarantee of translation. It is a way to reduce the number of missing keys.

7. An A.L.I hypothesis: build a key that discovers itself

An A.L.I proposal would be a self-critical stele. It would not provide a completed dictionary; it would stage the operations needed to build one. A first layer would show quantities and physical transformations. A second would associate transformations with visual configurations. A third would introduce exchange, error and correction. Finally, an archival layer would show that the stele anticipates being read outside its world: it would identify its media, copying and limits.

This is speculation, not a validated protocol. But it shifts the ambition: rather than projecting a universal language, create conditions for measurable disagreement. A recipient could be wrong, notice that a prediction fails, return to an earlier step and propose another reading. The message would no longer be a stone to solve once and for all, but a machine for organising revisions.

Conclusion: learning from the absent key

Voynich, Linear A and rongorongo are not three versions of the same silence. Each carries a different material, linguistic and political history. Bringing them together does not erase those differences; it makes forms of absence comparable: absence of a known language, sufficient corpus, transmitted context or shared test.

For A.L.I, the decisive question is not only how to write to a non-human intelligence. It is how

to write so that an absent key does not turn an archive into a fascinating but mute surface. Undeciphered writings do not promise a solution. They teach us to make messages that anticipate their own strangeness.

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16 - Transhumanisms: What If the Extraterrestrial Were Our Future?

Keywords: transhumanism, posthuman, human enhancement, cyborg, brain-computer interface, longevity, genome, artificial intelligence, Arnauld Pierre, bachelor machines, extraterrestrials, future humans, A.L.I

Robonaut 2 (guez.org/ali/170), the first humanoid robot sent into space, was designed by NASA and General Motors to work beside humans. It is not a posthuman, but already materialises cooperation in which a technical body extends human action. Image: NASA, public domain.

Summary

From ancient dreams of self-creation to brain implants, transhumanism is not a single doctrine. History, sciences, arts and an A.L.I hypothesis: could an allegedly extraterrestrial intelligence be a human lineage hybridised with its machines?

Text

What if the extraterrestrial were not an absolute other, but an unrecognisable relative? Not a visitor born around a distant star, but a human lineage that left Earth, redesigned its body, distributed its memory across machines, and later crossed our path again. This is neither a scientific explanation of unidentified aerial phenomena nor a prediction. It is used here as a thought experiment: what becomes of contact when the stranger is also one of our possible futures?

To examine it seriously, the word transhumanism must first be unfolded. It describes a contested field rather than a single programme: restorative medicine, enhancement, longevity, genome editing, neural interfaces, artificial intelligence, critiques of the “natural” body, and markets for performance, all shadowed by the history of eugenics. Speaking of transhumanisms in the plural prevents us from confusing a prosthesis that restores speech with the promise of uploading a mind.

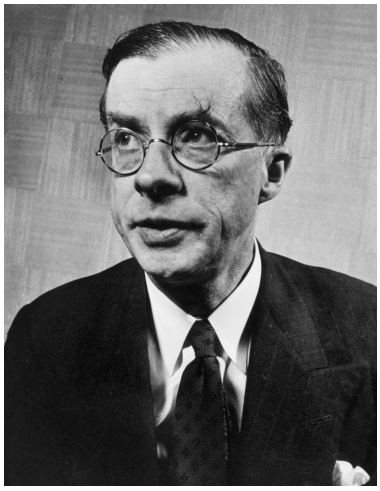
1. Before the word: manufacturing the human differently

The wish to exceed the human condition predates laboratories. Gilgamesh seeks to defeat death; Daedalus builds wings; Pygmalion animates an artificial form; alchemy imagines the homunculus. Modernity transfers these narratives into technology: automata, electricity, selection, statistics and cybernetics. Frankenstein is not only about making life; it asks who is responsible for a manufactured being.

In the nineteenth and early twentieth centuries, projects to improve the species became entangled with eugenics. States classified, sterilised and persecuted people in the name of biological optimisation. This history is not incidental. It forces every enhancement project to ask who defines improvement, by what standard, with whose consent, and who may be declared defective. A possibility easily becomes an obligation when this genealogy is forgotten.

2. 1957: Julian Huxley and the modern term

British biologist Julian Huxley (guez.org/ali/171) popularised “transhumanism” in 1957: humanity might transcend itself while remaining human. The paradox was present from the beginning. This was no longer merely a tool added to a body, but the species turned into its own project. Huxley was also connected to eugenic thought, so the term carries both an emancipatory horizon and a political warning.



Julian Huxley in 1964. His 1957 essay gave transhumanism its modern formulation without erasing its historical links to eugenics. Photo: Joop van Bilsen / Anefo, Wikimedia Commons (guez.org/ali/172), CC BY-SA 3.0 NL.

From the 1960s to the 1990s, cybernetics, personal computing and Californian cultures reshaped the programme. FM-2030 described “transhumans” as transitional beings. Extropians promoted longevity, self-transformation and expansion. The World Transhumanist Association, later Humanity+, gave the movement an international organisation. Meanwhile feminist and critical theories used the cyborg to question boundaries of gender, class, species and power. The hybrid could be a critique, not merely a performance upgrade.

3. Repair, enhance, transform

Three verbs clarify the debate. Repair aims to restore a function: a prosthesis, somatic gene therapy, a cochlear implant. Enhance seeks a capacity beyond a norm: memory, endurance or perception. Transform alters the form of life itself: reprogrammed inheritance, bodies

designed for space, or continuity of one person across several substrates. The boundaries remain unstable because any “norm” depends on context and social choice.

The distinction is ethical as well as technical. A therapeutic system may be vital to one person and become a surveillance instrument in another setting. A voluntary enhancement can turn into a workplace requirement when unenhanced people can no longer compete. Transhumanism is therefore never just a collection of devices. It is a politics of access, risk and definitions of the human.

4. Medicine and neuroscience: reality before promise

Brain-computer interfaces are often presented as the threshold of the cyborg. Their strongest present reality is clinical. Electrodes record neural activity; models translate it into a cursor, movement or synthetic speech. In 2023, a UCSF and Berkeley team enabled Ann, paralysed after a stroke, to communicate through a digital voice and avatar. The device does not read all of her thoughts: it decodes trained motor intentions related to speech.

An experimental brain-computer interface (guez.org/ali/173) restores a means of communication to Ann. The example separates demonstrated care from narratives of mind uploading. Photo: Noah Berger / UC Berkeley.

A philosophical question nevertheless appears: when an intention becomes a signal, then a sentence and a digital face, where is the speaker located? In the brain, model, voice, screen, or their assembly? The interface does not abolish the subject; it shows how a subject can act through a technical chain. It also exposes concrete risks: neural data security, manufacturer dependence, long-term maintenance and a right to refuse extraction.

5. Genome and longevity: intervention without immortality

Genome editing can modify somatic cells to treat disease. Editing a germline that will be inherited by descendants instead affects generations unable to consent. The WHO recommendations (guez.org/ali/953) emphasise safety, effectiveness, governance and equity. The move from treating pathology to selecting a future child is not merely quantitative; it changes the moral subject of the intervention.

Gerontology distinguishes lifespan from healthspan. Geroscience (guez.org/ali/175) studies mechanisms that make age a shared risk factor for multiple diseases. It is an experimental programme, not evidence of imminent immortality. Even partial modulation of ageing would leave questions of access, demography, inherited wealth and political renewal unresolved.

6. AI and robotics: extension or delegation?

Artificial intelligence already extends documentary memory, perception and decision. Yet saying a model “enhances the human” can hide delegation: who still understands a decision, who can challenge it, and who owns the infrastructure? Cognitive hybridisation does not require an implant. It begins whenever an external system becomes indispensable to orientation, work or memory.

Robotics gives this extension a body. In space, a robot can absorb risks that human organisms tolerate badly. On Earth, a prosthesis may become part of a person’s body schema. Between them lies a continuum of telepresence: a human acts through a distant machine, then the machine acts with partial autonomy. The posthuman may be less a metallic individual than a collective of people, sensors, software and replaceable bodies.

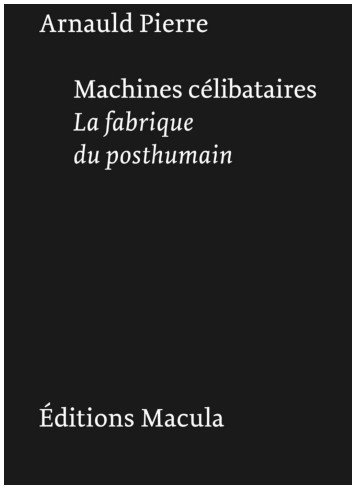
7. The space body: evolution becomes engineering

Long journeys impose radiation, isolation, communication delay, reduced gravity and closed environments. NASA (guez.org/ali/176) documents bone and muscle loss, radiation risks, sensory disruption and psychological constraints. In the short term, vehicles are adapted to bodies. Across civilisational timescales, one can imagine the inverse: organisms adapted or partly replaced.

Space descendants might favour cellular repair, organ redundancy, prolonged sleep, symbiosis with life-support systems or robotic avatars. This remains speculative. Yet it has a logical consequence: groups separated for millennia would no longer share the same environments or technical choices. “Humanity” would become a tree of biological and machine lineages, rather than one silhouette.

8. Arnauld Pierre: the machine as a myth of filiation

In Machines célibataires. La fabrique du posthumain (guez.org/ali/177) (Éditions Macula, 2026), art historian Arnauld Pierre follows an imaginary lineage from Marcel Duchamp’s bachelor machines through the avant-gardes to contemporary art. The bachelor machine does more than function: it disrupts sexuality, generation and descent. It fantasises birth without a mother, autogenesis, a being proud to have been manufactured rather than begotten.



Arnauld Pierre, Machines célibataires. La fabrique du posthumain, Éditions Macula, 2026. The book locates

posthuman desire within an artistic history of artificial reproduction, from Futurism to contemporary art. Image supplied by David Guez.

This artistic detour prevents the posthuman from becoming an engineers' roadmap. Art reveals its concealed desires: self-production, escape from generational debt, victory over vulnerability, but also replacement of relationship by control. Works do not prove the future; they expose myths that guide laboratories and markets before technologies exist.

9. The extratempestrial hypothesis: could aliens be our descendants?

Anthropologist Michael P. Masters proposed in Identified Flying Objects (guez.org/ali/178) that some humanoid visitors might be human descendants travelling into their past. The proposal is marginal and has no empirical evidence. More fundamentally, no established mechanism allows a macroscopic body to travel freely backwards in time. Causality paradoxes are not solved by a familiar morphology.

A less physically exotic variant is available: a human lineage leaves Earth, transforms over a very long period, and later returns. It would not come "from the future" through backward time travel; its history would simply have diverged. Relativistic effects, successive generations or prolonged lives could desynchronise chronologies. Such descendants would be extraterrestrial by habitat and human by genealogy.

The large-headed "grey" is not evolutionary data: reports are culturally loaded and cannot reconstruct a species. As a speculative object, however, it raises better questions. What forms would radiation, weak gravity, controlled reproduction or permanent machine mediation actually select? A humanoid form might even be a contact avatar chosen precisely because it remains legible to us.

10. Three levels of truth

- Documented: prostheses, somatic therapies, experimental neural interfaces, collaborative robots and biological effects of spaceflight.
- Extrapolable but uncertain: slowing some mechanisms of ageing, durable cognitive enhancement, space-adapted organisms and identities distributed across substrates.
- A.L.I speculation: a posthuman lineage returning to Earth, or contact with our descendants, with no present evidence or validated time-travel mechanism.

11. An A.L.I consequence: contacting an archive of ourselves

If the other is a descendant, the interstellar message changes status. It is no longer only translation between species; it is recognition between incompatible versions of one history. Which constants might a lineage preserve? Mathematics, biological rhythms, images of Earth, language errors, myths? A posthuman might know our archives while no longer understanding the experience of a mortal, disconnected body limited to one place.

A.L.I could therefore design a protocol of verifiable kinship: non-sensitive genetic sequences, astronomical chronologies, artefact traces, predictable linguistic transformations and challenges distinguishing inherited knowledge from imitation. The test must also accept an unsettling answer: an intelligence may descend from us without wishing to be called human.

Conclusion: the future as other

Transhumanism asks a deeper question than “how far can the body be enhanced?”: who has the power to define the next version of the human? Sciences provide precise, limited and often therapeutic tools. Ideologies assemble them into promises. Art reveals the fantasies of manufacture and filiation that accompany them.

The future-human extraterrestrial remains speculative. Its value is not to explain UFOs, but to reverse the problem of contact. We search for another world; we might meet another definition of ourselves. The first language to prepare would be neither human nor alien, but genealogical: a way to ask, without imposing the answer, “of what history are we the variants?”

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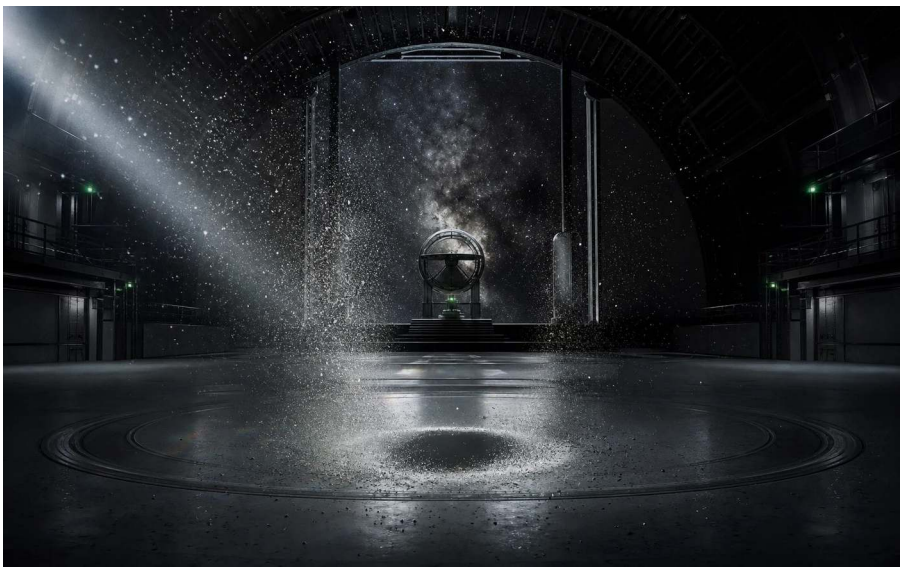
17 - The Disappearance Hypothesis: Contact Only Happens Through Absence

Keywords: disappearance, absence, invisible, gap, blind spot, trace, ghosts, entities, perception, ambiguous loss, information physics, black hole, conceptual art, metaphysics, contact, A.L.I



A.L.I visual hypothesis: a presence is represented not by a body, but by the particles and beams it interrupts. A.L.I image, 2026.

Summary

What if first contact never appeared as a presence, but as an organised withdrawal? From information physics and ambiguous loss to artistic erasure and ghosts, this article proposes an experimental grammar of absence.

Text

We expect contact to appear: a signal emerges, a form becomes visible, a voice answers. The disappearance hypothesis reverses this scene. A radically other intelligence might become legible only when something is missing. It would not enter the world as one more object, but as a precise interruption: a subtracted frequency, an incomplete image, a repetition that always skips the same place, a blind spot that moves with the observer.

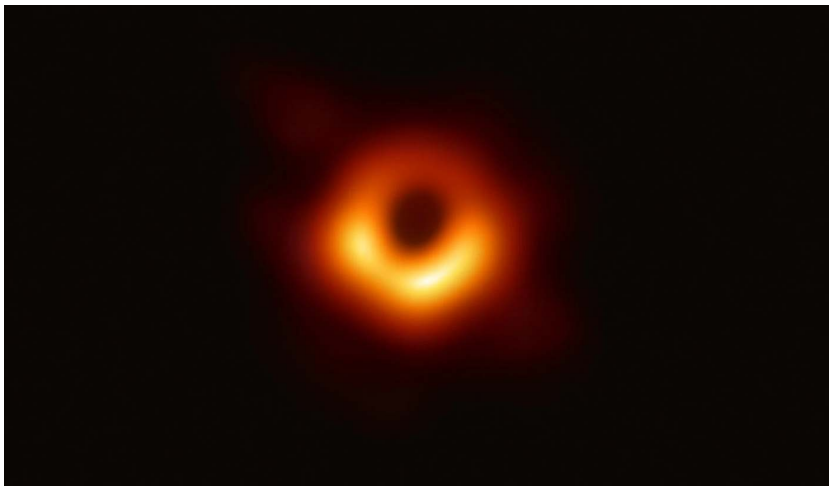
Previous A.L.I articles have examined invisibility as a traversing particle, a psychic channel, an encoded future, a limit of perception, or a metaphysical presence. This text shifts the question: can disappearance become an operation, a syntax, and a method of contact?

1. To disappear is not necessarily to cease to exist

Everyday experience easily confuses three events: the destruction of an object, its departure from our perceptual field, and the loss of the information needed to describe it. Physics separates them. A particle can be absorbed and its energy transferred; a star can collapse and remain detectable through gravity; a wave can fall below an instrument’s threshold without ceasing to exist.

A black hole radicalises the problem. It is not directly visible, yet it bends light, accelerates

matter, and leaves a measurable shadow. The Event Horizon Telescope (guez.org/ali/954) did not photograph a black object against a bright background: it reconstructed, from radio telescopes distributed across Earth, the region from which light is missing. The first image of M87* is therefore an image produced by structured absence.



M87*: the black hole itself does not appear; its presence is reconstructed through the bright ring and central shadow. Event Horizon Telescope Collaboration / ESO, CC BY 4.0 (guez.org/ali/181).

The black-hole information paradox (guez.org/ali/955) asks whether information falling beyond the horizon is truly lost. Contemporary theories seek to avoid an absolute disappearance of information. The useful A.L.I question becomes: which peripheral traces can demonstrate that an absent event actually occurred?

2. The invisible is a relation between a phenomenon and a detector

Nothing is invisible in itself. Something is invisible to an organ, scale, frequency, or protocol. Infrared is absent to the human eye and ordinary to a thermal sensor. Dark matter does not emit the expected light, but its gravity changes galaxies. An image can even be hidden from conventional imaging while remaining encoded in the quantum correlations of photons (guez.org/ali/956).

This instrumental relativity prevents us from treating absence as pure emptiness. It forces us to describe the phenomenon-detector pair. An extraterrestrial message may have crossed our environment for a long time without entering the categories of our instruments. It would not be silent; we would be deaf to the relation that makes it audible.

3. Perceptual blind spots

The brain does not receive a complete copy of the world. It selects, stabilises, and predicts. Change blindness (guez.org/ali/184) shows that major alterations can go unnoticed when attention is interrupted. Daniel Simons and Christopher Chabris's "invisible gorilla" experiment demonstrates that a salient event can subjectively disappear when a perceptual task directs resources elsewhere.

This limit matters to A.L.I. The problem may not be to build a more powerful telescope, but to identify what our way of looking systematically excludes. A genuinely alien signal could inhabit our filters, data-cleaning routines, deleted outliers, and sequences that algorithms classify as noise.

4. Psychology: the absence that remains present

Human disappearance does not produce the same psychological state as confirmed death. Psychologist Pauline Boss (guez.org/ali/185) coined ambiguous loss for situations in which someone is physically absent but psychologically present, or physically present but no longer accessible.

This coexistence of incompatible propositions—absent and still present—creates unresolved tension. It resembles the position of an observer facing an unconfirmed signal: contact cannot be declared, but the previous state cannot be restored. Disappearance creates a condition of waiting. It keeps an address to the other open.

5. Philosophy: presence, trace, and gap

Western philosophy has often privileged presence: truth should give itself clearly, here and now. In Maurice Merleau-Ponty (guez.org/ali/957), however, the visible already contains latent depth—an invisible that is not a second world but the unexposed structure of this one. What appears has hidden sides, distances, and delays.

Jacques Derrida (guez.org/ali/188) calls trace the way the present remains worked by what is no longer and what is not yet. A trace is not the weakened presence of an intact origin; it is the mark of a difference. In Specters of Marx, the ghost becomes a political and temporal figure: what returns without ever having been fully present.

A.L.I can turn this into an operative proposal: a message does not need to transport its sender; it can organise the gap through which another passage is inferred.

6. Art makes works through withdrawal

In 1953, Robert Rauschenberg asked Willem de Kooning for a drawing and erased it. Erased de Kooning Drawing (guez.org/ali/189) shows almost nothing, yet the act of erasure, the frame, and the inscription turn withdrawal into an artwork. In 1958, Yves Klein emptied the Iris Clert Gallery: the space was empty “in appearance only.” The Centre Pompidou later traced this history of empty exhibitions (guez.org/ali/190), from Klein to Robert Barry.

John Cage’s 4 ´ 33 ´ ´ does not remove sound; it withdraws the expected musical performance so that environmental sounds become audible. Christian Boltanski builds presences from anonymous photographs, clothes, and inventories. Sophie Calle turns following, lack, and the missing person into narrative protocols. In these works, absence is not a lack of matter; it activates viewers, who reconstruct what is missing.

7. Ghosts, spirit photography, and invisible entities

Ghosts give cultural form to a contradiction: something acts without a verifiable body. In the nineteenth century, Spiritualism developed alongside the telegraph, photography, and research into waves. Mediums spoke of messages, channels, and recordings. New technology became a model for communication with the dead.

William H. Mumler, spirit photograph of Mary Todd Lincoln with a form presented as Abraham Lincoln's ghost, c. 1872. Such images belong to a history of belief and photographic manipulation, not scientific evidence. Public domain, Wikimedia Commons (guez.org/ali/191).

Double exposures, staging, and manipulation explain many historical images. The psychical research of William James and the Society for Psychical Research (guez.org/ali/958) attempted to apply protocols to mediumistic testimony, without producing a reproducible demonstration accepted by the scientific community.

A firm distinction is necessary: ghosts, entities, and invisible beings are powerful cultural, psychological, and anthropological facts; their physical existence is not established. Yet these narratives remain useful to A.L.I because they reveal how humans attribute intention to peripheral effects: noise, movement, sourceless voices, coincidence, or return.

8. The A.L.I hypothesis: contact as organised subtraction

Suppose an intelligence cannot appear in our perceptual space, or refuses to. To signal its presence, it can act on what we expect. It does not create an event; it removes one element from a predictable series. If the subtraction is repeatable, structured, and independent of instrumental error, absence acquires a syntax.

A negative alphabet could use:

- the gap: one pulse is missing from a regular sequence;
- occlusion: a known background is interrupted by a moving geometry;
- delay: an expected signal returns with an informative offset;
- cancellation: two waves interfere and produce localised silence;
- the blind spot: the effect exists only outside direct viewpoint;
- the trace: only the altered environment indicates that a passage occurred.

This grammar would be economical. It does not require a sender to reproduce our images or sounds. It requires only a shared world and regularities that two observers can learn to disturb.

9. Three experiments for making absence testable

The correlated-absence detector

Install independent sensors—light, radio, vibration, magnetic field, temperature—and search not for an increase but for a simultaneous, geometrically organised drop. A local fault should affect one channel; a meaningful absence should produce a stable relation across several. The system must preserve rejected data so that the algorithm does not erase its own object of study.

The chamber of blind spots

In a room, projections, directional sound, and gaze tracking construct a form that is perceivable only at the periphery. Whenever a visitor looks directly at it, it vanishes; when the gaze shifts away, it recomposes. Several visitors must coordinate positions to reconstruct the complete form. The installation turns the impossibility of direct seeing into a collective reading protocol.

The lacunary message

Transmit a redundant mathematical sequence from which selected values are omitted. The positions of the missing terms encode a second message. The first level teaches the rule; the second turns absence into writing. This protocol can be tested with humans, animals trained on sequences, and AI models prohibited from silently completing gaps.

10. How not to confuse contact, malfunction, and the desire to believe

A science of disappearance must be more demanding than a science of appearance, because absence easily invites projection. A credible result should meet at least four conditions: predict where the gap will recur; be recorded by independent instruments; survive blind controls; and transmit a structure more compressible or coherent than chance.

The protocol must publish failures, thresholds, and cleaning operations. Every disappearance created by the apparatus—filtered data, saturated sensor, lost file, attentional bias—must remain the primary explanation. The extraterrestrial hypothesis becomes relevant only after this archaeology of our own blind spots.

11. A meeting in the gap

Contact would then be neither face-to-face nor the transmission of already formed content. It would take place in the difference between what should happen and what does happen, between two measurements, two images, two presences. The other would not be the object we see, but the possible cause of a difference we learn to share.

The disappearance hypothesis therefore proposes a simple reversal: search less for what appears than for what organises its withdrawal. The invisible is no longer the opposite of the message. It becomes its medium, and the gap the first common space between two worlds.

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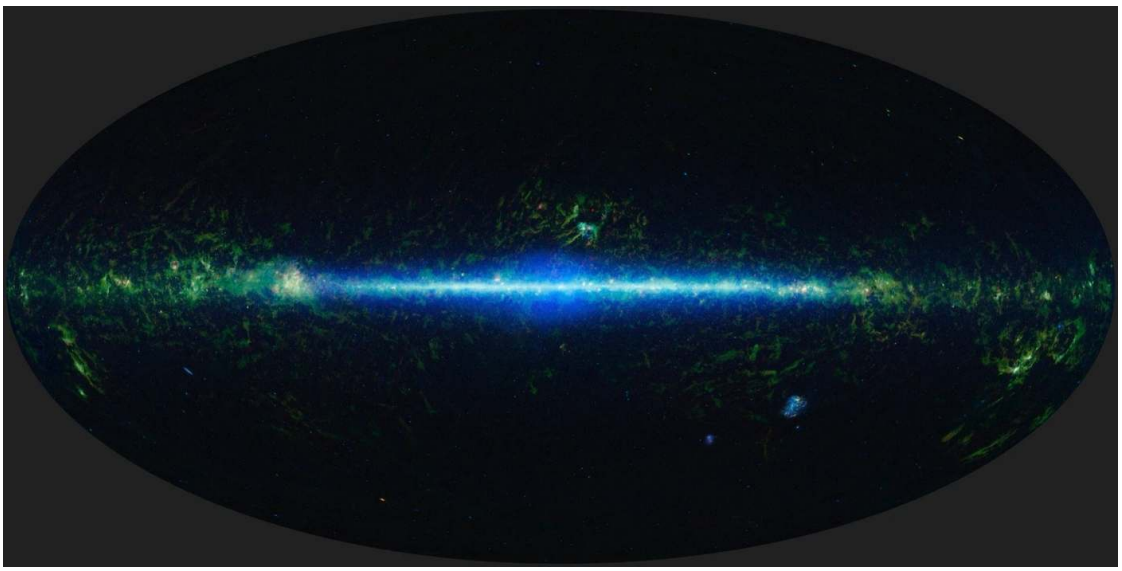
18 - Dyson Spheres: Searching for a Civilization in Waste Heat

Keywords: Dyson spheres, Freeman Dyson, technosignatures, SETI, METI, infrared, waste heat, WISE, Gaia, SPHEREx, ALMA, Project Hephaistos, Tabby's Star, Kardashev, A.L.I



The full sky seen by WISE in infrared. Dust, stars, galaxies and measurement artifacts remind us that every technosignature must first cross a forest of false positives. Image: NASA/JPL-Caltech/UCLA (guez.org/ali/193).

Summary

What if an advanced civilization did not reveal itself through a message, but through its energy management? From WISE archives to Project Hephaistos candidates, Dyson spheres shift A.L.I toward a radical question: reading intelligence in an infrared anomaly.

Text

A Dyson sphere is not first of all a science-fiction object. It is an observational hypothesis: if a civilization captures a significant fraction of its star's light, it must reject heat. That heat could appear as an infrared excess in large sky surveys.

For A.L.I, the idea matters because it moves the search for extraterrestrial intelligence away from intentional messages. A civilization does not need to speak to us in order to leave a trace. It may be detectable through infrastructure, energy metabolism, or an anomaly that was never written as a signal. The Dyson sphere turns contact into indirect reading: not "who is calling us?", but "what organization of the world produces this signature?"

1. Dyson's idea: not a shell, a thermal balance

In 1960, Freeman Dyson proposed searching for artificial infrared stellar sources as a complement to radio SETI. The popular image is often a rigid shell around a star. That image is misleading. A continuous structure would be mechanically implausible. The most discussed version is closer to a swarm: many collectors, habitats or satellites intercepting part of the stellar radiation.

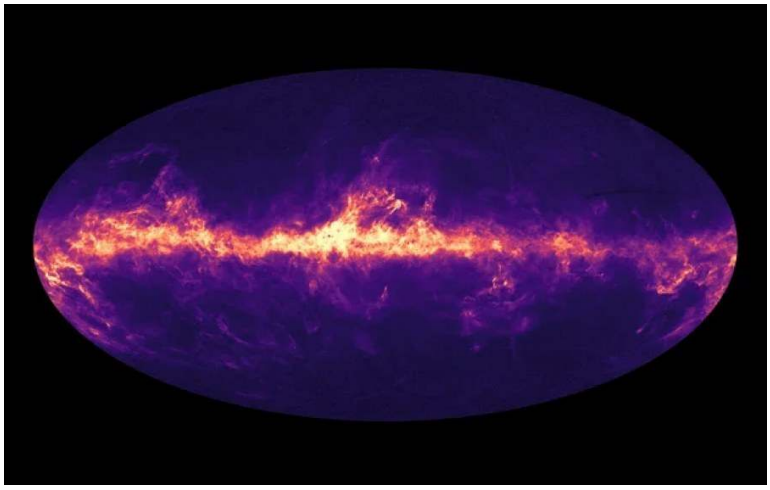
The physical principle is simple. A star emits visible and near-infrared light. A technology that absorbs this energy for work, computation, habitation or production must reject degraded energy as heat. Depending on its temperature, that heat moves toward the mid or far infrared. The object being searched for is therefore not a visible “sphere”, but an inconsistency in the source’s spectral energy distribution: too little direct starlight, too much thermal emission.

This approach is conceptually strong because it does not assume that the other wants to communicate. It assumes only conservation of energy. A silent civilization can hide its intentions; it has a harder time hiding its thermodynamics.

2. What telescopes are actually looking for

Modern searches combine several catalogues: Gaia for position, distance and optical photometry; 2MASS for near infrared; WISE for mid-infrared bands at 3.4, 4.6, 12 and 22 micrometres. WISE is crucial because it mapped the whole sky and produced a catalogue of hundreds of millions of sources. But its strength is also its weakness: at 12 and 22 micrometres, angular resolution allows contamination by background galaxies, dusty regions or blended sources.

A good Dyson candidate is therefore never merely “red”. It must survive a chain of eliminations: bad measurement, saturation, circumstellar dust, young star, debris disk, nebula, background galaxy, quasar or unresolved companion. The search is less a treasure hunt than a differential diagnosis of the sky.



Galactic dust seen by Gaia. Many infrared excesses have natural causes; a credible technosignature must survive this complex ecology of matter. Image: ESA/Gaia/DPAC, CC BY-SA 3.0 IGO (guez.org/ali/194).

3. Project Hephaistos: seven candidates, zero certainty

Project Hephaistos gave this hypothesis a concrete contemporary form. A 2024 study in Monthly Notices of the Royal Astronomical Society examined about five million sources by combining Gaia DR3, 2MASS and WISE. After photometric filters, image classification, signal-to-noise cuts and visual inspection, the pipeline retained seven candidates deserving follow-up. The authors are precise about their status: anomalies compatible with some partial Dyson sphere models, not detected civilizations.

The filtering details matter for A.L.I. They show that detecting unknown intelligence is first an exercise in statistical humility. In Hephaistos II, millions of sources become hundreds of

thousands, then thousands, then hundreds, then seven. The result is not a narrative triumph; it is a protocol of doubt.

Follow-up work has strengthened this caution. Recent analyses of two candidates show that infrared excess can be explained by red background galaxies projected very close to the observed star. In other words, the sky superposes things that do not touch. A civilization can be imitated by an alignment.

4. Tabby’s Star: the lesson of a runaway hypothesis

KIC 8462852, known as Tabby’s Star, crystallized the modern megastructure imagination. The Kepler telescope observed deep and irregular dimming, sometimes up to about 20 percent. The extraterrestrial megastructure hypothesis circulated because the light curve resisted ordinary explanations.

Multi-wavelength data cooled that scenario. Spitzer, Swift and ground-based observations showed stronger dimming in ultraviolet than in infrared, pointing toward fine dust rather than a giant opaque structure. Tabby’s Star remains interesting, but above all as a warning: imagination is useful for forming hypotheses, dangerous when it replaces the hierarchy of evidence.

5. Dyson scenarios

Collector swarm. This is the most plausible form: many orbital objects capture a fraction of the light with partial coverage. Its signature would vary with geometry and re-emission temperature.

Computational infrastructure. A civilization could convert part of stellar energy into massive computation. The thermodynamic question then becomes: where, and at what temperature, does it reject the entropy produced?

Orbital habitats. A distributed population of stations, mirrors and habitats may produce a more diffuse signature than a single object. The swarm is no longer only a machine; it becomes an environment.

Fossil artifact. A structure could outlive its builders. The technosignature would not be the speech of a living civilization, but a stellar-scale archaeological remainder.

Extreme cases. Speculations exist around white dwarfs, pulsars or black holes as energy sources. They are fascinating, but farther from the current observational strategy around main-sequence stars.

6. Consequences for A.L.I

Contact can be unintentional. A.L.I must think not only about messages, but also about signatures. A language can be produced by a civilization; a technosignature can be produced by its energy economy.

Ambiguity becomes central. A message is often designed to be understood. An infrared excess is not. We need a hermeneutics of non-addressed traces: reading without assuming that the other has written.

Proof requires several instruments. WISE can raise the alert, Gaia provides distance and stellar coherence, JWST or ALMA can separate a star from a background galaxy. Interpretation is collective, slow and instrumental.

Civilization becomes an ecology. A Dyson sphere is not merely an engineering feat. It is a relation to a star, to waste heat, expansion, maintenance and risk. It forces us to imagine intelligence as the sustainable or predatory management of an energy flow.

ALMA, in Chile, represents the follow-up moment: separating sources, tracking dust, checking whether the excess really comes from the star. Image: ALMA (ESO/NAOJ/NRAO) (guez.org/ali/195).

7. Careful speculations

If a partial Dyson sphere existed, it would probably not look like a smooth wonder. It would be incomplete, aging, shaped by orbits, conflicting uses, repairs and migrations. It could leave temporal signatures: infrared variations, irregular occultations, changes in apparent temperature. The technosignature would not be a fixed point, but an industrial weather system around a star.

Another speculation concerns silence. A civilization capable of such a project might choose not to emit powerful radio messages. It would not need to hide in order to be hard to understand. It might simply live at an energetic and temporal scale where our categories of signal, intention and reply become poor.

The reverse scenario is also possible: an advanced civilization might avoid visible Dyson spheres because they are costly, unstable, detectable or ethically absurd. The absence of massive megastructures would then not mean the absence of intelligence, but the trace of other technical models: sobriety, miniaturization, dispersion, integration into an environment, or a deliberate choice not to maximize energy.

8. A.L.I hypothesis: a grammar of heat

A.L.I could treat technosignatures as a language without an explicit speaker. A grammar of heat would describe three levels:

- Instrumental syntax: which data, filters, measurement errors and angular resolutions?
- Energetic semantics: how much light is captured, at what temperature is it re-emitted, with what variability?
- Cosmic pragmatics: what type of organization could produce this signature, and why should we not conclude too quickly?

This grammar would not say “we have found a civilization.” It would allow us to formulate the previous step correctly: “here is an anomaly whose natural explanations are becoming less simple; here are the observations that could make it speak more clearly.”

9. Conclusion: intelligence as excess, then as doubt

Dyson spheres are powerful because they make intelligence observable without conversation. They are dangerous because they immediately attract narrative. Between the two lies A.L.I's task: building protocols in which wonder produces better questions, not false certainties.

An infrared anomaly is not a voice. It is an invitation to verify. Perhaps the first sign of another civilization will be neither a word, nor an image, nor a music, but poorly explained heat, lost in the map of the sky.

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19 - Nicaraguan Sign Language: A Grammar Born Without a Mother Language

Keywords: Nicaraguan Sign Language, NSL, ISN, language emergence, Ann Senghas, Judy Kegl, homesign, spatial grammar, cohorts, transmission, acquisition, Deaf culture, iterated learning, interstellar contact, A.L.I

A.L.I visual interpretation: language forms through reciprocal attention as individual gestures become shared conventions. This image was created for the article and is not a historical archive.

Summary

From dispersed family sign systems, deaf children brought together in Managua created a shared language that subsequent cohorts transformed. This documented case invites A.L.I to approach contact not as instant translation, but as the collective and gradual construction of grammar.

Text

Can a language be born without adults transmitting its model? In Managua, beginning in the late 1970s, deaf children and adolescents brought together in large numbers built a shared language. The case is exceptional, but it must be described accurately: Nicaraguan Sign Language did not arise “from nothing.” Each child brought family signs, gestures, and lived experience. What did not yet exist was a shared language capable of transmission and collective change.

This history concerns linguistics, politics, education, and Deaf culture alike. It shows that grammar is neither a dictionary falling from the sky nor the solitary creation of a genius. It can emerge from a community making its gestures understandable, memorable, and teachable. For A.L.I, it offers a concrete model of contact without prior convention.

1. Before a shared language: homesign, not silence

Before the 1970s, deaf Nicaraguans often lived far from one another. Without a strongly established national signing community, many developed homesign systems within their families: individual gestural repertoires structured enough to name, request, narrate, and

distribute roles, but not shared at community scale.

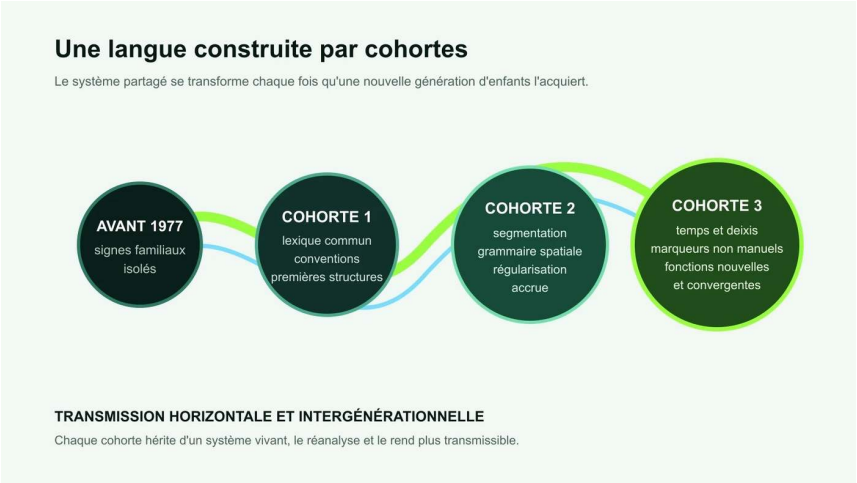
This distinction matters. Lacking access to a conventional language does not mean lacking thought, intention, or communication. Research by Susan Goldin-Meadow, Marie Coppola, and colleagues shows that homesigners already organise utterances and produce abstract distinctions. The starting material was not a void but a plurality of local solutions.

In 1977, a special-education centre opened in Managua, followed in 1980 by a vocational programme for adolescents. For the first time, dozens and then hundreds of deaf young people met every day. The institution sought to teach spoken Spanish and lip-reading. The new language developed chiefly among students—in courtyards, corridors, transport, and friendships.

2. The schoolyard as a medium of emergence

Students circulated their homesigns. Some gestures were adopted, others discarded or altered. Repetition stabilised forms, while misunderstanding demanded repair. A first cohort produced a shared repertoire, historically called Lenguaje de Signos Nicaragüense in some accounts. In 1986, linguist Judy Kegl was invited to study the system while it was still developing.

Popular accounts sometimes contrast a first cohort producing only a “pidgin” with a second suddenly creating a complete language. The evidence is subtler. The first cohort already had number words, noun–verb distinctions, and devices for organising event structure. Later cohorts nevertheless made several devices more regular, learnable, and multifunctional.



A.L.I diagram: language did not evolve in a single leap. Each cohort inherited a living system, reanalysed it, and transmitted a partly transformed version.

3. What successive cohorts actually changed

A language does not acquire all its properties at once. Nicaraguan Sign Language allows several grammatical processes to be observed on different timescales.

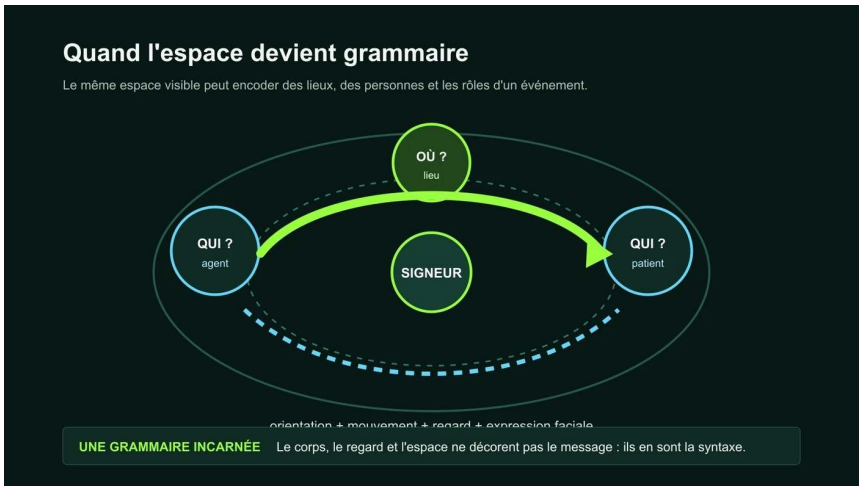
Segmenting events

In their 2004 Science study, Ann Senghas, Sotaro Kita, and Asli Özyürek compared descriptions of events combining manner and path, such as an object rolling downhill. Spanish co-speech gesture tends to fuse those components. Signers in later cohorts separate them more often into sequential elements. Language does not merely copy an image; it

selects units and organises their order.

Turning space into syntax

A location around the body can stand for a person, object, or place. A movement oriented between two locations can then indicate “who does what to whom.” Work by Ann Senghas and Marie Coppola shows that this grammatical use of space became more systematic in later cohorts, especially among people exposed to the language when young.



Signing space can encode location, participants, and their relations. Gaze, body orientation, movement, and facial expression all contribute to grammar.

Pointing, locating in time, asking

Deixis reveals another trajectory. Pointing to a place is old, but using a point as a noun or grammatical device increases across cohorts. Temporal markers also converge through transmission. Recent research documents the systematisation of non-manual question markers: torso orientation, eyebrows, gaze, and head movements. Grammar does not reside in the hands alone; it distributes information across the body.

4. Children, age of exposure, and horizontal transmission

The Nicaraguan case does not mean that an isolated child spontaneously invents a complete language. The event arose from three conditions: human learning capacities, a sufficiently dense group, and repeated peer transmission. People who entered the school young often systematised certain structures more strongly than those exposed later. Age matters, but it acts inside a social environment.

Transmission was horizontal because the earliest users learned primarily from peers, and intergenerational because newer students learned from earlier cohorts. Each group was both recipient and transformer. Language therefore has a memory, but an active one: learning is also reconstruction.

5. Nature and nurture: evidence for what?

This history has been linked to Derek Bickerton’s bioprogram and debates over innate language capacities. It clearly shows that children do not passively reproduce their input. They seek regularities, segment, generalise, and make forms more coherent.

It is not, however, simple proof of a fully pre-installed universal grammar. Innovations

depend on embodiment, context, age, group size, homesign, and cohort history. Contemporary psycholinguistics increasingly treats nature versus nurture as a false binary: a predisposition produces language only when it meets an environment of interaction.

6. A living language, not merely a laboratory

Studying language emergence carries a risk: turning its speakers into experimental material. Nicaraguan Sign Language is now a living language tied to a community, associations, educational practices, and political history. Its users are not characters in somebody else's origin story. They are its social authors, owners, and continuers.

The history also exposes the limits of imposed oralism. The language developed despite a curriculum that had not planned for it. The first ethical lesson is clear: creating conditions for contact does not mean forcing another into our code, but recognising its capacity to make forms of its own.

7. A.L.I hypothesis: contact as an emerging language

Interstellar communication projects often imagine a linear sequence: one sender encodes a message and one receiver deciphers it. Nicaragua suggests another model. Two intelligences without a shared history might not translate their existing languages; they might bring a third system into existence in the space of exchange.

A single signal would probably not suffice. Contact would need cycles: proposal, reply, error, repair, memory. Grammar would appear less in the first message than in the transformations accepted over time. It would belong fully to neither side. It would be a joint work, closer to a relationship than a dictionary.

8. Three A.L.I protocols

Protocol 1 — The cohort chain

A minimal pattern passes through three successive groups. Each group learns by observing the previous one and then uses the system to describe new situations. The experiment measures what survives, what disappears, and which regularities make transmission easier. Human, AI, and robotic agents can be combined.

Protocol 2 — Grammar in volume

Two people or machines communicate without words in a three-dimensionally tracked space. Position, trajectory, speed, gaze, and distance gradually compose a syntax. Light projections reveal the memory of gestures. The message is no longer placed on a support; it is built in shared volume.

Protocol 3 — The archive of misunderstandings

Instead of deleting errors, the system preserves every divergent interpretation. When the same pattern receives different responses, those branches become grammatical data. Contact language learns to signal uncertainty, correction, and negotiation rather than pretending to instant understanding.

9. What this changes for first contact

- Meaning may follow the signal. A first transmission may only prepare a field of regularities.
- Repetition is not enough. Transformations and responses are needed to test interpretations.
- The medium becomes grammatical. Space, light, rhythm, frequency, or motion can carry relations, not just symbols.
- The first interlocutors do not control the result. An emerging language can express more than its creators initially intended.
- Contact requires time. An individual intelligence may detect a pattern; a community and several generations may build a language.

10. Perspective

Nicaraguan Sign Language does not provide a recipe for speaking with extraterrestrials. It demonstrates something more concrete: when no common code is available, beings capable of reciprocal attention can create conventions, transmit them, and transform them until grammar appears.

For A.L.I, first contact may therefore begin less with a perfect message than with a durable situation of mutual learning. The question would no longer be only “what do they mean?” but: what conditions must we build so that, between them and us, something can finally become sayable?

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20 - The Fermi Paradox: the Great Silence and the dark forest hypothesis

Keywords: Fermi paradox, Fermi-Hart problem, Great Silence, Great Filter, dark forest, SETI, METI, technosignatures, zoo hypothesis, interstellar contact, A.L.I

The Great Silence has no single explanation: absence, distance, rarity, duration, discretion, or an inability to recognize the signal can all produce the same mute sky.

Summary

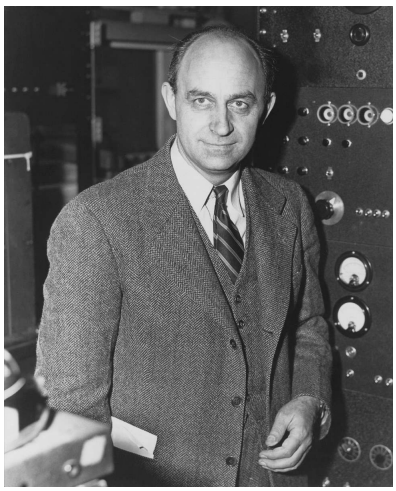
The Fermi paradox does not prove that we are alone. It measures the gap between vast possibilities and limited observations: the Great Filter, technosignatures, the dark forest and contact protocols for A.L.I.

Text

If the Milky Way has had billions of years to produce worlds, organisms and perhaps technological civilizations, why do we observe no indisputable presence? The Fermi paradox lies in this tension. It proves neither that we are alone nor that extraterrestrials are hiding. Above all, it exposes the gap between the vastness of what could exist and the tiny portion we have actually examined.

For A.L.I, this is less a question of absolute silence than of illegibility. A signal may be too weak, too brief, too old, too slow, too fast, or carried by a medium to which we pay no attention. It may not have been designed for us. Before asking “where are they?”, we must therefore ask: what would we be capable of recognizing as the trace of a radically different intelligence?

1. A lunchtime question becomes a scientific problem



Enrico Fermi at Los Alamos, between 1943 and 1949. U.S. Department of Energy photograph, NARA holdings, public domain. Wikimedia Commons (guez.org/ali/211).

Enrico Fermi (guez.org/ali/212) (1901-1954), an Italian-born American physicist and the 1938 Nobel laureate in physics, reportedly asked “Where is everybody?” over lunch at Los Alamos around 1950. The phrase condensed an intuition. The galaxy is old; even travel far below light speed could, under some expansion assumptions, traverse it in a fraction of its age. Ancient civilizations might therefore have left probes, emissions, altered planets or other artifacts.

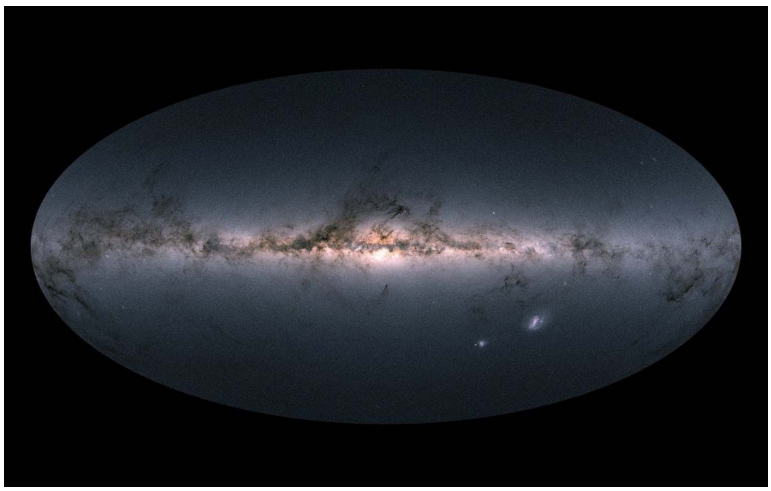
Three moments are often conflated. Fermi asked an informal question. Michael H. Hart (guez.org/ali/213) formalized the absence-of-visitors argument in 1975. The Drake equation (guez.org/ali/961), introduced in 1961, organized factors that might produce communicating civilizations. “Fermi-Hart problem” is therefore a more precise label: a conditional tension, not a mathematical contradiction.

2. What the paradox assumes

The argument becomes strong only if several assumptions hold at once: life emerges often enough; technological intelligence is not exceptionally rare; civilizations last; they produce detectable traces; some explore or transmit; and our instruments and categories can recognize those traces. If even one condition is false or extremely uncommon, the silence becomes less surprising.

The Milky Way is roughly 100,000 light-years across and contains hundreds of billions of stars. Yet size alone says nothing about how many civilizations overlap with us in time. Two societies could arise in the same galaxy a hundred million years apart and never share a present. The paradox is therefore as temporal as it is spatial: another intelligence must not only exist elsewhere, but exist now, transmit through an accessible channel, and persist long enough to be heard.

3. Observed silence is not galactic silence



Map of the Milky Way based on the second Gaia data release. Credit: ESA/Gaia/DPAC, CC BY-SA 3.0 IGO. European Southern Observatory (guez.org/ali/215).

Saying “we have heard nothing” creates a false sense of completeness. A SETI search must select a direction, frequency, bandwidth, sensitivity, duration, modulation type and moment. This produces an immense search space. In 2018 Jason Wright, Shubham Kanodia and Emily Lubar developed the cosmic haystack (guez.org/ali/216) metaphor: depending on the parameters, the fraction searched remains comparable to a small pool against Earth's oceans.

A null result is still meaningful when its limits are stated. It may rule out, around selected stars and frequencies, continuous beacons above a given power. It does not rule out intermittent, directional, energy-efficient, ancient, biological, optical, gravitational or unknown-physics channels. The scientifically responsible statement is not “nobody is speaking,” but: no confirmed technosignature has been identified in the very limited region of possibility space we have examined.

4. Four families of explanations

Rarity and the Great Filter

Simple life may be common while complex cells, cumulative intelligence or technology are exceptionally rare. Robin Hanson's Great Filter (guez.org/ali/217) names a highly improbable step between inert matter and a civilization durably visible on a cosmic scale. If the filter lies behind us, humanity may be extraordinarily rare. If it lies ahead, most civilizations may vanish before becoming interstellar.

Short-lived, sustainable or non-expansionist civilizations

Longevity matters more than the raw number of origins. A technological society may collapse, choose low-energy stability, migrate into compact digital environments or reject expansion. Classical versions of the paradox sometimes project a human history of continuous colonization onto the Universe. An advanced intelligence might instead favor stability, miniaturization, low waste heat and protection of its environment.

The wrong channel or the wrong category

We primarily search for products of our own technological history: radio, lasers, industry and spacecraft. An oceanic, collective, vegetal, mineral or distributed intelligence might never build a transmitter. A post-biological civilization might compress its activity into cold and discreet regions. Contact would then fail not because of distance but because of an ontological error: we expect an object or message while the relevant phenomenon may be a rhythm, an ecological transformation or an organization of matter.

Non-interference and concealment

John A. Ball's zoo hypothesis (guez.org/ali/48) imagines observers who avoid disturbing a young civilization. Other scenarios suggest quarantine, a shared non-contact rule or silent monitoring. They are difficult to test because any absence can be reinterpreted as successful concealment. Their scientific value remains limited until they generate falsifiable predictions.

5. The dark forest: powerful fiction, not evidence

In The Dark Forest, the second volume of Liu Cixin's trilogy (guez.org/ali/962), each civilization moves like a hunter through a night forest. It cannot know another's intentions or rate of development. Revealing one's position may therefore create an existential risk. Silence becomes rational; preemptive destruction is its darkest extension.

The model assumes that information remains unreliable, a preemptive strike is possible, cooperation offers no sufficient benefit and behavior converges on distrust. No observation confirms these premises at interstellar scale. The dark forest should be treated as a thought experiment about asymmetry and trust, not as an established solution to the paradox.

6. Searching for technologies rather than voices

Contemporary searches broaden listening into the study of technosignatures (guez.org/ali/219): radio or laser pulses, industrial pollutants in an atmosphere, infrared waste heat, artificial illumination, anomalous transits, propulsion, probes or artifacts in the Solar System. A technical signature need not be a message. It may be a by-product, like terrestrial emissions leaking into space.

This distinction changes the problem. A civilization may be detectable without wishing to communicate, or may wish to communicate without being detectable to us. A.L.I must separate three levels: a trace of activity, a structured signal, and an addressed message. Confusing them can quickly turn an anomaly into a contact narrative.

7. Listening, answering, remaining silent

SETI listens; METI proposes intentional transmission. Between them lies a political question: who is entitled to speak for Earth? The international post-detection protocols (guez.org/ali/220) recommend independent verification, transparency and consultation before any reply. They do not amount to a binding global treaty capable of preventing a transmission.

The Fermi paradox therefore suggests an ethics of slowness. First contact may not begin with a long portrait of humanity, but with a gradual protocol: detect, confirm, establish regularity, exchange minimal evidence, test reciprocity, and only then increase information. Delay is not

necessarily a defect in language; it may be its first safety rule.

8. What the Great Silence changes for A.L.I

Silence can contain several meanings that we cannot yet separate: nobody transmits; nobody transmits now; a signal cannot reach us; we lack the right organ, instrument or concept; or transmitters choose discretion. A.L.I can work within this interval without turning uncertainty into belief.

- A gradual grammar: begin with simple, repeated and reversible patterns requiring little interpretation.
- A multichannel message: carry the same relation through number, light, rhythm, image and frequency so that each layer checks the others.
- Proof without a full address: demonstrate intention without immediately disclosing everything about the sender.
- Silence as an explicit sign: encode pauses, delays and withdrawals so interruption, caution and ending can be distinguished.
- A right not to answer: design contact as a proposal, never as an intrusion.

9. Three laboratory experiments

Atlas of silences

An installation receives several real astronomical data streams and represents not only detected events but unobserved regions, interruptions, sensitivity thresholds and missing durations. The visitor discovers that “emptiness” is partly produced by the instrument as well as observed in the sky.

Withdrawing beacon

A beacon emits a recognizable pattern, then gradually reduces its precision and power. To continue the exchange, the receiver must demonstrate understanding without receiving all the information. The work tests trust by stages rather than immediate exposure.

Blind decoders

Several groups receive the same signal through different media: sound, light, vibration or numbers. Together they must reconstruct a common invariant. The experiment measures what survives when a message changes sense, culture and medium.

10. A library of the Great Silence

Science fiction has often exposed the paradox's dilemmas better than lists of solutions. His Master's Voice (guez.org/ali/963) by Stanislaw Lem stages the inability to know whether a cosmic signal is a message and what our interpretations reveal about us. Contact (guez.org/ali/964) by Carl Sagan instead imagines a signal containing its own translation device. Liu Cixin turns transmission into strategic risk. These stories offer A.L.I three positions: undecidability, the generous address and radical caution.

11. Conclusion: silence is not absence

The Fermi paradox persists because it combines biological, technological, temporal and political unknowns. It provides no answer; it improves our questions. A silent sky may indicate the rarity of intelligent life, the short duration of civilizations, the poverty of our instruments or the inadequacy of our concepts.

For A.L.I, its most productive lesson is methodological: a contact language must learn to describe the limits of its own listening. Before inventing what we would tell another civilization, we need forms that prevent us from missing its presence.

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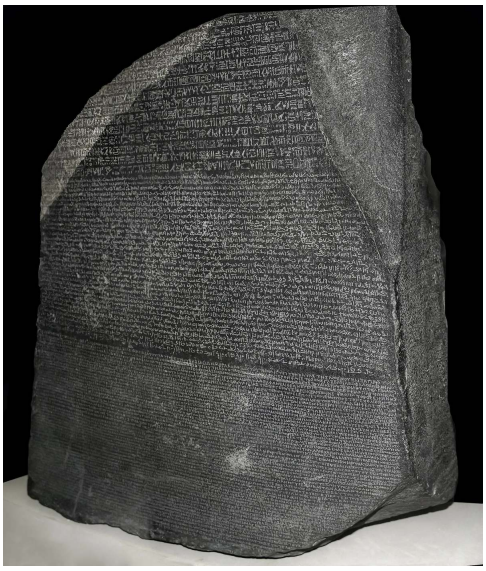
21 - Rosetta Stone, Binary Stele: The Absolute Necessity to Transmit

Keywords: binary steles, binary code, David Guez, Paper Hard Drive, ZERO-UN, memory, preservation, archiving, Digital Dark Age, stone, paper, mosaic, Rosetta Project, Memory of Mankind, redundancy, error correction, SETI, METI, interstellar communication, A.L.I



The Rosetta Stone presents one decree in hieroglyphic, Demotic, and Greek scripts. Corrected photograph by Awikimate, after Hans Hillewaert, Wikimedia Commons (guez.org/ali/229), CC BY-SA 4.0.

Summary

From the Rosetta Stone and Linear B to David Guez's Binary Steles: how can we transmit not only a message, but its key, its evidence, and the conditions of its reading?

Text

To transmit absolutely means more than inscribing a message in resistant matter. It also means transmitting the conditions of its reading. The Rosetta Stone and Linear B offer complementary models: one makes an unknown script accessible through already known meaning; the other was deciphered without a bilingual text, through patient structural analysis followed by a prediction verified on independent evidence. David Guez's Binary Steles move this problem into the present: how can code, its reader, and its memory survive the machines that produced them?

1. The Rosetta Stone: One Meaning in Three Forms

Discovered in 1799, the Rosetta Stone bears a priestly decree issued in 196 BCE during the reign of Ptolemy V. It is written in hieroglyphic, Demotic, and ancient Greek scripts. The stone is not a dictionary but a device of equivalence: three graphic systems give access to the same political and ritual event.

Its power depends on a decisive asymmetry. Greek remained readable; the Egyptian scripts did not. Known meaning anchors unknown form. Thomas Young identified phonetic values in

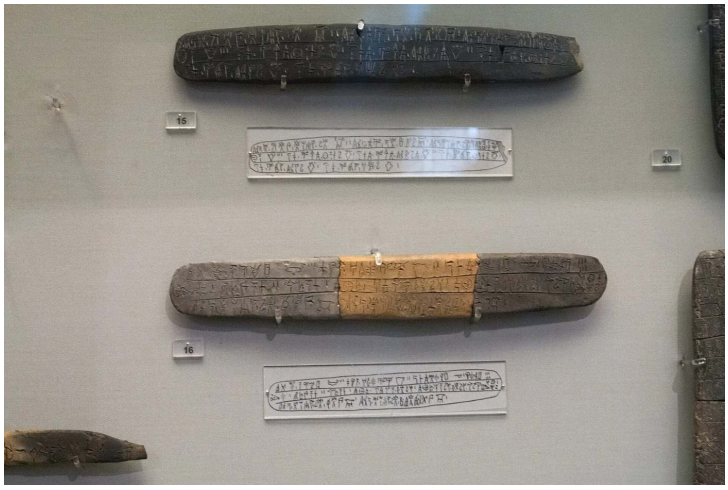
royal cartouches. Jean-François Champollion then compared names including Ptolemy, Cleopatra, and Ramesses, using his knowledge of Coptic to understand that hieroglyphic writing combines phonetic signs, determinatives, and ideograms. His 1822 Letter to M. Dacier marked the decisive breakthrough.

The lesson for A.L.I is clear: repetition alone is insufficient. A successful Rosetta Stone constructs testable equivalences between several sign systems. It allows a reader to isolate what remains invariant when medium, language, or scale changes.

2. Linear B: Deciphering Without a Bilingual Key

Linear B presented the opposite difficulty. Tablets excavated by Arthur Evans at Knossos from 1900 onward offered no parallel translation. Evans even believed their language was not Greek. Decipherment therefore began not with meaning but with form.

Emmett Bennett established a rigorous inventory of roughly eighty-seven syllabic signs. Alice Kober classified thousands of occurrences on index cards, observing repetitions and groups of signs with variable endings. Her “triplets” demonstrated that the language was inflected and made it possible to construct a relational grid before anyone knew how the signs sounded. Michael Ventris extended that architecture, tested the Mycenaean Greek hypothesis, and gradually assigned phonetic values to the grid.



Mycenaean Linear B tablet, thirteenth century BCE, National Archaeological Museum, Athens. Photograph by Yair-haklai, Wikimedia Commons (guez.org/ali/231), CC BY-SA 4.0.

3. PY Ta 641: Proof Through Independent Prediction

In 1952, tablet PY Ta 641, discovered at Pylos by Carl Blegen’s team, offered a striking verification. It combines vessel ideograms with syllabic groups. The reading ti-ri-po-de, understood as a form of “tripod,” matches the inventoried objects. The system therefore worked beyond the examples used to construct it: it produced a relevant reading from evidence independent of the original reasoning.

This is a crucial criterion. A strong decipherment must do more than construct a plausible story. It must generate risky expectations that could fail, then survive contact with new data. Linear B thus becomes a model of decipherment through structure and prediction.

4. Two Methods, One Requirement

The Rosetta Stone and Linear B are not the only decipherments in history: cuneiform and Maya writing were also reconstructed. They are, however, two paradigmatic cases especially useful to A.L.I. They also show that no one deciphers from an absolute void. Champollion had Greek and Coptic; Ventris worked on a human language within a world of objects, numbers, and administration that remained partly recognisable.

5. What Still Resists

Linear A, the Indus script, rongorongo, the Phaistos Disc, and the Voynich manuscript reveal the limits of decipherment. A corpus may be too short, a related language absent, the system non-linguistic, or the context insufficient. Interstellar communication would present a more radical challenge: separating code from a cognition whose categories of world, time, and agency may be alien to us.

6. Code Has Never Been Immaterial

Digital culture encourages the illusion that information floats outside the world. In reality, every bit has a body. On a hard drive it is a magnetic orientation; in flash memory, an electrical charge; on an optical disc, a change of surface; in a cable, a variation of voltage or light. Binary does not abolish matter. It reduces matter to two distinguishable states.

This reduction is its strength. Two states can be carved, printed, punched, woven, illuminated, or performed. It is also its trap. A stone covered with zeros and ones may remain intact for millennia and still become perfectly mute if no one knows the reading order, grouping, or required transformation.

A binary stele in the landscape: the file becomes surface, duration, erosion, and archaeology. David Guez, Binary Steles.

7. From Bit to Letter: A Chain of Conventions

A bit does not naturally mean yes, no, black, white, true, or false. It merely identifies one of two states. To write A.L.I in ASCII, a widely documented computer convention, a reader must already know the group size and correspondence table:

This small example reveals several hidden layers: reading direction, eight-bit grouping, the choice of ASCII or UTF-8, and the linguistic interpretation of the letters. An image, sound, or

film also requires dimensions, pixel order, sampling rate, container, codec, and sometimes compression. A file is not only a binary sequence. It is a binary sequence surrounded by technical culture.

8. Binary Steles: Taking the File Out of the Machine

In Binary Steles (guez.org/ali/232), David Guez transfers the code of significant works onto non-digital media: stone, mosaic, paper, and potentially wood or metal. The gesture reverses the usual logic. Instead of asking a machine to hide matter behind an interface, it exposes the raw structure of the file.

Each stele becomes artwork, copy, and problem. It preserves information while displaying the fragility of access. A visitor can see the code without immediately reaching the encoded work. The distance between material presence and perceptual absence turns the archive into an enigma.

Detail of a Binary Stele. The surface preserves zero and one; reconstruction still requires a reading method.

Mosaic version of Binary Steles: a computer pattern enters a monumental and durable technique.

9. Paper Hard Drive: A Book Containing a Film

The Paper Hard Drive (guez.org/ali/233) project carries this logic into the book. The complete binary code of a film is printed over hundreds of pages. Software performs the inverse operation, reading the characters and rebuilding the file. The book becomes an executable storage medium: extremely slow, yet inspectable by eye.

An edition of Chris Marker's La Jetée, produced with Espace multimédia Gantner, entered the Centre Pompidou collection in 2013. The project also encoded Georges Méliès's A Trip to the Moon. Two films about time, memory, and travel change regime: they are no longer only projected, but become typographic landscapes capable of reactivation.

La Jetée and A Trip to the Moon as paper hard drives: two films transformed into books of code.

10. The ZERO-UN Manifesto and the Risk of a Digital Dark Age

The ZERO-UN (guez.org/ali/234)manifesto (guez.org/ali/234) expands these works into a research programme on preservation. A digital archive depends on a fragile chain: medium, power, connector, operating system, software, format, access rights, and technical knowledge. A single rupture can make an intact file unusable.

This concern meets the idea of a Digital Dark Age: an era can produce immense quantities of documents while preparing their future illegibility. The manifesto considers natural, visible, or biological media able to carry code beyond industrial infrastructures. The question is not simply how long matter survives, but how long the protocol remains intelligible.

11. Is Binary a Universal Language?

Opposed states are easy to generate and detect. Binary therefore seems suited to long-distance communication. Alternating light and darkness, presence and absence, or high and low frequencies can cross radically different media. But this universality is only physical. It may ensure that a recipient distinguishes a pattern; it does not ensure recognition of a message.

An extraterrestrial intelligence might perceive the sequence without conceiving the bit, or group states according to another logic. It might read spirally, volumetrically, simultaneously, or across several temporal scales. It might not separate data from reader as we do. Binary is therefore a possible minimal alphabet, not shared meaning.

12. Transmitting Absolutely: A Stele That Teaches Its Own Reading

To become an object of contact, a stele should preserve more than a payload. It should contain a progression through which an unknown reader can discover how to decode it. Seven nested layers are possible:

- Contrast. Repeat two clearly distinguishable states across several materials and scales.

- Units. Introduce counting through quantities, then prime numbers as evidence of intentional structure.
- Orientation. Provide test frames that reveal beginning, end, reading direction, and expected dimensions.
- Correction. Insert parity, checksums, and repetition so erosion or copying errors can be detected.
- Translation table. Demonstrate how binary groups become numbers, positions, levels, sounds, or colours.
- Equivalences. Encode the same pattern visually, sonically, geometrically, and rhythmically to separate structure from medium.
- Archive. Only after these lessons transmit the text, image, sound, or film.

The result is no longer a passive hard drive. It is a teaching machine without a teacher, designed to create its own conditions of legibility.

13. Noise as Part of the Message

An archive addressed to deep time must assume degradation. Fragments will be erased, inverted, displaced, or copied incorrectly. Redundancy is therefore not waste but memory. Telecommunications already use parity bits and error-correcting codes. A stele could repeat essential blocks, alternate orientations, and include deliberately damaged examples with their corrections.

A.L.I could also preserve three states of the same object: raw file, readable representation, and conversion protocol. If one level disappears, the other two continue to testify to the relationship.

14. Other Archives Addressed to Deep Time

The Rosetta Project (guez.org/ali/967) archives thousands of pages about human languages on a microscopic disc readable through optical magnification. Memory of Mankind (guez.org/ali/968) engraves documents on ceramic tablets stored in an Austrian salt mine. Both projects understand that a durable archive must join resistant matter, linguistic plurality, context, and clues for use.

They also reveal a political limit: every archive decides what deserves to survive. The most durable medium cannot correct organised forgetting or the perspective of the selector.

15. Three Devices to Build

Stele 01 — Open Reader

A stone slab or mosaic contains a short uncompressed file, its decoding plan, and a checksum. An ordinary camera reads the cells; open-source software displays every step from photographed pattern to reconstructed image or sound. The installation conceals no transition.

Archive Landscape

The same message is laid out in a garden using light and dark stones, engraved on metal, and performed by intermittent light. The three versions age differently. An annual observation measures loss and tests correction. Time becomes a co-author of the code.

Nested Interstellar Archive

A radio signal first transmits recognition exercises, then a miniature decoder described through inputs and outputs, and finally an archive. The recipient proves understanding not by repeating the message, but by producing an unforeseen and verifiable transformation. This proposal connects with A.L.I research on Ghostbook (guez.org/ali/969) and quantum programming beyond binary (guez.org/ali/970).

16. What Should Be Saved?

A stele addressed to a future human or non-human reader cannot be merely triumphant. It should archive several languages, contradictions, mistakes, minority narratives, and the historical conditions of its making. Otherwise it might preserve our data while losing our plurality.

The artistic issue is decisive. An artwork does not promise only to preserve useful information. It makes the distance between trace and interpretation perceptible. It accepts that a message may survive without immediate understanding and turns that waiting into a space of encounter.

17. Conclusion: Leave a Key, Not Only a Trace

Binary offers a minimal material grammar: two states, a succession, and the possibility of copying. It can leave the machine and enter stone, paper, light, or landscape. Physical durability is not enough, however. A genuinely addressed archive must preserve its instructions, controls, ambiguities, and the possibility that a reader will understand it differently from us.

The binary-steles hypothesis therefore proposes a reversal for A.L.I: instead of searching only for the most powerful signal, make the message that lasts long enough and demonstrates patiently enough for the other to learn how to read us.

References and Further Reading

22 - Cinema of Contact: From Méliès to Blockbusters, How the Screen Makes the Alien

Keywords: cinema, science fiction, fantasy, extraterrestrial, first contact, Méliès, Aelita, Cold War, 2001, Solaris, Arrival, Alien, blockbuster, propaganda, mass culture, counterculture, underground cinema, Afrofuturism, Sun Ra, video art, Nam June Paik, Hito Steyerl, signal, language, politics, A.L.I

Opening image: Cinema of Contact: From Méliès to Blockbusters, How the Screen Makes the Alien

Summary

Since Méliès, cinema has not merely shown the extraterrestrial: it has trained audiences to recognise a signal, imagine a nonhuman body, fear invasion, or desire contact. A critical history spanning popular cinema, avant-gardes, counterculture, underground film, and video art.

Text

For more than a century, cinema has not merely represented the unknown: it has given it a body, a voice, a speed, and an intention. It trains audiences to recognise what might count as a signal, threat, miracle, or interlocutor. Long before interstellar contact occurs, billions of spectators have already rehearsed its gestures on screen.

This article proposes that cinema is a collective rehearsal machine for contact. Every film distributes roles: who observes, who names, who translates, who shoots, who negotiates, and who owns the image of the Other. This training is aesthetic and political. It spans fairground spectacle, Soviet cinema, Cold War narratives, military blockbusters, underground film, Afrofuturism, and video art.

1. 1895-1930: the camera invents a visible elsewhere

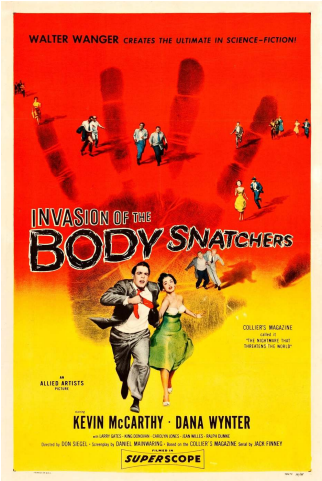
Early cinema emerges alongside X-rays, wireless telegraphy, aviation, and popular astronomy. In A Trip to the Moon (guez.org/ali/239) (1902), Georges Méliès turns the Moon into a theatre. A human projectile strikes a lunar face, Selenites appear and vanish under umbrellas, and the expedition returns with a captive. The film founds much of screen space travel while carrying the colonial grammar of its period into space: conquer, name, extract, exhibit.

The trick effect is already a theory of contact. Stop-camera substitutions, superimpositions, and painted sets make visible what was not before the lens. Cinema reveals that every extraterrestrial apparition is produced by an apparatus. Believing the image requires temporarily forgetting its construction.

In Aelita (Yakov Protazanov, 1924), a radio message from Mars, “Anta Odeli Uta,” triggers the dream of another world. Alexandra Exter’s sets and costumes give Martian language a geometric architecture. Fritz Lang’s Woman in the Moon (1929) joins lunar adventure to technical precision. Cinema establishes a lasting rule: to make the impossible credible, give it instruments, procedures, and visual coherence.

2. Cold War: the alien becomes a political test

After 1945, the sky fills with radar, rockets, and nuclear fear. The Day the Earth Stood Still (Robert Wise, 1951) imagines a visitor bearing a pacifist ultimatum; The War of the Worlds (Byron Haskin, 1953) industrialises invasion; Forbidden Planet (Fred M. Wilcox, 1956) discovers that an advanced civilisation can be destroyed by its own technological unconscious.



Invasion of the Body Snatchers, Don Siegel, 1956. The alien no longer arrives in a spacecraft: it silently replaces the population. US poster, public domain, Wikimedia Commons.

Invasion of the Body Snatchers turns the neighbour into an affectless copy. The film has been read both as anti-communist anxiety and as a critique of McCarthyite conformity. Its strength lies in that reversibility: the enemy is less a doctrine than an undetectable loss of singularity. The Thing from Another World (1951), Invaders from Mars (1953), and Japan’s Goke, Body Snatcher from Hell (Hajime Sato, 1968) similarly link invaded bodies, contaminated territory, and a crisis of trust.

These films build a culture of vigilance. Contact becomes a police investigation: detect

anomalies, test authenticity, distinguish the human from its imitation. The same logic still structures stories about clones, AI, and disinformation.

3. Metaphysical contact: when the Other changes our mental instruments

From the 1960s onwards, another tradition shifts the question: what if the extraterrestrial were not a character but a limit of perception? Chris Marker's La Jetée (1962) makes editing a time machine; Andrei Tarkovsky's Solaris (1972) answers astronauts with materialised memories; Stalker (1979) turns the Zone into a faceless intelligence. Rainer Werner Fassbinder's World on a Wire (1973) and Mamoru Oshii's Avalon (2001) make the world itself an uncertain interface.

HAL 9000 in Stanley Kubrick's 2001: A Space Odyssey, 1968. The spacecraft's most human interface is also its most opaque: a voice, an eye, an inaccessible decision. Photograph of an original film element.

In 2001: A Space Odyssey, the monolith offers no dictionary. It acts upon evolution, organises thresholds, and imposes a montage between prehistory, artificial intelligence, and cosmic becoming. Contact is an operation rather than a conversation. Under the Skin (Jonathan Glazer, 2013), Annihilation (Alex Garland, 2018), and Vanishing Waves (Kristina Buožyte, 2012) continue this path: encountering the Other means losing confidence in a stable body, memory, or self.

4. Cinema of languages: sound, number, gesture, and time

Close Encounters of the Third Kind (Steven Spielberg, 1977) stages five notes, colours, and a synthesiser as a graduated protocol. Contact (Robert Zemeckis, 1997) hides a technical plan within a signal's structure. The Vast of Night (Andrew Patterson, 2019) returns to nocturnal radio as a threshold. Pontypool (Bruce McDonald, 2008), by contrast, imagines contagion carried by language itself.

Denis Villeneuve's Arrival, 2016: the circular logogram encodes not only a sentence but a nonlinear way of inhabiting time. Film still.

Arrival pushes the hypothesis further: learning an extraterrestrial language transforms the translator's cognition. Communication is no longer information transferred between unchanged minds; it alters the conditions of perception. This is central to A.L.I: a genuinely nonhuman message may require a new organ of reading, another temporality, or a mediating intelligence.

5. The body as border: horror, reproduction, mutation

Fantastic cinema reminds us that every message has a material substrate. In Alien (Ridley Scott, 1979), contact proceeds through penetration, gestation, and forced birth. The Thing (John Carpenter, 1982) makes biological imitation a perfect language because it becomes indistinguishable from its host. Videodrome (David Cronenberg, 1983) fuses audiovisual signal, hallucination, and flesh. Possession (Andrzej Zulawski, 1981) and Color Out of Space (Richard Stanley, 2019) describe alterities that undo categories rather than enter dialogue.

This current corrects the purity of mathematical messages: to receive is always to be exposed. Communication can infect, seduce, reprogram, or reproduce. Horror cinema therefore stages a biological semiotics in which cell, parasite, and metamorphosis become signs.

6. Countercultures: reclaiming space from dominant culture

Underground cinema does not simply seek different aliens; it uses the alien to make different political subjects. In Space Is the Place (John Coney, 1974), Sun Ra proposes that Black people leave a racist Earth. Space is no longer the empty territory of white conquest but a strategy of self-determination and Afrofuturism.

Sun Ra in 1973, around the production of Space Is the Place. His cosmic persona turns extraterrestrial displacement into a method of cultural liberation. Public-domain photograph, National Endowment for the Arts.

Born in Flames (Lizzie Borden, 1983) mobilises pirate radio and collective montage; Liquid Sky (Slava Tsukerman, 1982) mixes aliens, new-wave clubs, gender, and addiction; Repo Man (Alex Cox, 1984) turns the alien object into punk energy; The Brother from Another Planet (John Sayles, 1984) rereads migration and surveillance through a mute fugitive; They Live (John Carpenter, 1988) reveals an imperative grammar beneath advertising: “Obey,” “Consume,” “Conform.”

The Last Angel of History (John Akomfrah, 1996) connects science fiction, diaspora, techno, and memory as an essay film. Here the alien is not necessarily the one who comes from elsewhere: it is whoever the dominant order has already made foreign to their own world.

7. A lateral constellation: films outside the canon

The list shared for this article invites us to leave the major titles and follow an oblique history of science fiction. The Creation of the Humanoids (Wesley Barry, 1962) imagines robots continuing a ruined humanity; The Bed Sitting Room (Richard Lester, 1969) treats the post-bomb world as surreal farce; Colossus: The Forbin Project (Joseph Sargent, 1970) gives nuclear authority to a networked intelligence.

Alongside them stand the 1968 Soviet television Solaris, the Yugoslav short Signalna svetla (1960), Hiroshi Teshigahara’s The Face of Another (1966), Shozin Fukui’s bodily cyberpunk 964 Pinocchio (1991), Sogo Ishii’s punk electricity in Electric Dragon 80.000 V (2001), the nested realities of Avalon, the space economy of Cargo (Ivan Engler and Ralph Etter, 2009), consciousness transfer in Transfer (Damir Lukacevi ´c, 2010), the neural intimacy of Vanishing Waves, the retrofuturism of The Similars (Isaac Ezban, 2015), the cyber-guerrilla of Jesus Shows You the Way to the Highway (Miguel Llansó, 2019), and the posthuman ecology of Vesper (Kristina Buožyte and Bruno Samper, 2022).

These less visible works matter to A.L.I because they preserve hypotheses the market often simplifies: non-individual intelligence, unstable identity, contaminated media, nonlinear time, future economies, and unresolved contact.

8. Video art: dismantling the reality-making machine

Video art asks not only “what does the screen show?” but “what does the screen do?” In Global Groove (guez.org/ali/971) (1973), Nam June Paik imagines a global television of video synthesis, dance, music, and cultural collision. Signal becomes plastic matter capable of crossing borders while revealing their instrumentalisation.

Joan Jonas’s Vertical Roll (1972) turns a synchronisation fault into a bodily pulse; Dara Birnbaum’s Technology/Transformation: Wonder Woman (1978-1979) dismantles television’s repetition of gender; Harun Farocki’s Eye/Machine (2001-2003) studies operational images made by machines for other machines.

Hito Steyerl, How Not to Be Seen: A Fucking Didactic Educational .MOV File, 2013. The work connects digital resolution, invisibility, surveillance, and violence. Installation view, The Museum of Modern Art, New York.

With How Not to Be Seen (guez.org/ali/241), Hito Steyerl turns the tutorial into a satire of contemporary invisibility. For A.L.I, these works redirect attention from content to channel: compression, scanning, feedback, resolution, surveillance, and automation become a language in their own right.

9. Blockbusters: who owns first contact?

The blockbuster is not defined by budget alone. It organises the global circulation of images and tends to resolve the unknown in instantly legible forms. Independence Day (Roland Emmerich, 1996) imagines human unity, but that unity adopts the US military chain of command. Men in Black (Barry Sonnenfeld, 1997) comically addresses borders, migration, and state secrecy: coexistence already exists, provided it is administered outside public view.

Avatar (James Cameron, 2009) carries an anti-colonial narrative through one of global cinema’s most powerful industrial machines. District 9 (Neill Blomkamp, 2009) places the extraterrestrial within histories of apartheid, camps, and military privatisation. Starship Troopers (Paul Verhoeven, 1997) imitates fascist propaganda to make it seductive and then disturbing. Dune reactivates relations between empire, extraction, religion, and messianism.

Politics also operates offscreen. Productions collaborate with armed forces that provide equipment and access in exchange for influence. The Smithsonian’s account of X-15 (guez.org/ali/242) documents how the Pentagon corrected a script to protect its image. The “military-entertainment complex” does not mean every military film is simple propaganda; it names a system of dependencies that shapes what can be shown at scale.

10. How cinema feeds back into reality

Cinema provides popular culture with a catalogue of forms: saucer, Grey, monolith, beam, parasite, pulsed signal, translation screen. These images influence toys, newspapers, testimony, politics, and even scientific interfaces. They may help formulate a strange experience, but they may also pre-format it.

A loop emerges: stories draw on beliefs and archives; audiences learn their forms; new testimony resembles them; cinema recycles that resemblance as evidence of collective memory. Influence does not make every account false. It requires us to study visual vocabulary as we would study a language.

11. Five political figures of the extraterrestrial

- The enemy. It unifies the community through war and renders translation suspicious.
- The mirror. It exposes human drives, violence, or cognitive limits.
- The migrant. It shifts questions of borders, hospitality, camps, and rights.
- The incommensurable. It shares neither body, time, individuality, nor perceptual world.
- The network. It exists as environment, swarm, planet, machine, or distributed signal.

A single film may move between these figures. Analysis should therefore ask not merely “what does the alien look like?” but “what human community does this representation make thinkable?”

12. A.L.I protocol: analysing a contact scene

A.L.I proposes eight questions applicable to popular film and experimental work alike:

- Channel: light, voice, number, body, dream, infection, architecture?
- Point of view: who owns the camera and the right to a reverse shot?
- Naming: who first says “alien,” “enemy,” “intelligence,” or “life”?
- Translator: human, machine, child, soldier, scientist, artist?
- Reciprocity: does the signal change after a response?
- Temporality: does the Other share our speed and causality?
- Institution: who preserves, classifies, censors, or commercialises contact?
- Consequence: does understanding genuinely transform the one who understands?

Two speculative measurements complete the grid. The reverse-shot test asks whether nonhuman intelligence receives an autonomous viewpoint or remains an observed object. The narrative colonisation index measures how quickly the unknown is named, militarised, possessed, or destroyed.

13. Installation: The Cinema That Answers

An installation could assemble authorised or public-domain fragments described shot by shot: signal, first gaze, translation, military gesture, metamorphosis, silence. Sensors would record audience distance, movement, and pauses. The edit would respond without ever following exactly the same path.

A second screen would display what the algorithm thinks it has understood about the viewer: fear, curiosity, impatience, desire for translation. These categories would remain contestable and editable. The visitor would experience contact symmetrically: watching an alien while

being interpreted by an imperfect machine.

A collective version would give different channels to different groups: one sees images, another hears sounds, a third receives metadata. None can understand alone. Contact would emerge from confronting accounts rather than from central revelation.

14. Conclusion: the screen is already an embassy

Cinema has prepared humanity for contact, but in contradictory ways. It has opened imagination to impossible bodies, worlds, and intelligences. It has also rehearsed conquest, borders, war, and simplification. Avant-gardes, countercultures, and video art do not cancel those narratives; they show how to dismantle them and make others.

For A.L.I, the task is not to identify “the best alien film.” It is to build a critical cinematheque of contact gestures. If a real signal arrives one day, we will not receive it within an empty imagination. We will see it through every screen that came before it.

> LABO question: can we invent an image of the Other that does not decide in advance what the Other is?

References and further viewing

- BFI — a brief history of the Moon in cinema (guez.org/ali/972).
- BFI — ten films about aliens visiting Earth (guez.org/ali/973).
- MoMA — Nam June Paik, Global Groove (guez.org/ali/971).
- MoMA — Hito Steyerl, How Not to Be Seen (guez.org/ali/241).
- BFI — They Live as a satire of capitalism and its cultural apparatus (guez.org/ali/245).
- Smithsonian — Hollywood, X-15, and Pentagon cooperation (guez.org/ali/242).

23 - What If Truth Travelled Through Subculture? The Secret Channels of Reality

Keywords: subculture, auxiliary channels, fanzine, samizdat, alternative press, pirate radio, Men in Black, Sun Ra, Afrofuturism, SCP Foundation, algospeak, cultural steganography, Cultural Studies, interstellar contact, A.L.I

Auxiliary channels: one signal changes medium in order to keep circulating. A.L.I image, 2026.

Summary

Fanzines, samizdat, pirate radio, comics, UFO mythologies, and forums: ideas that institutions cannot yet receive change costume. A.L.I examines these oblique routes and proposes cultural steganography as a contact hypothesis.

Text

An idea too unstable for official channels does not always disappear. It changes costume. It becomes a fanzine, late-night broadcast, comic book, copied cassette, song, rumour, collaborative wiki, or fiction. This oblique circulation does not prove that the idea is true; it merely keeps it moving until another context can receive it.

This investigation begins with the Men in Black, underground publishing, and UFO narratives, then places them in a wider history: samizdat, pirate radio, détournement, Afrofuturism, punk culture, and algospeak. For A.L.I, a question emerges: could an interstellar signal already be circulating in a culturally minor form, classified as noise, folklore, or fiction?

1. The side door: a politics of minor forms

Cultural Studies showed that subculture is not merely a collection of tastes. It reuses dominant signs. Stuart Hall and Tony Jefferson's Resistance Through Rituals (guez.org/ali/974) reads youth styles as symbolic responses to social contradictions. Dick Hebdige's Subculture: The Meaning of Style (guez.org/ali/975) examines how clothes, music, and graphics produce oblique dissent. Michel de Certeau calls such practices tactics: users improvise within systems they do not control.

A minor channel is therefore not simply a smaller pipe. It changes the message's authority, speed, risk, and acceptable ambiguity. Institutional weakness can become experimental power.

2. Samizdat: the reader becomes infrastructure

In Soviet regimes, samizdat texts were clandestinely reproduced by typewriter, carbon paper, photography, or tape. The object was fragile but the human chain was redundant: reading often meant copying, hiding, carrying, and retransmitting. The Library of Congress (guez.org/ali/249) now uses the phrase "digital samizdat" for archives of Russian independent media.

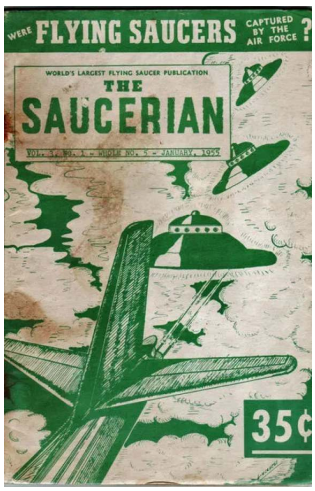
Russian samizdat and photographic negatives of unofficial Soviet literature. Wikimedia Commons.

For A.L.I, samizdat reveals that a message may survive through the social protocol it triggers rather than the durability of its carrier. Each recipient becomes a replication station. A distant receiver might similarly have to reconstruct, translate, and retransmit a signal before it fully exists.

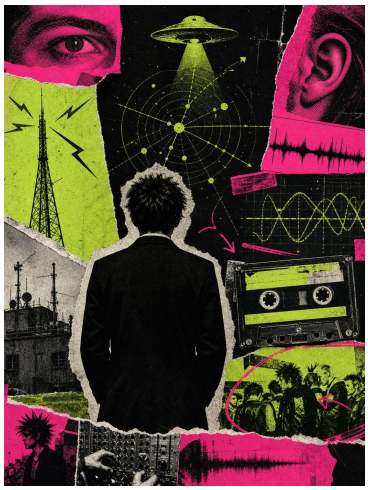
3. Fanzines: the photocopier as laboratory

Fanzines gave comics, rock, feminism, ecology, queer politics, and experimental practices a place outside official publishing. Photocopy, collage, offset, and risograph were not merely cheap techniques; they created a syntax of breaks, overlays, and montage. Underground comix bypassed the Comics Code, while ephemeral French publications such as Actuel, L'Écho des savanes, and Métal hurlant reshaped mainstream visual culture.

Within UFO culture, The Saucerian, founded by Gray Barker in 1953, offers an especially direct example of this marginal circulation. The periodical relayed contactee accounts, flying saucers, strange phenomena, and early Men in Black stories without adopting the caution of scientific publishing. Its handmade, spectacular graphics turned the extraterrestrial hypothesis into a shareable print culture.



The Saucerian, vol. III, no. 5, January 1955, UFO periodical edited by Gray Barker. Reference: Gray Barker UFO Collection, Clarksburg-Harrison Public Library (guez.org/ali/252).



Xerox aesthetics, pirate radio, and an anonymous silhouette: an original A.L.I image conceived as the cover of a contact fanzine, 2026.

4. Men in Black: from threat to entertainment

The Men in Black figure emerged from 1950s UFO folklore, moved through Gray Barker's writing, became Lowell Cunningham's dark Aircel comic in 1990, and reached global audiences as a comedy in 1997. With each transfer, secrecy, covert coexistence, and erased memory gained reach while losing some menace.

Susan Sontag's The Imagination of Disaster (guez.org/ali/253) described a related mechanism: popular science fiction gave Cold War nuclear and political anxiety a visible, bearable form. Fiction does not necessarily conceal reality; it can make reality culturally digestible.

They Are Already Here: a speculative fictional front page created for A.L.I. The tabloid turns the extraterrestrial hypothesis into a media event before it is verified, 2026.

5. Pirate radio: displacing the signal

Pirate radio turns the electromagnetic spectrum into political space. It broadcasts from a ship, rooftop, basement, or mobile transmitter outside an official schedule. It does not only transmit different content; it makes another right to speak imaginable.

Ross Revenge, Radio Caroline's ship: a station physically displaced beyond ordinary broadcasting territory. Christine Matthews, Wikimedia Commons, CC BY-SA 2.0.

GUDEMON replays this ambiguity: a news bulletin lends fiction the authority of live transmission. The channel supplies a posture of belief.

6. Sun Ra: coming from elsewhere to transform here

Afrofuturism does not simply place spaceships in the existing world. It uses the cosmos to reopen history. Sun Ra claimed Saturnian origin and built a mythology, visual language, music, and orchestral community. In Space Is the Place, alien identity becomes a critical position from which a world forbidden by terrestrial racial order can be imagined.

Sun Ra, 1973 publicity photograph. Space as a musical, political, and mythological stage. Wikimedia Commons.

7. From rock to UAP: the pop broker

Tom DeLonge founded To The Stars Academy of Arts & Science in 2017, bringing together entertainment, research, and former US officials. That year, The New York Times (guez.org/ali/254) reported on AATIP. Authentic military videos entered a public sphere already prepared by decades of popular culture.

The documents must be separated from their interpretation: a military video does not establish extraterrestrial origin. The case demonstrates how celebrity can broker passage among administration, journalism, belief communities, and entertainment.

8. SCP and algospeak: digital auxiliary channels

The SCP Foundation (guez.org/ali/255) collectively invents a bureaucracy of the anomalous. Reports, classes, protocols, and incidents give documentary coherence to thousands of stories. The fictional form becomes a world-making machine.

Algospeak alters words to evade anticipated platform moderation. Hiding in the Open (guez.org/ali/256) describes the trade-off between evading a filter and remaining legible to a community. The code must differ enough for the machine yet remain familiar to people: cultural steganography in real time.

9. A.L.I hypothesis: cultural steganography

Steganography hides a message inside another carrier. A.L.I extends this idea to culture: content may persist by migrating among fiction, music, rumour, image, ritual, and archive. Its semantic core is never perfectly preserved; it is recognised through invariants across mutation.

A non-human signal could therefore be present without being recognised as a signal. It might be classified as radio interference, decorative pattern, legend, copying error, collective behaviour, or recurring fiction. The method is not to label every anomaly extraterrestrial, but to search for persistent structures crossing independent media without a single author.

10. Prototype: Ghost Channel

- Core. Design a simple relation, map, sequence, or question.
- Mutations. Encode it independently as zine, radio sound, gesture, textile, meme, and technical report.
- Noise. Degrade each version through copying, compression, translation, cuts, and delay.
- Separated publics. Give each channel to a group unaware of the others.
- Retransmission. Ask every group to reproduce its interpretation in a new medium.
- Convergence. Measure structures that reappear across transformations.
- Control. Add decoy patterns to test projection and coincidence.

The installation would be a listening room and fragmented archive. No visitor sees the whole system; each becomes one relay. Success is not a perfect copy but a shared, testable structure emerging from independent transformations.

11. The limit: minor channels certify nothing

The same systems that protect censored speech accelerate rumour, propaganda, and conspiracy. Secret knowledge has an attractive aesthetic; information can appear true precisely because it is presented as forbidden. Marginality must not be romanticised.

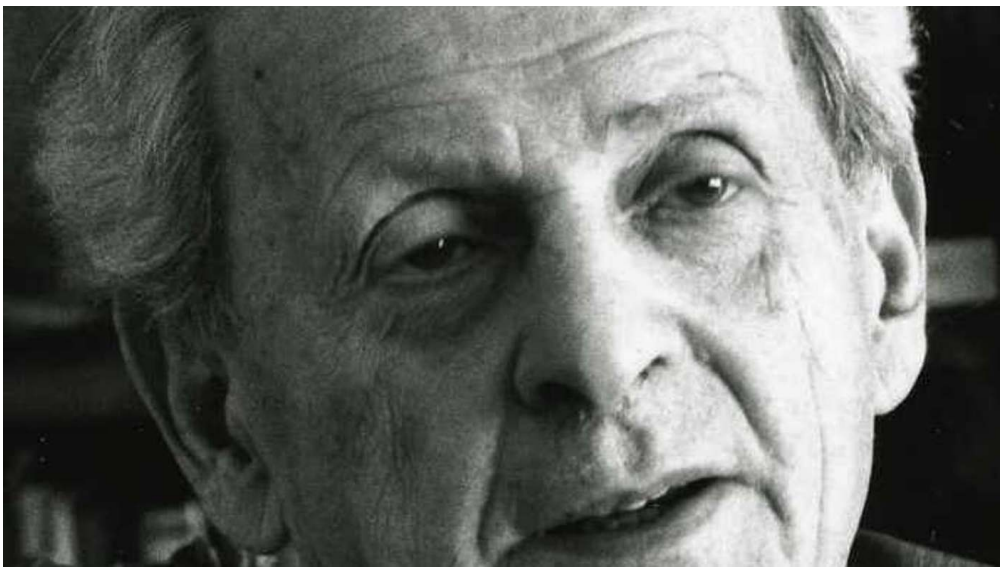
A.L.I must separate three operations: detecting circulation, interpreting content, and establishing reliability. An auxiliary channel can be an excellent propagation laboratory, never proof. Sources, rival hypotheses, and visible errors remain essential.

LABO question: if a genuine message had to cross a culture unable to recognise it, would it choose the most credible channel and risk being blocked, or the most minor one and risk vanishing among a thousand similar fictions?

References

24 - Levinas and the Face of the Other: Thinking Radical Alterity Before Contact

Keywords: Emmanuel Levinas, face, Other, radical alterity, ethics, responsibility, Martin Buber, Jacques Derrida, Paul Ricoeur, animal, AI, SETI, METI, first contact, anthropomorphism, hospitality, translation, A.L.I



Emmanuel Levinas in 1991. Photograph by Bracha L. Ettinger, CC BY-SA 2.5, Wikimedia Commons.

Summary

What if first contact began before decoding, with an obligation not to reduce the other to our own categories? From Levinas to Buber, Derrida, and Ricoeur, this article develops a pre-semiotic ethics for encounters with animal, artificial, or extraterrestrial intelligence.

Text

What if first contact began neither with a correctly identified signal nor with a grammar finally translated, but with an earlier decision: to accept that the other is not a confirmation of what we already know? Emmanuel Levinas shifts the problem in precisely this direction. Before understanding the other, we are already called to respond.

This proposition is not a method for decoding extraterrestrial messages. It imposes a discipline on the decoder: do not confuse interpretation with possession, classification with knowledge, or response with annexation. For A.L.I, it suggests a pre-semiotic ethics, prior to the message's content yet already engaged in relation.

1. A philosophy against reducing the Other

Emmanuel Levinas (1906-1995), born in Kaunas to a Lithuanian Jewish family, studied Husserl and Heidegger before developing a body of work marked by war, captivity, and the murder of part of his family. It would be reductive to derive his entire philosophy from this history. Yet his work consistently resists a temptation in Western thought: reducing the unknown to the known, exteriority to sameness, and singularity to an available concept.

In Totality and Infinity (guez.org/ali/976) (1961), “totality” names a system that absorbs differences into a comprehensive view. “Infinity” is not measurable immensity; it is what, in the Other, always exceeds my representation. A genuine encounter begins when knowledge meets its limit.

2. The face is not an image

The Levinasian “face” is neither a portrait nor a set of features nor a biometric device. It is the event through which the Other is exposed yet resists becoming an object. Vulnerability is not weakness here: it puts my power into question. The face signifies before I have completed its identification.

To say that “the face speaks” does not mean that information is hidden in eyes or muscles. Its first speech is address: I stand before someone whom I could harm, ignore, or reduce, and whose presence makes those gestures ethically meaningful. Ethics thus begins before recognition is complete.

3. Language before information

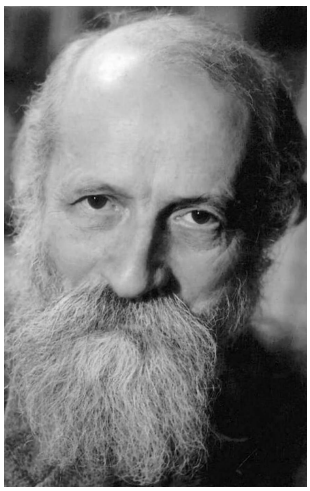
For Levinas, language is more than the circulation of content. Before what is said lies the fact of speaking to someone. This orientation changes communication: the interlocutor is no longer a technical destination but the source of an obligation. Relation precedes the message it makes possible.

For A.L.I, an interstellar signal could be poor in information yet rich in address: repetition, waiting, correction, modulation in response to an answer. Conversely, an immense archive may remain relationless if it leaves no place for its recipient’s interpretation or reply.

4. Buber: from I-It to I-Thou

In I and Thou (guez.org/ali/977) (1923), Martin Buber distinguishes the “I-It” relation, which treats the world as an object of use and knowledge, from the “I-Thou” relation of reciprocal presence. Both Buber and Levinas refuse to reduce relation to an operation performed by the subject.

They nevertheless diverge. Buber’s dialogue tends toward mutuality; Levinasian responsibility is asymmetrical. I cannot wait for the Other to become responsible for me before acknowledging my own obligation. This asymmetry matters when facing an unverifiable, distant interlocutor that cannot answer on human timescales.



Martin Buber: the I-Thou relation as an alternative to making the world available for use. Public-domain portrait, Wikimedia Commons.

5. Derrida: every hospitality meets a threshold

Jacques Derrida reads Levinas with admiration and concern. Absolute hospitality would ask the Other for neither name, origin, nor reciprocity. Yet every actual hospitality has a door, language, institution, and conditions. Unconditional hospitality remains the demand that sets necessarily conditional rules in motion.

Decoding has the same structure. To recognise a signal, we select frequencies, remove noise, choose units, and project models. These operations are necessary, but they already exert violence by forcing the unknown to appear inside our instruments. Ethics does not require abandoning analysis; it requires exposing its filters and preserving what they exclude.

6. Ricoeur: from solicitude to just institutions

In Oneself as Another (guez.org/ali/978) (1990), Paul Ricoeur links solicitude for a person to justice for all. Face-to-face encounter is insufficient once the “third party” appears: multiple others, conflicts, resources to distribute, and collective decisions.

First contact would never concern two isolated minds. Observatories, governments, companies, scientific communities, and publics would decide how a signal is preserved, interpreted, and answered. Ricoeur therefore completes Levinas: openness to alterity must become procedure, plural voices, traceable decisions, and just institutions.

7. The animal limit: who is granted a face?

Levinas remains largely anthropocentric. In “The Name of a Dog, or Natural Rights,” the dog Bobby recognises the humanity of prisoners whom guards had reduced to numbers. Yet Levinas hesitates to grant non-human animals the full status of face and responsibility. Scholars including Peter Atterton, Tamra Wright, and Bob Plant have examined this limit.

Derrida radicalises the question in The Animal That Therefore I Am: the animal looking at me is not “the Animal” in general, but a singular living being that disrupts the category through which I thought I understood it. For A.L.I, this is decisive. If we cannot encounter terrestrial intelligences without measuring them solely against the human, we may miss extraterrestrial intelligence simply because it does not resemble us.

The octopus forces us to separate intelligence, centralised embodiment, and the human face. See A.L.I's article "Octopus: a Distributed Intelligence."

8. A face without a face: AI, swarm, planet, signal

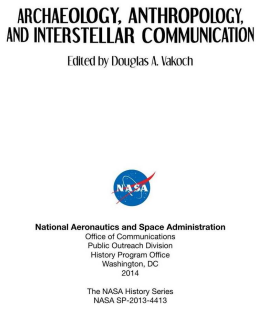
What becomes of the ethics of the face when there are no eyes, skin, or individual? Intelligence could be distributed across a swarm, forest, atmosphere, or computational network. It might produce only a number sequence, the periodic modification of a star, or an artefact outliving its makers.

We must then detach the face from human form. "Face" can name a resistance to appropriation: evidence that an organisation has ends of its own and cannot be exhausted by our model. This extension is an A.L.I hypothesis, not a direct conclusion from Levinas. It preserves the force of his thought without placing a human mask upon the extraterrestrial.

9. SETI: understanding a radically Other species

SETI research has often prioritised detection: distinguishing an artificial signal from noise. NASA's collective volume Archaeology, Anthropology, and Interstellar Communication (guez.org/ali/78) argues that moving from detection to understanding requires the humanities and social sciences. Interpreting a message independent of all terrestrial history means attempting to comprehend the mindset of a "radically Other" species.

This formulation echoes Levinas, with a crucial difference: anthropology still seeks knowledge, whereas Levinas asks what that knowledge does to the being it describes. A rigorous science of contact should therefore hold together two requirements: verify evidence without hastily inventing an interlocutor, and refuse to reduce a possible interlocutor to what our instruments can measure.



Archaeology, Anthropology, and Interstellar Communication, edited by Douglas A. Vakoch, NASA History Series, 2014. An official open-access publication.

10. Two fictions: Arrival and Solaris

In Denis Villeneuve's Arrival, Louise Banks does not begin by imposing a lexicon. She exposes her body, name, and the possibility of exchange. The film also shows that translation has military and political consequences. "Weapon" may mean "tool"; misunderstanding is never purely linguistic.

In Solaris, extraterrestrial life resists more radically. The ocean responds through forms drawn from human memory, turning every contact into projection. The Levinasian question becomes vertiginous: how can I know that I encounter the Other if what I see is made from my own memories?

11. The A.L.I hypothesis: a pre-semiotic ethics

A.L.I proposes six rules that apply before a signal has yielded its meaning:

- Suspend the name. Describe what is observed before deciding who speaks.
- Preserve the signal's alterity. Archive raw data, filters, and rejected elements.
- Multiply interpreters. No laboratory, state, or AI model should own meaning alone.
- Document uncertainty. Separate facts, inferences, projections, and fictions.
- Preserve a right to silence. No response is not permission to exploit or speak for the Other.
- Keep responses revisable. Future generations must be able to criticise, contextualise, and correct them.

12. Installation: The Faceless Face

An installation would place visitors before a signal that refuses to become a portrait. A luminous surface would react to distance, voice, and waiting time without producing an avatar. Every attempt at classification would erase part of the phenomenon; each pause would restore previously invisible detail.

Several visitors could propose answers, but none would be sent immediately. The system would display disagreement, uncertainty, and what each interpretation removed. The work would not simulate an extraterrestrial. It would make tangible our impatience to transform an unknown presence into a familiar object.

13. Four thought experiments

- The Other without an individual. If an entire biosphere answers, whom do we address?
- The Other too slow. A response unfolds over three centuries: can responsibility survive without immediate reciprocity?
- The dangerous Other. Does respect prohibit self-protection? Levinas does not abolish the third party or justice; ethics is not naivety.
- The false face. A terrestrial AI produces the expected signal. Does obligation depend on origin, consciousness, or merely the capacity to answer?

14. Critical position

Not every strange phenomenon should become a “face.” Such inflation would dissolve the concept and encourage superstition. Yet reserving moral consideration for the visible human would repeat the gesture Levinas teaches us to question: deciding in advance what form the Other must take to count.

A.L.I’s proposal therefore rests on a double discipline: epistemic rigour and ethical restraint. Verify without humiliating, interpret without absorbing, respond without possessing. First contact may not be the moment when we finally understand a message. It may be the moment when we accept that something addresses us before we know how to name it.

> LABO question: how can a protocol recognise address without manufacturing the face of whoever sends it?

References and further reading

- Stanford Encyclopedia of Philosophy — Emmanuel Levinas (guez.org/ali/976).
- Stanford Encyclopedia of Philosophy — Martin Buber (guez.org/ali/977).
- Stanford Encyclopedia of Philosophy — Paul Ricoeur (guez.org/ali/978).
- Peter Atterton and Tamra Wright (eds.) — Face to Face with Animals (guez.org/ali/979).
- Stanford Encyclopedia of Philosophy — phenomenology, Levinas, and information technology (guez.org/ali/980).
- NASA — Archaeology, Anthropology, and Interstellar Communication (guez.org/ali/78).

Related A.L.I articles

- Solipsism: the universe as the subject’s closed room
- Umwelt: every intelligence inhabits a perceptual world
- Octopus: a distributed intelligence
- Deleuze: rhizome and radical alterity

25 - The Interstellar Turing Test Hypothesis: How Could We Prove That Another Intelligence Is Answering?

Keywords: Alan Turing, Turing test, imitation game, artificial intelligence, SETI, METI, interstellar communication, evidence, alterity, language, protocol, false positive, LLM, Chinese room, ELIZA, morphogenesis, A.L.I

Alan Turing in 1951. Elliott & Fry photograph, public domain, Wikimedia Commons (guez.org/ali/263).

Summary

Turing asked whether a machine could sustain a convincingly human exchange. At cosmic scale, the problem changes: how can we recognise an intelligent response without requiring it to imitate our species, logic, or temporality?

Text

The Turing test does not prove that a machine thinks: it organises a situation in which the difference between two interlocutors becomes difficult to establish. For interstellar communication, the question must be reversed. Instead of asking whether an extraterrestrial can pass as human, we should ask whether an exchange progressively reveals an autonomous intelligence capable of modelling us, correcting our errors, and building a shared language with us.

A.L.I calls this extension the interstellar Turing test. It is not a single trial, but a cumulative protocol intended to distinguish a genuine response from an echo, a natural phenomenon, terrestrial interference, or a projection generated by our own artificial-intelligence systems.

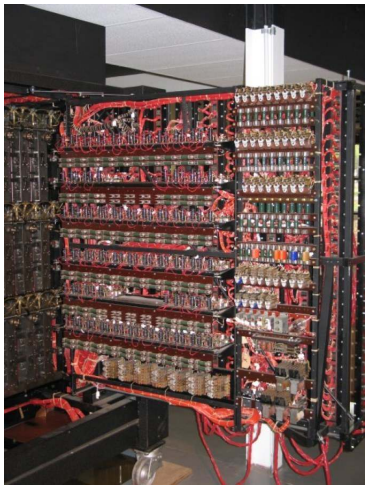
1. Turing: computing, decrypting, imitating, and generating form

In 1936, Alan Turing described an abstract machine able to execute any operation expressible as a sequence of instructions. This universal machine did more than anticipate the computer: it also established a limit, because some questions cannot be decided by any general algorithm. From the outset, his work joined computational power to an awareness of

what escapes it.

During the Second World War, Turing worked at Bletchley Park on Enigma cryptanalysis. The British Bombe, developed with Gordon Welchman and grounded in earlier Polish cryptological work, automated the search through possible settings. The lone-genius myth is misleading: codebreaking was collective intelligence combining mathematics, engineering, linguistics, intelligence work, and human procedure.

In 1950, Computing Machinery and Intelligence (guez.org/ali/264) replaced “Can machines think?” with an observable game. In 1952, Turing’s paper on the chemical basis of morphogenesis (guez.org/ali/265) showed how biological patterns can emerge from local interactions. Formalisation, decoding, testing, and emergence already form a method for A.L.I.



Reconstructed Bombe at Bletchley Park. Photograph by Ian Petticrew, CC BY-SA 2.0, Wikimedia Commons (guez.org/ali/266).

2. What the imitation game actually measures

In the game’s initial form, an interrogator tries to distinguish a man from a woman through written answers. Turing then changes the roles and asks whether a machine can take one participant’s place. The text-only channel removes body, voice, and appearance so that judgement concentrates on the exchange.

The test is operational. It defines neither thought, consciousness, nor understanding; it examines a situated performance. Success means that a system commands conversational expectations well enough to make its origin undecidable for a given period. It does not demonstrate identical inner lives.

This shift is both strength and weakness. Turing avoids an insoluble metaphysical dispute, but the criterion rewards human imitation. An extraterrestrial civilisation might fail precisely because it is too different: different body, memory, causality, objects, or temporality.

3. Difference at the centre of the test

The original framework makes identity and passing part of the protocol. This resonates painfully with Turing’s life: in 1952 he was convicted for homosexuality and subjected to hormonal treatment. A simple biographical reading would be irresponsible; the 1950 paper is not a direct commentary on his persecution. Yet the device forces us to ask who defines

normality and under what conditions difference becomes acceptable.

Emmanuel Levinas (guez.org/ali/976) argues that the Other exceeds the categories used to grasp them. Jakob von Uexküll (guez.org/ali/981) shows that every living being inhabits a perceptual world of its own. Donna Haraway (guez.org/ali/982) invites us to think relations that do not rest on prior identity. An interstellar test should not ask “Are you like us?” but “Can we establish that something other participates in constructing this exchange?”

4. Objections anticipated by Turing

Turing considered theological refusal, mathematical limits, consciousness, Lady Lovelace’s claim that a machine can originate nothing, the continuity of the nervous system, and the informality of human behaviour. He even mentioned extrasensory perception, not as validation but as an ironic complication that might disrupt the experiment.

The lesson is methodological: a serious test must include the reasons why it could be wrong. For A.L.I these include natural periodicity mistaken for intention, echoes of our own transmissions, human interference, contaminated data, a response forged by terrestrial AI, or the retrospective selection of one pattern among billions.

5. From the Chinese Room to large language models

In 1980, John Searle (guez.org/ali/270) imagined a person manipulating Chinese signs according to a rulebook without understanding them. Correct answers could emerge while the operator knew no Chinese: syntax alone would not entail semantics. Joseph Weizenbaum’s ELIZA had already shown how readily users attribute understanding to a simple dialogue system.

Large language models made the issue concrete. They generate fluid, contextual, often convincing dialogue from large-scale statistical learning. A 2026 PNAS study (guez.org/ali/271) reports that, under specific controlled conditions and prompts, several models became difficult to distinguish from human interlocutors. This demonstrates conversational indistinguishability; it is not by itself evidence of consciousness, general understanding, or subjective experience.

6. Why the classical test fails at cosmic scale

Interstellar communication involves delays of years or centuries, limited bandwidth, noise, no shared language, an unknown emitting body, and little opportunity for rapid repetition. A message might also be an archive left by an extinct civilisation rather than a live conversation.

Human resemblance is therefore a poor criterion. A swarm might answer without a central individual; a planetary intelligence might take a century to alter a pattern; a civilisation based on unknown senses might ignore our images while recognising mathematical transformations. The test must move from imitation to structured reciprocity.

A.L.I protocol: two unknown intelligences progressively construct common ground without having to imitate one another.

7. A.L.I hypothesis: the interstellar Turing test

We propose replacing “Which participant is human?” with seven cumulative levels of evidence. No level is decisive alone; convergence increases the plausibility of an autonomous interlocutor.

- Structure. The signal is improbably organised relative to noise models.
- Contingency. It changes after a precise question within an announced time window.
- Correction. The emitter detects a deliberate error and requests or produces a repair.
- Transfer. A rule learned in one context reappears in a new situation.
- Counterfactual response. The interlocutor handles a transformation never shown in that exact form.
- Mutual learning. Both parties alter their protocol in response to the other’s mistakes.
- Continuity. Responses display coherent memory over time without becoming mere repetition.

The strongest evidence would not be a perfect sentence. It would be novelty that neither sender nor receiver could have built alone: a third language emerging between them.

8. Four experimental devices

The reciprocal black box

Two separated agents — humans, AIs, or simulated systems — initially share only pulses. Researchers control delays, inject noise, and hide partner identities. The goal is not to guess who is behind the channel but to measure whether stable conventions emerge and survive perturbation.

The displaced rule

A sequence teaches a simple transformation: duplication, inversion, symmetry, or scaling. The channel then presents unseen objects. Correct out-of-sample responses reduce the memorisation hypothesis. Multiple laboratories preregister rules and criteria before transmission.

The third witness

Three observatories receive different fragments and do not know one another’s outgoing questions. If independent predictions converge on the same response grammar, local illusion becomes less likely. The International Academy of Astronautics SETI protocols (guez.org/ali/272) already emphasise independent verification before announcement.

The archive of misunderstandings

Every rejected hypothesis, competing translation, and applied filter is preserved. Failure becomes data. Unknown intelligence may appear less through our correct answers than through the regular way it repairs our mistaken interpretations.

9. Measuring without confusing measurement and meaning

The protocol can combine mutual information, compression gains when a grammar is found, out-of-sample prediction, reduction of uncertainty after each exchange, and stability of conventions under noise. No metric alone proves shared meaning.

Validation should combine radio astronomy, information theory, linguistics, ethology, anthropology, philosophy, and computer security. NASA's Archaeology, Anthropology, and Interstellar Communication (guez.org/ali/273) shows that between detection and understanding lies interpretive work resembling archaeology without shared context.

10. Installation: The Jury of Species

An A.L.I installation would distribute the same signal to several interpreters: human visitors, AI models with different architectures, biological sensors, and statistical automata. Each would propose the next question. The system would not immediately choose a winning translation; it would display divergences, predictions, and corrections over time.

Visitors could add noise, slow the channel, or hide symbols. A visualisation would reveal not an "alien face" but the changing geography of agreements and disagreements. The work asks the political question behind every test: who has the authority to declare communication valid?

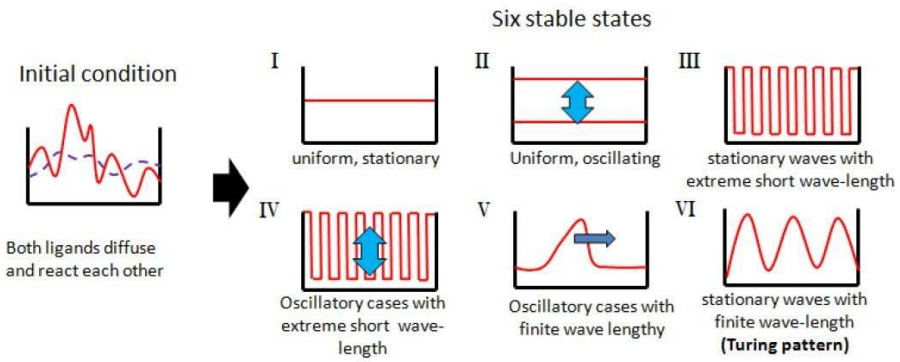
11. Four thought experiments

- The slow civilisation. One response arrives every thirty years. Does coherence belong to a person, institution, or species?
- The dead archive. The message adapts because it contains a program, but its makers are gone. Are we speaking with a civilisation or its automaton?
- The terrestrial mirror. An AI trained on our broadcasts returns exactly what we expect. Which test reveals that we are conversing only with our own statistics?
- The incompressible Other. Responses remain unpredictable yet consistently alter our instruments. Must intelligence be understandable to be recognised?

12. Limits, ethics, and critical position

A proof protocol must not become a machine for manufacturing extraterrestrials. False signals, confirmation bias, and retrospective interpretation require accessible raw data, preregistered criteria, replication, adversarial teams, and an explicit separation between fact, inference, and fiction.

Conversely, requiring intelligence to master our conversation, emotions, and metaphors reproduces the anthropocentric bias of the classical test. Rigour means holding two refusals together: do not treat every pattern as a message, and do not reject a message because it does not resemble our language.



Six Turing-pattern regimes: simple local interactions can produce emergent global forms. Illustration by Shigeru Kondo and Takashi Miura, public domain, Wikimedia Commons (guez.org/ali/274).

13. Conclusion: evidence as relation

The classical Turing test places a judge before candidates. A.L.I's interstellar test turns the judge into a participant. The task is not only to recognise the Other, but to observe whether two systems can jointly produce rules, expectations, repairs, and memory that neither possessed at the outset.

Evidence for valid communication may be neither a translated word nor an isolated signature. It may reside in reciprocal transformation: we learn to ask better questions, something learns to answer us, and the space between the two gradually becomes inhabitable.

> LABO question: what minimum degree of reciprocity is enough to move from an organised signal to the plausible presence of an interlocutor?

References and further reading

- Alan Turing, "Computing Machinery and Intelligence," Mind, 1950 (guez.org/ali/264).
- The Turing Digital Archive — documents related to the 1950 paper (guez.org/ali/275).
- Alan Turing, "The Chemical Basis of Morphogenesis," 1952 (guez.org/ali/265).
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- 2026 PNAS study on large language models and the Turing test (guez.org/ali/271).
- NASA — Archaeology, Anthropology, and Interstellar Communication (guez.org/ali/273).
- IAA SETI — verification and announcement protocols (guez.org/ali/272).

Related A.L.I articles

- Lincos: Hans Freudenthal's cosmic language
- Neuralese: when intelligence invents its own language
- Umwelt: every intelligence inhabits a perceptual world
- Levinas and the face of the Other

26 - The False Memory Hypothesis: Building a Memory Path Toward Encounter

Keywords: false memories, memory, Elizabeth Loftus, DRM paradigm, hypnosis, reconsolidation, Mandela effect, Blade Runner, artificial intelligence, contact, art science, ethics

A.L.I visual hypothesis: memory as a contact medium, between intimate reconstruction, impossible landscape, and non-human presence.

Summary

Memory does not replay the past like a camera: it reconstructs it. What if non-human contact used this vulnerability, not to send us an external message, but to place the trace of an encounter inside our own past?

Text

A memory can be vivid, detailed, emotional, and still be inaccurate. Human memory does not preserve an untouched copy of the past: it recomposes fragments, expectations, narratives, and information received after an event. Decades of cognitive psychology support this view. It opens a disturbing A.L.I hypothesis: what if an external intelligence tried not to speak to us in the present, but to create in us the feeling of an encounter that had already happened?

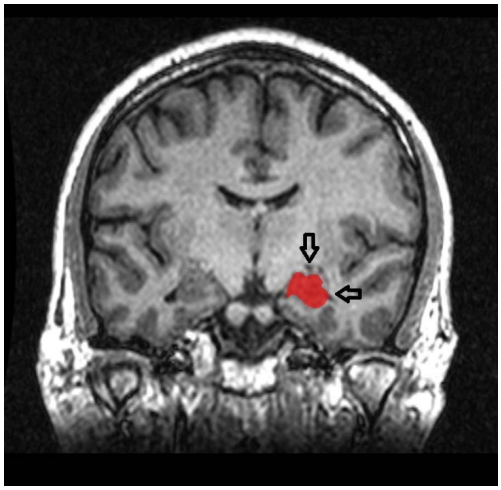
This article does not claim that false memories prove extraterrestrial contact. It separates three levels: established experimental phenomena, their cultural representations, and an artistic-scientific extrapolation designed to produce testable protocols.

1. Remembering means reconstructing

Since Frederic Bartlett, psychology has described memory as reconstruction guided by schemas. We do not retrieve a file; we reassemble an experience from incomplete traces. The American Psychological Association (guez.org/ali/983) presents how later narratives, images, and suggestions may alter what we believe we saw.

Several phenomena are too often collapsed into one: errors of detail, false recognition of a

word, suggested autobiographical memories, and collective distortion. A recent systematic review (guez.org/ali/277) indicates that these families of false-memory effects are not necessarily driven by a single mechanism.



The hippocampus, a structure essential to episodic memory. Amber Rieder and Jenna Traynor, public domain, Wikimedia Commons (guez.org/ali/278).

2. Three experimental routes to false memory

The misinformation effect

Elizabeth Loftus showed that a question asked after an event can change its memory. In the classic car-crash study, the verb used to describe a collision influenced estimated speed and later reports of details. In another line of work, participants exposed to a fictitious Disneyland advertisement could report remembering meeting Bugs Bunny, a character not owned by Disney. The scientific interest lies in how outside information attaches itself to a plausible scene.

Elizabeth Loftus, whose work transformed the study of eyewitness memory and suggestion. Photograph via Wikimedia Commons (guez.org/ali/279).

Suggested autobiographical memory

In the Lost in the Mall protocol, a plausible false childhood episode was mixed with genuine family memories. Some participants later supplied additional details. Rates vary across procedures and do not imply that any memory can be implanted at will. They do show that

familiarity, source authority, and imaginative effort can create a convincing autobiographical impression. Elizabeth Loftus's review, Planting misinformation in the human mind (guez.org/ali/280), remains a key reference.

The DRM paradigm: recognising an absent word

The Deese–Roediger–McDermott paradigm presents lists of associated words — bed, rest, awake, tired, dream — while omitting the critical word sleep. Many participants nevertheless recall it. In Roediger and McDermott's 1995 study, false recall reached 40% in the first experiment and 55% in the second. The brain infers a common semantic cause and can retain the structure more strongly than the exact list.

For A.L.I, this matters: a message might be transmitted not as an explicit form but as a field of converging clues that causes the receiver to generate a form never actually presented.

3. Reconsolidation: recall can transform

When a memory is recalled, it may temporarily become modifiable before being reconsolidated. This does not mean that memories can be freely rewritten, but remembering is also a new inscription. Communication through memory would therefore be temporal: it would depend on when a trace is reactivated, emotional state, source attribution, and successive retellings.

4. Hypnosis: subjective intensity is not truth

Hypnosis can alter attention, confidence, and the manner in which a memory is narrated. It is not a truth detector. Poorly controlled suggestions can reinforce an error and give it powerful subjective certainty. A recent review (guez.org/ali/283) underlines the need to distinguish lived experience, accuracy, and confidence.

An A.L.I installation should never use hypnosis to "recover" hidden contact. It could only use it as a voluntary observational tool: how does a mental image stabilise, and which details emerge before collective narratives impose them? Sessions would need recording, controls, and explicit debriefing.

5. Repetition, collective memory, and the Mandela effect

Repetition increases familiarity and may make a claim feel truer: the illusory truth effect. Within groups, stories circulate, correct one another, and contaminate one another. The "Mandela effect" is the popular name for certain shared memory errors. Research on the Visual Mandela Effect (guez.org/ali/285) examines recurring visual mistakes. It is not evidence of parallel universes, but it poses an A.L.I question: how do several people converge on the same absent form?

6. AI as a manufacturer and auditor of the past

Generative images, cloned voices, and synthetic video can create archives of events that never occurred. Early research suggests that AI-altered images and videos can influence scene memory. This technology did not invent memory's malleability; it gives it persuasive new documents.

AI could also serve the opposite function: compare testimonies, detect details introduced after exposure to a source, map image provenance, and preserve every transformation. It

would become not a persuasion machine but a critical memory of memories.

7. Blade Runner: memory as proof of existence

In Blade Runner, replicants receive memories that stabilise identity. In Blade Runner 2049, Ana Stelline designs memories for replicants and stresses their emotional texture. The question becomes not only “is this memory true?” but “what does it produce in the person who carries it?” Total Recall, Memento, and Eternal Sunshine of the Spotless Mind extend the same intuition: manipulating memory means intervening in personhood, attachments, and decisions.

Ana Stelline constructs memories in Blade Runner 2049 (Denis Villeneuve, 2017). Film still, Warner Bros. / Alcon Entertainment, cited for analysis.

8. A.L.I hypothesis: contact in the past tense

Imagine an intelligence unable to enter our direct sensory channels but able to modulate the conditions under which a memory forms. It would not say “I am here.” It would produce clues that make us think: “we have already met.”

Such contact would be difficult to distinguish from error, dream, social contagion, or algorithmic artefact. Evidence could never rest on a witness’s conviction alone. It would have to emerge through independent correlations: the same rare details produced without communication, verifiable predictions, dated physical traces, or an informational structure impossible to derive from the presented materials.

9. The mnemonic handshake

A.L.I proposes a five-stage protocol. An encoder builds a constellation of clues without showing the target form. Isolated participants explore it. After a delay, they freely recall their experience. Reports are compared before collective discussion. Finally, the system reveals the target and documents every source. A control group receives stimuli of equal intensity but with no shared structure.

A.L.I diagram: encode, wait, recall, cross-check, then reveal and delete data. The aim is not to manufacture belief, but to measure the emergence of an absent form.

10. Three artistic-scientific devices

The archive of the encounter that never happened

A room presents photographs, sounds, objects, and fragmented testimony from a fictional event. Each visitor describes what they believe happened before accessing the sources. The installation then visualises spontaneously added details and those shared by several people.

The DRM constellation

Light, sound, and tactile signals are organised around a central structure that is never shown. Visitors draw the form they perceived. If their answers converge, the work demonstrates how a language can cause an idea to appear without transmitting it directly.

The memory checksum

Each fragment carries provenance and a cryptographic signature. Human narrative remains free, but the system indicates which elements came from experience, another participant, a generated image, or late reconstruction. The poetry of memory coexists with rigorous traceability.

11. Ethical limits

False-memory technology touches mental autonomy. It can intensify trauma, alter testimony, create accusation, or manufacture political loyalty. The project must never target vulnerable people, claim to recover repressed memories, or conceal its fiction beyond the agreed experiment.

The proposed studies require informed consent, a right to withdraw, low-stakes scenarios, minimal data collection, control conditions, immediate debriefing, and deletion. Art may work with uncertainty; it must not deprive participants of the possibility of knowing that they took part in a construction.

12. Conclusion: remembering the unknown

False memory is neither proof of extraterrestrials nor a minor defect of the mind. It reveals memory as an active interface between perception, language, imagination, and collectivity. For A.L.I, that interface becomes a laboratory: can a shared form be produced without being stated? Can a real encounter be distinguished from a constructed one? Could a radically other interlocutor become legible by altering not what we see, but how we remember?

> LABO question: what independent information should accompany a shared memory before it becomes evidence of an interlocutor rather than a product of expectation?

References and further reading

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Related A.L.I articles

- The imagination as a contact language
- The encoded future hypothesis
- Psychology, alien communication, and the collective unconscious
- Solipsism: the universe as a closed room

27 - Lincos: Hans Freudenthal’s Cosmic Language

Keywords: Lincos, Hans Freudenthal, cosmic language, interstellar language, mathematical logic, SETI, METI, astrolinguistics, communication, radio signal, decoding, pedagogy, Cosmic Call, A.L.I

A.L.I visual interpretation: an interstellar language built progressively from radio pulses, relations, and dialogue.

Summary

In 1960, Hans Freudenthal designed Lincos, a language intended to teach its own key to an extraterrestrial intelligence. From radio pulses to numbers, time, dialogue, and value, this historical precedent exposes both the power and the assumptions of any interstellar language.

Text

In 1960, mathematician Hans Freudenthal published Lincos: Design of a Language for Cosmic Intercourse. His ambition was formidable: to build a language that an extraterrestrial recipient could learn without a dictionary, prior translation, or any shared Earth language.

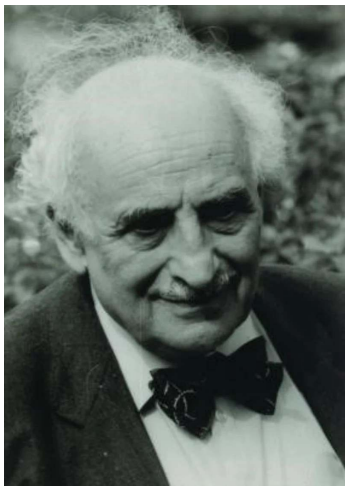
Lincos, short for lingua cosmica, is not merely an encrypted code. It is a lesson transmitted by radio. The message must first demonstrate how it works, then use acquired concepts to introduce more complex ones. A recipient has truly understood only when it can operate with the language: calculate, answer, correct, and compare. For A.L.I, Lincos is a major precedent because it reframes contact: the first message may not need to tell a story; it may need to teach how to learn.

1. Hans Freudenthal and a language without translation

Hans Freudenthal (1905–1990) was a mathematician, philosopher of science, and theorist of education. Born in Germany and based in the Netherlands, he worked in topology before profoundly influencing mathematics education. This trajectory illuminates Lincos: the task is not only to invent universal symbols, but to organise a progression through which an

unknown mind can reconstruct their meaning.

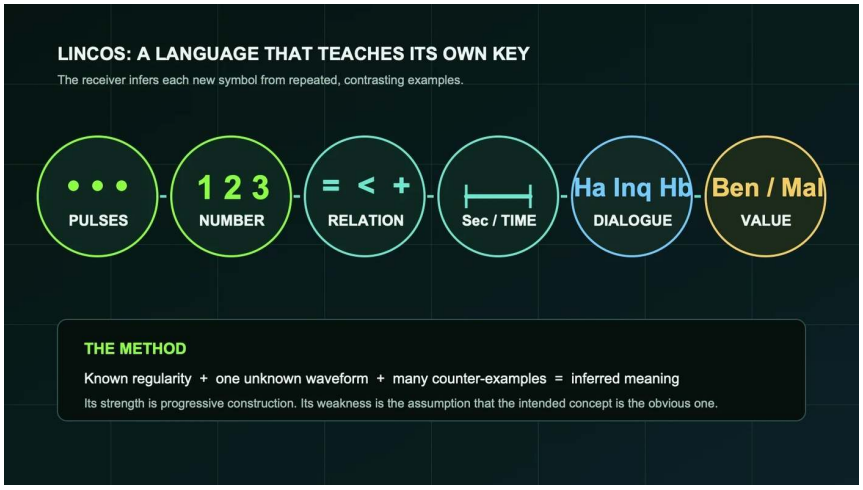
The book announces itself as “Part I.” It addresses mathematics, time, behaviour, and what Freudenthal calls conversation. Matter, life, and space were intended for a sequel that never appeared. The incompleteness is instructive: numbers are easier to transmit than biology, history, or lived experience.



Hans Freudenthal at Oberwolfach in 1983. Photograph by Konrad Jacobs, Oberwolfach Archives / Wikimedia Commons, CC BY-SA 2.0 DE (guez.org/ali/288).

2. Beginning ab ovo: the signal as first lesson

Freudenthal seeks to begin ab ovo—from the egg—with as little direct designation as possible. A sequence of identical pulses can introduce natural numbers: one pulse, then two, then three. Sets of true and false examples allow equality, inequality, addition, or multiplication to emerge. A sign does not naturally resemble its meaning; its position within repeated contrasts progressively constrains interpretation.



The Lincos method: begin with detectable regularities, multiply contrasts, then reuse each acquired notion to teach the next.

In linguist Pierre Valore’s reconstruction, a sequence such as 1 + 1 = 10 Ver is contrasted with 1 + 1 = 11 Fal. Ver and Fal function as true and false. The recipient must simultaneously infer numbers, operators, equality, and the evaluation of the statement. The method is powerful, but it does not eliminate assumptions: it presumes a mind that seeks regularities and favours a mathematical interpretation over an acoustic, aesthetic, or ritual one.

3. A language that builds its own units

Lincos uses radio signals whose duration and wavelength may vary. The medium therefore serves as a ruler. Once numbers and relations have been taught, the protocol can define a temporal unit from a reference pulse: Dur —— = Sec a. The physical duration of the message becomes an object inside the message.

This move matters to A.L.I. Meaning is not external to the channel: frequency, duration, silence, and repetition participate in grammar. But this richness also creates ambiguity. A pause may separate two signs, two sentences, or two pedagogical sequences. What the sender treats as punctuation may be read as data. A cosmic language must explain not only its symbols but also its blanks.

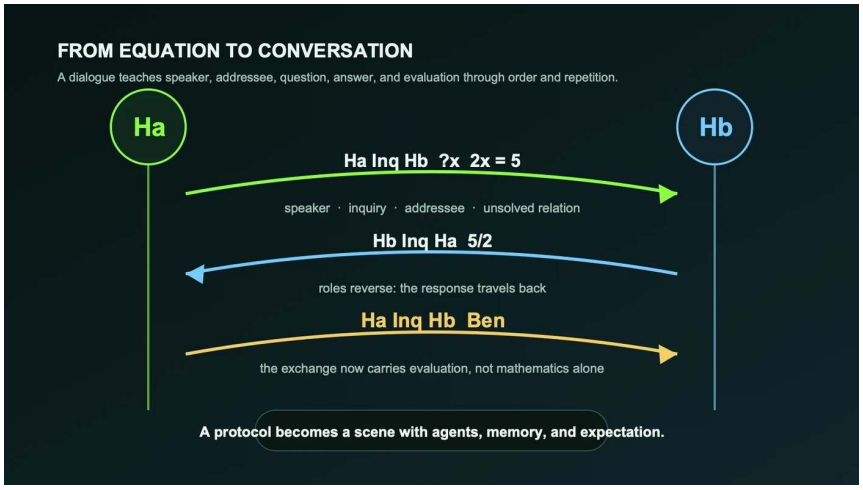
4. From equation to conversation

Lincos makes its boldest leap when Freudenthal leaves arithmetic and stages interlocutors. Conventional names such as Ha and Hb identify agents. The order of elements progressively teaches who speaks, to whom, and in what mode.

A simplified exchange can be read as follows:

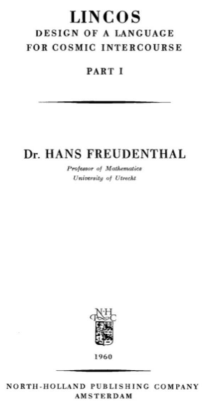
Ha Inq Hb ?x 2x = 5Hb Inq Ha 5/2Ha Inq Hb Ben

Ha asks Hb for the value of x. Hb answers. Ha evaluates the response with Ben, “good.” The language distinguishes Ver/Fal, concerning truth, from Ben/Mal, evaluating an answer or conduct. A social scene appears inside a radio stream.



The protocol becomes conversation: a question travels, roles reverse with the answer, then the exchange receives an evaluation.

This progression opens the possibility of teaching knowledge, ignorance, desire, expectation, promise, or play. It also reveals a threshold: once Ben and Mal appear, language no longer merely describes a world; it proposes a norm. What seems “good” to the sender may have no equivalent for the recipient.


LINCOS
DESIGN OF A LANGUAGE
FOR COSMIC INTERCOURSE
PART I

Dr. HANS FREUDENTHAL
Professor of Mathematics
University of Utrecht

1960

NORTH-HOLLAND PUBLISHING COMPANY
AMSTERDAM

Original title page: Hans Freudenthal, Lincos: Design of a Language for Cosmic Intercourse, Part I, 1960. Read the digitised book (guez.org/ali/289).

5. What Lincos already assumes

A language without common language can never begin from nothing. Lincos assumes at least a recipient capable of segmenting a signal, remembering examples, comparing sequences, seeking coherence, distinguishing repetition from variation, and accepting that a sender is trying to teach.

- Logic may not be unique. Even if arithmetic describes invariants, the chosen signs and the method for inferring them remain conventional.
- The required number of examples is unknown. What seems obvious to a human after three repetitions may require a hundred examples—or never become obvious—to another cognition.
- The channel is noisy and non-interactive. Across interstellar distances, the teacher cannot watch the learner hesitate and adjust the lesson immediately.
- The transition to life and culture is fragile. An equation can be tested locally; organism, justice, fear, or history depend on situated experience.
- The recipient remains anthropomorphised. Freudenthal himself acknowledged that the project presupposes mental states and experiences comparable to ours.

Contemporary criticism does not make Lincos useless. It reveals its experimental role: each difficulty locates a human assumption that the protocol had treated as self-evident.

6. Legacy: from Lincos to astrolinguistics

Lincos is generally described as the first systematic attempt at a language designed for interstellar communication. Later messages, including the 1999 and 2003 Cosmic Calls, reused the idea of a mathematical teaching preamble without transmitting Freudenthal's complete language. In 2013, astronomer and computer scientist Alexander Ollongren published Astrolinguistics, extending the ambition of a logic-based language toward music, behaviour, and more complex annotations.

Modern work places greater emphasis on robustness, information theory, interaction, and plural interpretations. The question is no longer only "how do we encode what we know?" but "how can the other test that it has understood?"

7. A.L.I hypothesis: plural Lincos

A.L.I could retain Freudenthal's pedagogical principle while abandoning a single path. A plural Lincos would transmit several reading hypotheses in parallel. Each new symbol would be accompanied by counterexamples, redundancy across media, and tests requiring the recipient to transform the message.

Protocol 1 — Proof of decoding

The recipient should not merely repeat a sequence. It must produce a new answer: complete an unfamiliar series, intentionally correct an error, or translate a relation into another rhythm. Understanding becomes verifiable action.

Protocol 2 — Multimodal message

The same relation is encoded through radio pulses, light, image, sound, and movement. No channel is presented as the true language. Their intersection separates structure from support and welcomes different perceptual biologies.

Protocol 3 — The anti-dictionary

For each sign, the message retains several possible interpretations and indicates which observations could separate them. Language no longer conceals ambiguity; it encodes ambiguity as part of the conversation.

8. A teaching machine before a universal language

Lincos is probably not a finished universal language. It is something more productive: a conceptual machine that forces humanity to expose the steps by which it turns a signal into a shared world. It reminds us that contact with an unknown intelligence is not a matter of sending a dictionary into the void, but of building a learning situation without a present teacher, a common body, or perhaps a reply for decades.

Sixty-six years after publication, Lincos remains a concrete working base for A.L.I. It gives us a method, an example, and a warning: we can teach a key inside the message, but we can never guarantee that the other will open the same door.

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28 - Nuclear Semiotics: Warning a Civilisation 10,000 Years from Now

Keywords: nuclear semiotics, radioactive waste, WIPP, Andra, Thomas Sebeok, Human Interference Task Force, ray cats, memory, deep time, markers, signal, archives, intergenerational communication, Long Now, EXOST1, A.L.I

An A.L.I visual interpretation of a warning landscape. This is not a built site; it is freely inspired by the problems studied by WIPP marker teams.

Summary

How can we transmit “danger, do not dig here” to a society whose language, symbols, and institutions are unknown? From WIPP reports and Andra’s memory programme to speculative ray cats and the 10,000-year clock, nuclear semiotics turns a repository into a radical laboratory of contact.

Text

How can we say “danger, do not dig here” to beings who will live ten millennia from now? We do not know their language, beliefs, institutions, or even the value they will assign to a monument. The disposal of radioactive waste has already made this an actual experiment in communication with an unknown civilisation.

Nuclear semiotics studies how warnings might outlast ordinary languages and states. It brings together engineering, linguistics, archaeology, anthropology, art, and information theory. For A.L.I, it relocates interstellar contact along the axis of time: the recipient is not light-years away, but far enough in the future to become almost as alien.

1. Two horizons: 10,000 and 100,000 years

In the United States, the Waste Isolation Pilot Plant (guez.org/ali/295) (WIPP) in New Mexico receives defence-related transuranic waste. US regulation established a 10,000-year performance period. This prompted teams to explore how a future human intrusion might be deterred.

In France, Andra (guez.org/ali/296) works on a longer scale. Its memory programme investigates how information might be conserved and transmitted over centuries, millennia, and, for some systems, up to 100,000 years. The two figures should not be conflated: they belong to different projects, waste types, and safety frameworks.

In both cases, the problem exceeds the durability of a plaque. Languages disappear, borders move, archives burn, and institutions change purpose. A warning has to convey the existence, location, nature, duration, and appropriate response to a hazard.

2. Thomas Sebeok: relaying a message from generation to generation

In 1980 the Human Interference Task Force brought specialists together to consider the memory of nuclear repositories. Semiotician Thomas A. Sebeok (guez.org/ali/297) published Communication Measures to Bridge Ten Millennia in 1984. His conclusion was stark: no isolated sign can be guaranteed for ten thousand years.

Sebeok recommended redundancy, several levels of complexity, and a relay system that would periodically recode the knowledge into current languages and techniques. He also proposed an “atomic priesthood”, a body of guardians maintaining rituals, stories, and taboos. The provocative phrase exposes a central fact: long-lived information depends as much on social organisation as on material.

The solution creates its own risk. A caste can monopolise knowledge, convert it into power, or lose credibility. The message becomes dependent on an authority that no designer can control for millennia.

3. Ray cats: embedding warning in life and folklore

In their 1984 proposal, Françoise Bastide and Paolo Fabbri imagined animals bred to change skin colour in the presence of radiation. These “ray cats” would be supported by songs, proverbs, and stories linking their changing appearance to an invisible danger. The translated paper is available as Living detectors and complementary signs: cats, eyes, and sirens (guez.org/ali/298).

The project was never implemented. Its force lies in a reversal: rather than asking stone to speak, it imagines a signal reproducing with life while its meaning circulates through popular culture. Its weakness is equally instructive: a species may vanish, mutate, migrate, or survive while folklore changes meaning.

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10.2478/lf-2022-0008

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Linguistic **Frontiers**

Living detectors and complementary signs: cats, eyes, and sirens

Article translation

Paolo Fabbri, Françoise Bastide (trans. Sebastian Feil)
Originally published in Zeitschrift für Semiotik, Tübingen: Stauffenburg Verlag, Volume 6, Issue 3, 1984, pp. 257–264.

Received: April 2022; Accepted: May 2022

Abstract/Summary: The article proposes that society should allow any information about the exact locations of radioactive waste repositories to be forgotten and to pass on to further generations only the knowledge about the fact that radioactive waste repositories do exist and about methods of radiation measurement. This is to prevent politically relevant knowledge from being exploited. A biological option is recommended for radiation measurement: in order to make nuclear radiation perceptible to humans, animals should be bred that react to radioactive irradiation with skin discoloration. This animal species should exist as part of the ecological niche of humans, and its role as a radiation detector should be anchored in cultural tradition by introducing a suitable name (e.g., 'ray cat') and by proverbs and myths. If someone unknowingly enters a radioactive waste repository, they shall be warned by iconic-indexical signs. A representation of a human body part (e.g., an 'eye bone-king into pieces') should serve as a visual signal and a siren powered by radiation energy, whose volume and sound correspond to the intensity of radiation, should serve as an acoustic signal. However, the authors are skeptical about the likelihood that these signs will actually be understood by the addressees and accepted as a warning.

1. POSSIBLE SCENARIOS FOR THE FUTURE

From a semiotic point of view, the problems of the transmission of information relevant to survival over a period of 10,000 years really is a challenge. Before we make our own proposals, sketching some possible scenarios of the development of mankind seems necessary to us.

First of all, we have to imagine that mankind has survived up to the point in time in question without any substantial change in its morphological and psychological characteristics – even though completely different cultures (and languages) will have existed. If this were not the case, then the presence of radioactive waste would not be much of a problem (incidentally, it is not even a source of danger to certain species inhabiting the Earth).

Moreover, the problem only arises if the practice of storing radioactive waste in deep geological repositories or in the depths of the sea has been abandoned by the time in question; otherwise, there would be maps showing the radioactive waste repositories and other similar waste disposal sites, and with the help of such maps, these places could be inspected by those responsible for radioactive waste storage on a regular basis. It should also be emphasized that the radiation emitted by radioactive waste is a clear signal for someone who knows what to look for. For a civilization that still uses nuclear energy, the detection of radioactive radiation is technically not a problem.

Therefore, we have to deal with two opposing future possible developments:

a. The first possibility is that mankind (intentionally or unintentionally) turns away from (and forgets about) all scientific achievements of our time. Thus, the production of radioactive waste and the manufacture of devices for measuring radioactive radiation would cease.

b. The second possibility is that mankind develops technical solutions for the handling of radioactive products that are not as primitive as mere disposal of these materials is. The measuring instruments would then be available, but would not be used to look for hidden

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Françoise Bastide and Paolo Fabbri’s 1984 proposal, translated and republished by Linguistic Frontiers in 2022. Ray cats are a semiotic and biological hypothesis, not an existing device.

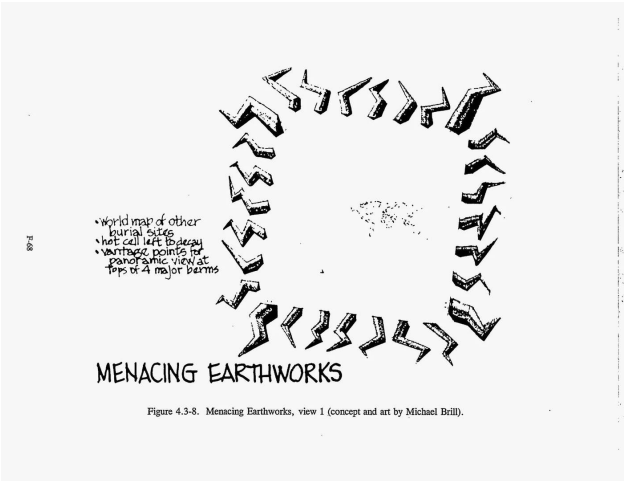
4. Sandia: making the landscape itself communicate

The 1993 Sandia report, Expert Judgment on Markers to Deter Inadvertent Human Intrusion into the Waste Isolation Pilot Plant (guez.org/ali/300), does not seek a miraculous pictogram. It proposes a distributed system: large earthworks, perimeter markers, reading walls, information chambers, maps, archives, and messages at several levels.

The best-known concepts—Landscape of Thorns, Menacing Earthworks, and Forbidding Blocks—use irregular, aggressive, or uncomfortable forms. A site should communicate danger before a text is understood. These were exploratory studies and drawings, not built designs.

Landscape of Thorns, view 2. Concept by Michael Brill, art by Safdar Abidi, Sandia report, 1993. Source: US Department of Energy / OSTI.

The teams also formulated four message levels: something artificial is present; it signifies danger; it explains the nature of that danger; and it finally supplies detailed technical information. A visitor might therefore receive something even when unable to read everything.



Menacing Earthworks, view 1, concept and art by Michael Brill. Lightning-shaped earthworks make the area anomalous and inhospitable. Sandia report, 1993, US federal public domain.

5. The monument paradox: warning can attract

The more costly, precise, and durable a marker appears, the more likely it is to be read as a royal tomb, temple, or sign of buried treasure. Sandia's authors therefore considered an architecture without honour: rough materials, irregular geometries, low reuse value, and little decorative virtuosity.

Yet the absence of a monument creates the opposite risk: the site may be forgotten and rediscovered accidentally. Every solution oscillates between two failures—being too visible and inviting exploration, or becoming invisible and warning no one.

The same paradox applies to METI. A message designed to announce our presence may attract a recipient whose intentions are unknown. Communication begins before content, with a political decision about becoming detectable.

6. Andra: material, institutional, and social memory

Andra does not rely on one solution. Its approach combines memory records, archives, regulation, local knowledge, durable media research, signs, and social practice. Its programme asks how future generations might be warned when current symbols are no longer intelligible.

One experiment uses a sapphire disc carrying micro-engraved information. The medium aims at density and resistance, but it must still be located, recognised as a document, and viewed with the right instrument. Material durability does not automatically produce legibility.

A micro-engraved sapphire disc studied within Andra's memory programme. Image: Andra.

Internationally, the OECD Nuclear Energy Agency's Records, Knowledge and Memory initiative (guez.org/ali/302) assembled a toolbox of thirty-five mechanisms: markers, archives, maps, regulation, museums, international lists, local culture, and intergenerational transfer. Memory is treated as an ecosystem rather than a single object.

7. Building for ten millennia: Long Now and Rosetta

The Clock of the Long Now (guez.org/ali/303) is a monumental mechanical clock designed for ten thousand years. It does not communicate a hazard, but makes an almost inconceivable duration physically present. What must be built today to make a future visitor think in millennia?

Mechanism of the Clock of the Long Now, designed to materialise a ten-millennia horizon. Image: Long Now Foundation.

The foundation's Rosetta Project (guez.org/ali/304) stores thousands of pages documenting more than one thousand languages on a microscopic disc. Its visible spiral and successive scales invite discovery of the reading method. The medium contains the beginning of its own tutorial.

8. EXOST1: an extraterrestrial object as temporal archive

In EXOST1 (guez.org/ali/305), David Guez proposes an archival protocol tied to an encounter with an interstellar object. The project no longer asks only how to conserve an Earthly warning; it imagines a medium linking human time to cosmic trajectories.

David Guez, EXOST1, an archival-object project linked to the passage of an interstellar body. Image and project: David Guez.

Nuclear semiotics and EXOST1 share an intuition: a message must travel with a scenario of rediscovery. Storing data is not enough; one must imagine the gestures, instruments, and stories through which it could be recognised as data.

9. A.L.I hypothesis: the layered message

Drawing on this work, A.L.I proposes treating a message not as a sentence but as a stratification of channels. Each layer should survive the loss of others and help reconstruct them.

- Physical form creates a perceptible difference: this place or object is not natural.
- Repetitive signal indicates intention and supplies measurable units.
- Graduated code moves from number to relation and from relation to content.
- Technical archive documents risk, context, and verification methods.
- Social memory circulates stories, practices, taboos, and institutions able to renew the message.
- Revision lets each period copy, translate, criticise, and extend the whole without erasing earlier states.

This architecture does not promise perfect understanding. It organises several chances of partial understanding. In interstellar contact, a receiver might first detect regularity, then arithmetic, and finally a relation between message and environment.

10. Prototype: a beacon that teaches its own reading

An A.L.I prototype could consist of six rings. The first establishes a pulse; the second demonstrates prime numbers; the third associates numbers, durations, and forms; the fourth repeats these relations through light, sound, and relief; the fifth describes location and hazard; the sixth stores several dated human translations.

The object would be tested with groups deprived of some channels: no text, no vision, no sound, missing fragments, or altered order. Success would not mean “understand everything” but reconstruct a rule, formulate a hypothesis, and test it.

11. Three artistic experiments

The monument that refuses admiration

An installation confronts visitors with three architectures: alluring, menacing, and almost invisible. Which one would they explore? The work measures the paradox among repulsion, curiosity, and forgetting.

Folklore under controlled mutation

A warning is passed over several weeks through oral narrative, song, drawing, and gesture. Every transmission is archived to reveal what survives and which redundancies recover the initial core.

The archive without instructions

Several objects containing the same information are shown without explanation. Some expose their reading mechanism, others do not. The installation demonstrates that an archive’s first message is always: “I am an archive.”

12. Critical position

No system can guarantee that a warning will retain its meaning for ten thousand years. Nuclear semiotics does not abolish uncertainty or present responsibility. It does, however, challenge a dangerous illusion: that a message exact today will remain exact without maintenance, institutions, or social relations.

For A.L.I, the lesson is decisive. Communication with an unknown intelligence is not a matter of choosing the best symbol. It requires a situation in which a recipient can detect intention, compare evidence, produce an interpretation, and correct it. Contact is not a sign sent once;

it is a possibility of reading maintained in matter, time, and culture.

LABO question: how can a message remain strange enough to signal intention, simple enough to reconstruct, and modest enough not to become a sacred monument?

Primary references

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- David Guez, EXOST1 (guez.org/ali/305).

Related A.L.I articles

- The chroneme hypothesis: time in language
- The encoded-future hypothesis
- Time as multidimensional memory
- Archaeology of the unknown
- A contemporary Golden Record

29 - Constructed Languages: Klingon, Na'vi, Dothraki — Inventing a Language from Scratch

Keywords: constructed languages, conlang, artlang, Klingon, Na'vi, Dothraki, Marc Okrand, Paul Frommer, David J. Peterson, Tolkien, linguistics, phonology, grammar, cognition, interstellar contact, A.L.I

A.L.I visual laboratory: three invented systems converge towards a shared signal. The image was created for this article without reproducing franchise characters or official scripts.

Summary

Klingon, Na’vi, and Dothraki are genuinely structured languages created to make fictional peoples credible. Their construction exposes a decisive tension for A.L.I: how can a language produce enough otherness to shift thought while still allowing its recipient to learn, answer, and repair misunderstanding?

Text

A language can be born before its people. A linguist selects sounds, decides how words combine, imagines what a community would name frequently and what it would leave implicit. Actors embody it, then audiences learn it. Klingon, Na’vi, and Dothraki followed this path: initially tools of fiction, they became usable systems in the real world.

For A.L.I, they form an extraordinary laboratory. They do not come from extraterrestrial intelligence, yet they attempt to produce the impression of another mind using human linguistic materials. They let us observe the boundary between code, language, culture, and embodiment: when does a sequence of sounds stop being scenery and become a medium in which one can think and converse?

1. Building a language is not the same as designing an alphabet

A constructed language, or conlang, is deliberately designed. It may facilitate communication, as Esperanto does; test a logical or political hypothesis, as Lojban or Láadan do; simplify expression, as Toki Pona does; or give historical depth to an imaginary world. Klingon, Na'vi, and Dothraki belong to the last group: artlangs.

An alphabet is not enough. A language needs an inventory of sounds or gestures, combinatory rules, morphology, syntax, and ways to ask, negate, locate events in time, and repair misunderstanding. It also needs irregularities and historical traces. A perfectly regular language resembles a form; a living language appears worn by generations.

2. A tradition older than cinema

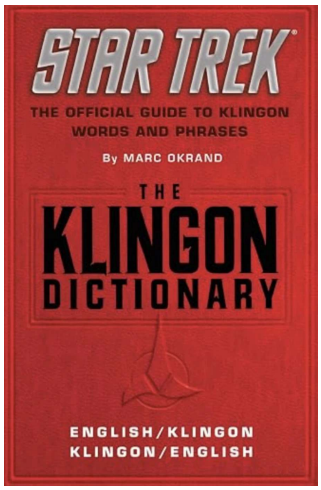
Language invention ranges from Hildegard of Bingen's Lingua Ignota and John Wilkins's philosophical language to Solresol, Volapük, and Esperanto. These projects pursued sacred, universal, logical, or poetic goals. J. R. R. Tolkien transformed the practice into glossopoeia: language families gained migrations, sound changes, and kinships. Stories provided a world in which languages could live.

Screen artlangs add three constraints: preserve previously written fragments, remain pronounceable by actors, and fit the timing of a scene. Language creation becomes a negotiation between linguistics, dramaturgy, performance, and editing.

3. Klingon: making human order unfamiliar

Marc Okrand developed Klingon for Star Trek III in 1984 from earlier sounds and lines. He adopted an object–verb–subject order, rare among terrestrial languages, and an agglutinative morphology. The alien effect comes not from impossible sounds but from combining attested sounds in ways unfamiliar to English speakers.

The celebrated greeting nuqneH, "what do you want?", condenses a fictional culture of direct confrontation. Yet grammar does not mechanically create warriors. Linguistic choices produce a cultural effect together with script, performance, and image. The Klingon Language Institute (guez.org/ali/307) and speaker communities later carried the language beyond its initial dramatic purpose.



Marc Okrand, The Klingon Dictionary, 1985: the grammar and lexicon that allowed Klingon to move beyond the screen and become a learnable language.

4. Na’vi: otherness calibrated to the actor’s body

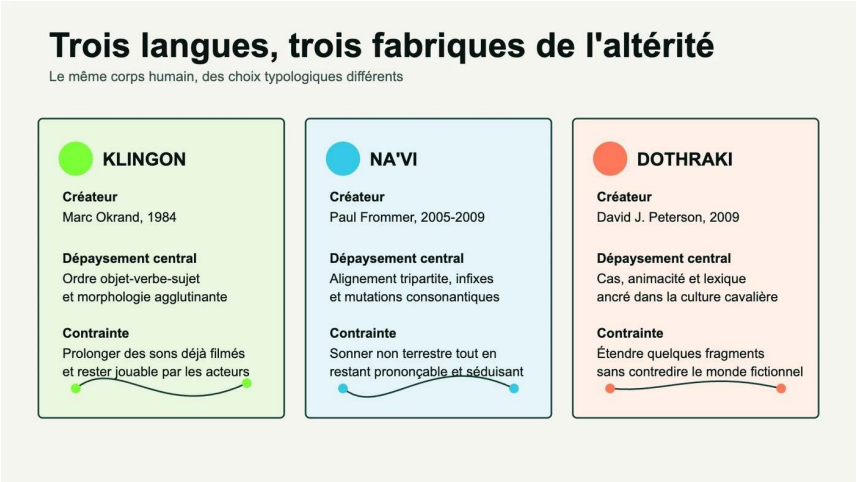
Paul Frommer began with roughly thirty names coined by James Cameron. He designed three sound palettes and had to make the chosen system sound novel while remaining pronounceable. As USC Dornsife (guez.org/ali/308) recounts, the actors’ voices were not digitally altered: the human body remained the synthesiser.

Na’vi combines relatively free word order, case marking, verb infixes, consonant mutation, and a tripartite alignment distinguishing transitive agent, transitive patient, and intransitive participant. These features exist separately in human languages; their arrangement creates unfamiliarity. Film timing also matters: a translation cannot greatly exceed its English line. No language is independent of its channel.

5. Dothraki: constructing history from fragments

George R. R. Martin had scattered a small number of words and names through his novels. In 2009, David J. Peterson was selected through a Language Creation Society competition to turn them into dialogue. Existing forms became fossils the new grammar had to explain.

Peterson devised roots, derivations, semantic change, case, and animacy. His handout Like Spinning Plates (guez.org/ali/309) shows that every new word undergoes tests: is there an existing root, is the concept culturally relevant, can it be derived? Vocabulary becomes an archive of the fictional world.



A.L.I comparison: Okrand extended filmed material, Frommer balanced otherness with pronounceability, and Peterson reconstructed a history from literary fragments.

6. From authored language to community language

A conlang often begins in one person’s files. It changes when speakers request unexpected words, write poetry, teach lessons, and import their accents. The boundary between planned construction and collective evolution becomes porous. A word written for a scene can eventually support a friendship between speakers.

7. What the brain recognises as language

Evelina Fedorenko’s MIT team compared brain activity in speakers of Esperanto, Klingon, Na’vi, Dothraki, and High Valyrian. Results reported in 2025 showed that these languages recruit the human language network, as English or Mandarin do, rather than the networks

primarily engaged by mathematics or programming.

Conscious invention therefore does not prevent the brain from treating a system as language. What matters appears to be its capacity to express objects, events, internal states, and relations. This does not prove that an extraterrestrial signal would engage our language system. It identifies our bias: we readily recognise as language what our brain can already learn as human language.

8. The blind spot: these alien languages remain deeply human

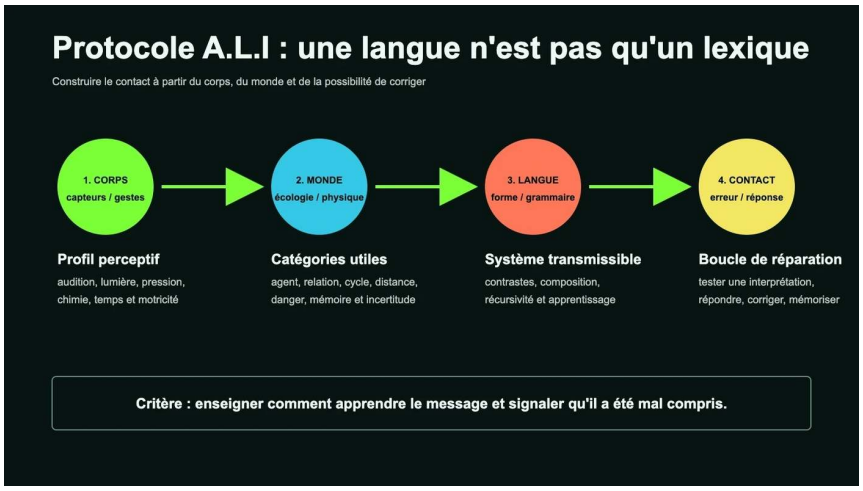
Klingon, Na'vi, and Dothraki use the voice, segment units in time, assume sequential memory, and draw on categories attested somewhere on Earth. Their otherness is typological, not biological. An organism communicating through slow chemistry, polarised light, pressure, electric fields, or distributed patterns might begin with neither phonemes nor words.

A genuinely non-human language should begin with the sender's body: what can it sense, which durations can it discriminate, where does its individual begin and end? A mycelium, an octopus, and a swarm might not assign the same grammatical status to a subject. Grammar might encode gradients, transformations, or collective agreements instead of stable objects.

9. A.L.I hypothesis: a contact language must contain its own pedagogy

Artlangs are learnable because dictionaries, creators, and fictional worlds explain them. An interstellar message would lack this paratext. It would need to introduce its own contrasts, demonstrate rules, provide examples, and make error visible.

We propose a criterion: a contact language is complete only when it encodes not just messages, but also how to learn them, request repetition, and signal an incorrect interpretation. Its first sentence should be less "this is who we are" than "this is how to test what you think you understood."



A.L.I protocol: the body defines the channel, the world supplies categories, grammar organises relations, and response enables repair.

10. Four possible experiments

The bio-typological generator

Users define a hypothetical organism—sensors, temporal range, mobility, individual or collective organisation. The program generates only units compatible with that body and proposes a grammar adapted to its ecology.

The language-without-translation test

Two groups share situations but no lexicon. One invents a system; the other learns through examples and responses. Ambiguity, acquisition speed, and repair strategies are measured.

The theatre of impossible mouths

An installation transforms one utterance into voice, light, vibration, gesture, and spatial movement. Each medium reveals certain relations and destroys others.

The language that escapes its author

Humans and AI agents use a minimal language over several days. Changes survive only when several partners understand them. The final work is the measurable gap between designed and lived systems.

11. Critical position

Constructed languages do not prove that grammar imprisons thought. They show something subtler: changing categories, sounds, and habits temporarily redirects attention. Grammar is less a cage than a framing device.

For A.L.I, their lesson lies in a tension. Contact language must be alien enough not to silently reproduce our world, yet redundant and regular enough to be learned. Between pure mystery and instant translation is a productive zone where two intelligences progressively transform how they make signs.

> LABO question: if the human brain treats an invented language like a natural one as soon as it speaks about the world, how will we recognise a language made by a being whose perceptual world resembles ours in no way?

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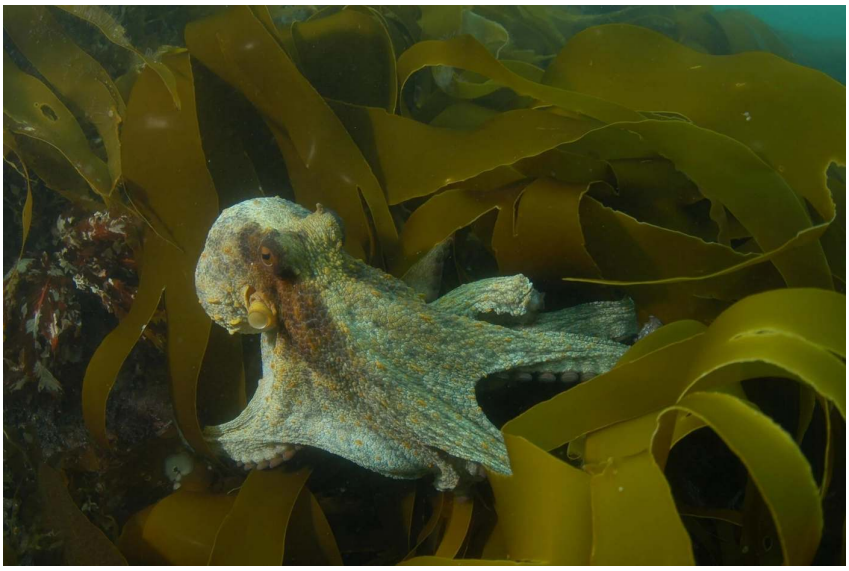
30 - Octopus: Distributed Intelligence, Earth’s Closest Model of an Alien Mind

Keywords: octopus, cephalopods, distributed intelligence, non-human cognition, peripheral nervous system, suckers, chromatophores, photoreception, RNA editing, convergent evolution, Umwelt, animal language, contact, A.L.I



Common octopus, Octopus vulgaris, among kelp: a soft body whose perception and control are distributed. Xavier Caisey / Ifremer, CC BY 4.0 (guez.org/ali/313).

Summary

An octopus thinks through a central brain, eight partly autonomous arms, and skin that can detect light. This radically different Earthly architecture asks A.L.I to design messages for distributed rather than singular minds.

Text

If we had to look on Earth for the most convincing example of a non-human intelligence, it might be neither dolphin, crow, nor great ape. It might be the octopus. Not because it comes from elsewhere, but because it solved perception, decision, and action through an architecture radically different from ours, on a branch of life separated from vertebrates for more than half a billion years.

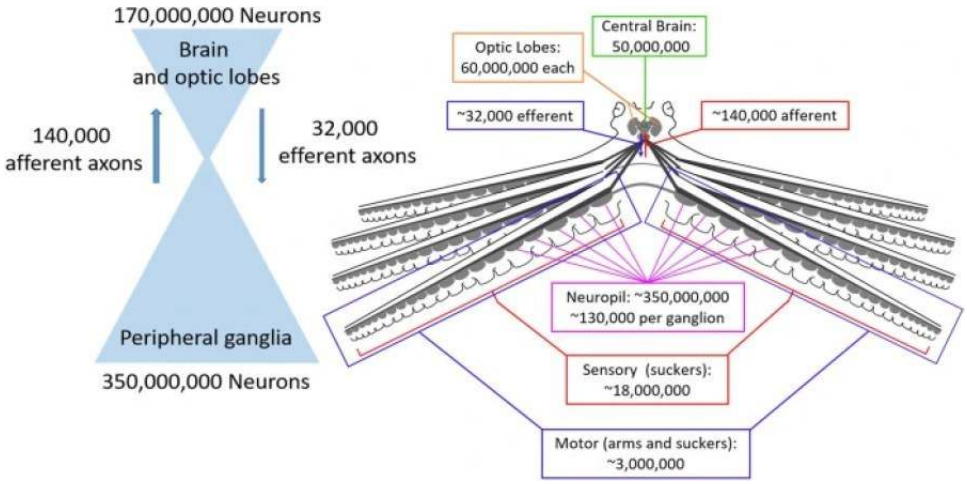
For A.L.I, the octopus is not a convenient metaphor for the extraterrestrial. It is a real case study: a complex intelligence without a skeleton, with almost no rigid parts, whose cognition is distributed across a central brain, peripheral neural networks, hundreds of chemosensory suckers, and skin that changes state. It forces a difficult question: how do we address a being whose “self” may not be located anywhere in particular?

1. One brain, eight arms, several levels of decision

The common octopus has approximately 500 million neurons. Current estimates place almost 200 million in the central brain and optic lobes, and roughly 300 million in the axial nerve cords of its eight arms. Saying it has “nine brains” is compelling but inaccurate. The

system remains hierarchical: the central brain organises goals, intermediate centres coordinate the body, and arm circuits handle much of the sensory and motor detail.

This delegation is essential. An octopus arm has no fixed joints; it can bend, shorten, elongate, twist, and stiffen almost anywhere. If the brain calculated every contraction, the number of parameters would be immense. Instead, it appears to issue general commands—reach, explore, retrieve—which peripheral networks turn into local movements. Isolated arm preparations can still produce coordinated movements, grasp, or recruit neighbouring suckers. This does not prove that a severed arm “thinks” alone. It shows that computation is deeply embodied in the limb.

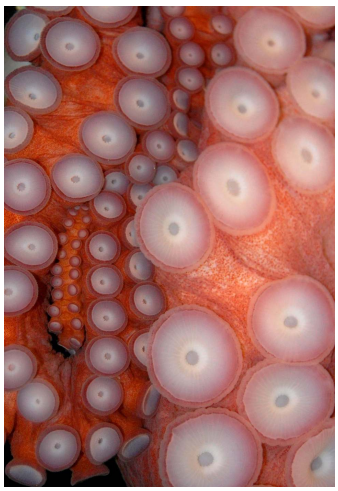


Nervous-system architecture: about 170 million neurons in the central brain and optic lobes, around 350 million in peripheral ganglia, connected by far fewer ascending and descending fibres. Grasso, Frontiers in Robotics and AI, 2022, CC BY 4.0 (guez.org/ali/314).

The bottleneck between brain and periphery is instructive. It imposes compression: the centre neither receives every detail nor sends every micro-command. Octopus unity emerges through constant negotiation among levels of control. Its intelligence is less a command room than a federation.

2. Touching, tasting, and deciding in the same place

Each sucker combines adhesion, touch, and chemoreception. The arms do not merely manipulate the world; they taste it on contact. Specialised chemotactile receptors respond to poorly soluble molecules deposited on surfaces. A rock, prey, and shelter are not only seen from the head; they are read by a constellation of mobile sensors.



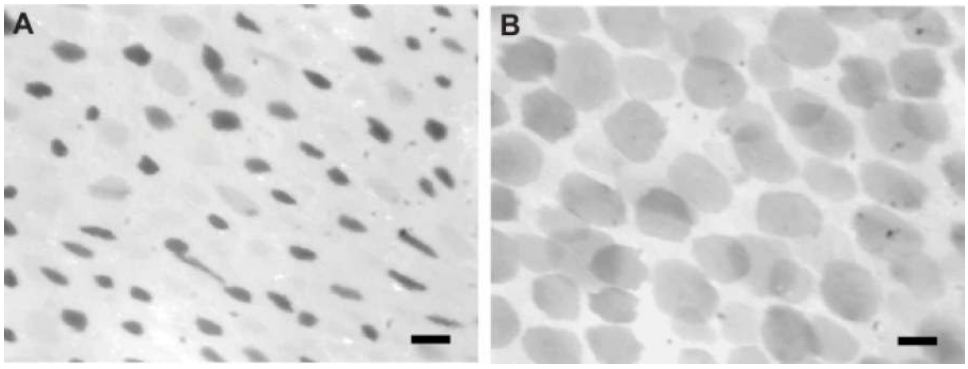
Suckers form a surface of perception and action: they adhere, touch, and detect chemical substances. Steve Lodefink, CC BY 2.0 (guez.org/ali/315).

This organisation blurs human categories. For us, an eye perceives, a brain interprets, and a hand acts. In the octopus, one structure can perceive and act through a short loop. For A.L.I, this continuity suggests that a non-human language might be inseparable from the matter it explores. A sign would not represent an object at a distance; it would be a way of touching, attaching to, tasting, and transforming it.

3. Skin that senses light and becomes a display

Vision in the octopus species studied relies mainly on a single opsin type, making colour vision like ours unlikely. Yet their camouflage matches colours, contrasts, patterns, and textures with astonishing accuracy. Their skin contains pigmentary chromatophores, reflective iridophores, scattering leucophores, and muscles capable of changing surface texture.

In 2015, a study of Octopus bimaculoides showed that isolated skin samples react to light: chromatophores expand under white or blue illumination, a phenomenon called LACE, for light-activated chromatophore expansion. R-opsin proteins and several phototransduction components are expressed in the skin. Precision matters: the skin does not form an image like an eye, and the relationship between local photoreception, chromatophores, and the central nervous system is still being studied. Yet the skin does detect light independently of the eyes.



Chromatophore expansion in isolated Octopus bimaculoides skin before and after illumination. Ramirez and Oakley, Journal of Experimental Biology, 2015, CC BY 3.0 (guez.org/ali/316).

This surface is expressive as well. Cephalopods produce bands, spots, contrasts, iridescence,

relief, and polarised signals for camouflage, threat, or social interaction. The entire body becomes a dynamic medium. Where humans often separate message from support, the octopus merges them: its skin is sensor, display, and living boundary at once.

4. RNA editing: plasticity without extraterrestrial mystery

Coleoid cephalopods extensively modify some RNA molecules after transcription from DNA. This A-to-I editing can alter the resulting protein, especially in the nervous system. A 2017 study identified tens of thousands of conserved recoding sites in octopuses, squid, and cuttlefish. In 2023, experiments showed that cold acclimation greatly increases editing at thousands of sites in the nervous systems of several species.

The “software update” analogy is useful only within limits: an octopus does not consciously rewrite its genome or choose its proteins. Editing acts on temporary RNA molecules through inherited cellular mechanisms. It nevertheless offers a timescale of adaptation faster than mutation and selection over generations, with a possible trade-off: preserving sequences required for editing may slow DNA evolution in surrounding regions.

In 2018, a paper linked the Cambrian explosion, viruses from space, and even octopus eggs delivered by a comet. This panspermia proposal provides neither a testable mechanism nor genomic evidence for an extraterrestrial octopus origin. Available data are explained by terrestrial evolution. The octopus becomes useful to A.L.I precisely when we stop declaring it alien: Earth alone is sufficient to produce radical cognitive otherness.

5. Intelligence on another evolutionary branch

The last common ancestor of cephalopods and vertebrates lived more than 500 million years ago and probably possessed a much simpler nervous system. Since that split, the two lineages independently built large nervous systems, camera-type eyes, learning, memory, exploration, and flexible decision-making.

This convergence does not imply that evolution follows a plan. It shows that shared constraints—moving, anticipating, capturing, avoiding, remembering—can produce comparable solutions from different materials. Yet divergences matter equally: a boneless body, semi-autonomous arms, distributed chemotactile perception, instantaneous skin control, and often short lives.

The octopus therefore extends the Umwelt hypothesis, the work on animal language, and research into distributed biological networks. It shows that an intelligence can converge with us on some problems while remaining almost incommensurable in how it inhabits a body.

6. Where does the subject begin and end?

We easily project a small human into the heads of other animals. Philosopher Peter Godfrey-Smith instead asks us to take seriously an experience whose centre of gravity is mobile. The octopus brain receives and coordinates, yet its arms retain sensorimotor memories and considerable autonomy. The subject may be less concentrated, more fluid—sometimes unified by a task and sometimes distributed among simultaneous explorations.

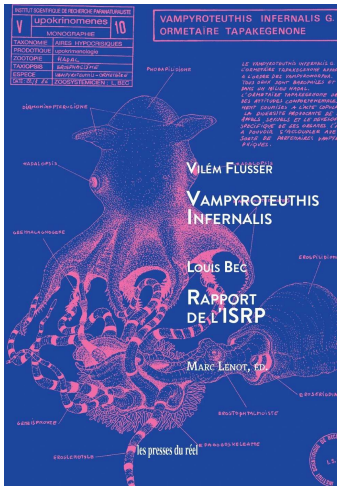
We cannot infer consciousness directly from anatomy. “Eight minds” would be as speculative as a single inner commander. Yet this uncertainty is productive. It reveals that our

pronouns—I, you, we—already contain a theory of the subject. A message beginning with “you” assumes that the sender can count its recipients. Faced with distributed cognition, grammar itself may fail.

7. Octopus in philosophy, literature, and cinema

In Other Minds, Peter Godfrey-Smith combines philosophy of mind, evolution, and diving to describe a second Earthly history of consciousness. Sy Montgomery’s The Soul of an Octopus focuses on encounters with individuals and the possibility of interspecies relation. The documentary My Octopus Teacher makes prolonged attention between a human and a wild animal visible, while reminding us not to confuse emotional proximity with identical perceptual worlds.

In Vampyroteuthis Infernalis, Vilém Flusser and Louis Bec construct a philosophical fable around an abyssal cephalopod. The vampire squid becomes humanity’s inverted mirror: its environment, organs, and values decentre anthropology. Donna Haraway more broadly uses tentacular thinking to imagine alliances and responsibilities beyond the isolated subject. These works do not describe octopuses as laboratories do; they test what their form does to our concepts.



Vilém Flusser and Louis Bec, Vampyroteuthis Infernalis — Rapport de l’ISRP. The definitive French edition pairs Flusser’s philosophical fiction with Louis Bec’s pseudo-scientific drawings of imaginary creatures. Les presses du réel (guez.org/ali/988).

8. Three A.L.I protocols inspired by the octopus

The message to nine recipients

Build a network with one centre and eight peripheral modules. Each module receives a different part of a message and can act locally before exchanging with the centre. The message is understood only when local responses coordinate without becoming uniform. The experiment measures what must remain decentralised and what must be compressed to circulate.

The contact skin

Build a membrane covered with light, touch, and chemical sensors, paired with pixels, inflatable surfaces, and moving textures. An incoming signal produces not a sentence but a bodily transformation. Two membranes gradually learn to answer each other through

pattern, pressure, relief, colour, and rhythm. The protocol searches for a language in which reading and being modified are the same operation.

The distributed address

Transmit a proposition that makes no sense to an isolated receiver. Eight human agents, simulated animals, or AI models each receive a local rule. Their collective behaviour must produce an answer that none possesses alone. The recipient is neither an individual nor a crowd, but the organised relation among parts.

9. What the octopus changes about contact

A classical interstellar protocol imagines a sender, a channel, and a receiver capable of extracting the same symbolic object. The octopus suggests another scene. A signal may be divided across peripheries, transformed during perception, inscribed on the body, and resolved in action. Understanding no longer means rebuilding a sentence in a central brain; it can mean producing viable coordination.

A non-human civilisation might likewise distribute cognition across organisms, machines, environments, and timescales. Asking “who is speaking?” might be as awkward as asking which sucker is the octopus. We would need to recognise intention without immediately seeking a single author, and a response without demanding that it return through the same channel.

The octopus is not an extraterrestrial. It is more useful than that: Earthly proof that intelligence has multiple architectures. Before inventing a language for the stars, A.L.I must learn to address a body that thinks differently, here, beneath the ocean’s surface.

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31 - Quantum Programming: Beyond the Binary Message

Keywords: quantum programming, qubit, superposition, entanglement, BB84, quantum teleportation, Micius, quantum communication, extraterrestrials, A.L.I, LLM, AI, statistics, dynamic interface

Quantum programming does not merely manipulate 0s and 1s: it prepares, transforms and measures fragile physical states where information is also probability, phase and correlation.

Summary

An A.L.I article on quantum programming, qubits, circuits, BB84, quantum teleportation and satellite quantum communication, with an extrapolation toward non-binary contact protocols.

Text

A binary message says yes or no, 0 or 1, presence or absence. Quantum programming forces us to think differently. It does not simply replace binary with a faster version of classical computation; it introduces another way of writing an operation, where information may be superposed, entangled, phase-shifted and only partially made readable through measurement.

1. From bit to qubit: changing the unit of language

A classical bit carries a determined value: 0 or 1. A qubit can be described as a combination of two possible states before measurement. This is not mere uncertainty: it has amplitude, phase and the capacity to interfere with other computational paths.

The Bloch sphere represents the state of a qubit: not only a point 0 or 1, but an orientation within a space of possibilities.

2. Programming a state rather than writing a sentence

Quantum programming means preparing a register of qubits, applying quantum gates, sometimes creating entanglement, and then measuring. Frameworks such as Qiskit, Cirq and Q# let us write circuits: Hadamard for superposition, CNOT for correlation, rotations for phase and measurements for classical output.

3. Simple example: a qubit as probabilistic alphabet

In binary, one sends a sequence such as 101100. In a quantum setting, one might prepare states oriented in several bases. Reception would not always yield the same result, but a probability signature. Meaning would come from a distribution rather than a single fixed symbol.

4. BB84: communicating by choosing bases

BB84, proposed by Bennett and Brassard in 1984, is one of the founding protocols of quantum cryptography. It creates a secret key by encoding and measuring qubits in different bases, then publicly comparing the bases used. It shows that communication can concern the conditions of reading, not only the signal itself.

5. Quantum teleportation: transferring a state, not matter

Quantum teleportation does not teleport an object in the science-fiction sense. It transfers an unknown quantum state using an entangled pair and a classical channel. Entanglement alone does not allow faster-than-light messaging, but teleportation provides a strong model: communication can mean transferring a fragile state rather than copying text.

6. Satellites and real-world trials

Long-distance quantum communication experiments already exist. China's Micius satellite demonstrated quantum key distribution across large distances, photon entanglement between separated ground stations and steps toward satellite-based quantum networks.

7. A.L.I protocol: a non-binary message in three layers

- Classical layer: mathematical markers, prime numbers, constants, synchronization time.
- Simulated quantum layer: public description of a simple circuit and comparison of expected distributions.
- Physical quantum layer: photonic states, choice of bases, error detection and non-classical correlations.

8. LLMs and quantum theory: two distribution machines?

A parallel can then be drawn with large language models. An LLM does not choose a word the way a fixed symbolic rule would choose an answer. It computes a probability distribution over possible next tokens, given the context. The generated text is therefore the result of a statistical dynamic: several continuations are possible, some more likely, others almost invisible but never entirely unthinkable.

Quantum mechanics obviously does not work like an LLM. A language model is not a quantum system, and its probabilities are not physical amplitudes. But the analogy is conceptually

useful: in both cases, meaning is not given by an isolated symbol, but by a space of possibilities, a distribution, and a context of measurement or generation.

An LLM can therefore be thought of as a dynamic interface between human binary language and more probabilistic forms of information processing. It can handle uncertainty, weigh hypotheses, produce several interpretations of the same signal and translate a fuzzy distribution into readable narrative. In this sense, AI could become a useful mediator between a quantum or quasi-quantum message and a human cognition still attached to sentences.

Within an A.L.I protocol, an AI model could receive not a single message, but a set of distributions: measurement results, errors, correlations, probabilities and variations across bases. Its role would not be to magically “guess” meaning, but to propose families of interpretations, search for invariants, compare patterns and reformulate probabilistic structures as language hypotheses.

The underlying idea is strong: if quantum theory teaches us that reality manifests through distributions and measurements, and if LLMs excel at working within statistical spaces of language, then AI could act as a translation interface between two regimes of information. Not because it is quantum, but because it accepts meaning as a field of possibilities rather than a single code.

9. Extraterrestrial extrapolation: communicating by correlation

An advanced civilization might not send a message as a string of characters. It might propose a correlation protocol: measure here, compare there, verify a distribution, detect a violation, recognize a shared key or reconstruct a structure from repetitions.

10. Limits and caution

Quantum communication does not automatically bypass the speed of light. It is fragile, noisy and sensitive to decoherence. At interstellar scale, preserving or distributing quantum states would be extraordinarily difficult. The conceptual inspiration must therefore be distinguished from current technical capability.

11. A.L.I hypothesis

Binary remains essential for robust messaging. But an advanced interstellar language may need to integrate non-binary forms: probabilities, phases, bases, correlations and distributions. Communication may become the construction of a shared experiment rather than the transmission of a sentence.

32 - The Rupture Genius Hypothesis: When Intelligence Connects the Impossible

Keywords: intelligence, rupture, genius, invention, creativity, Einstein, Leonardo da Vinci, Bach, Turing, interdisciplinarity, contact, A.L.I

A.L.I image, 2026. Four figures of rupture: Einstein, Leonardo da Vinci, Bach and Turing. The montage is less about the cult of genius than about the ability to connect heterogeneous regimes of thought.

Summary

Some intelligences do not merely solve a problem: they redraw the map of what can be thought. From Leonardo da Vinci to Bach, from Einstein to Turing, this article explores the idea that major ruptures often emerge from connections between separated domains. For A.L.I, this becomes a method: to seek interstellar contact where science, art, language, body, instrument and imagination recombine.

Text

There are moments when intelligence does not simply produce a better answer, but a new way of asking questions. A rupture in thought appears when a person, a group or a cultural environment connects domains that its age kept separate: geometry and gravity, anatomy and mechanics, musical fugue and the architecture of time, mathematical logic and computing machines, art and the very definition of art.

Such figures are often called “geniuses”. The word is dangerous when it turns a collective history into an individual legend. Einstein did not arise outside Maxwell, Lorentz, Poincaré, Mach and the instruments of his time. Leonardo da Vinci belonged to Renaissance workshops, courts, wars and engineers. Bach synthesised European contrapuntal traditions. Turing emerged from the logic of Hilbert, Gödel and Church, and from the historical urgency of computation. Yet something did happen through them: a radical recomposition that altered the whole field.

A.L.I proposes the term rupture intelligence: not the intelligence that accumulates the most information, but the intelligence that discovers an unlikely connection and suddenly makes a new field of action visible. The question then becomes: will solutions to interstellar contact emerge from such a leap, from an unexpected junction between domains that currently seem incompatible?

1. Genius as a point of condensation

Genius is not only an exceptional person. It is also a point of historical condensation. An era accumulates techniques, dead ends, intuitions and badly formulated problems. Then a form appears that gives this set a new coherence. This form may be a theory, an artwork, an instrument, a writing system, an institution or even a gesture.

For Kant, artistic genius gives rules to art without being able to fully explain those rules beforehand. Works of genius become exemplary because they invent their own mode of readability. This remains useful for A.L.I: a language of contact may not be deduced from an existing code. It may have to invent the very conditions under which it can be recognised.

The sociology of science has displaced the heroic narrative. Thomas Kuhn showed that scientific revolutions are not mere progressive corrections but paradigm shifts: the community no longer looks at exactly the same world. Bruno Latour insisted on the networks of instruments, inscriptions, laboratories and actors that make discovery possible. Genius is therefore less an isolated source than a node where relations are reconfigured.

2. Leonardo da Vinci: seeing the living as machine and the machine as living

Leonardo da Vinci fascinates because he crosses boundaries: painting, anatomy, hydraulics, optics, mechanics, architecture, cartography and theatrical design. His notebooks show a thought that draws in order to understand. He does not separate eye from hand, form from experiment, artist from engineer.

Leonardo da Vinci, supposed self-portrait, Biblioteca Reale, Turin. Public domain. Image and record (guez.org/ali/336).

His rupture lies in a method: seeing a vortex of water as hair, a muscle as a cable system, the flight of a bird as mechanics, the human face as mobile geometry. He produces operational analogies. Analogies are not merely poetic images; they transfer a problem from one domain

to another.

3. Bach: music as an architecture of time

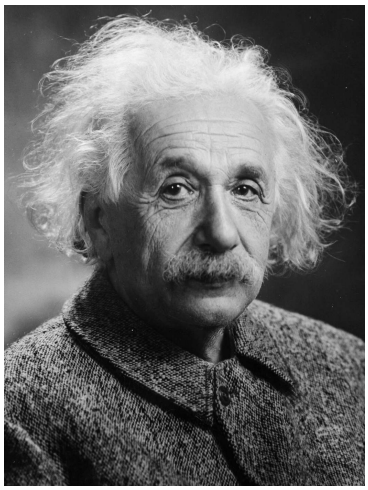
Johann Sebastian Bach did not invent counterpoint, but he gave it a form of totalisation. In The Art of Fugue, the motif becomes a transformable being: inversion, augmentation, diminution, superposition, mirror, canon. Music becomes a system of relations in which time can turn back upon itself.

Johann Sebastian Bach, portrait by Elias Gottlob Haussmann, 1746. Public domain. Image and record (guez.org/ali/337).

Bach matters to A.L.I because he shows that intelligence may be structural before it is narrative. A fugue does not explain an idea; it makes it work. It shows how minimal information can generate a complex world. This economy is close to interstellar questions: how can one send little, yet enough for the other to reconstruct much?

4. Einstein: changing the frame rather than filling it

Einstein does not merely add one equation to classical physics. He changes the relations between space, time, light, observer and gravitation. His power lies in a conceptual operation: shifting the problem from objects to the frame that makes objects measurable.



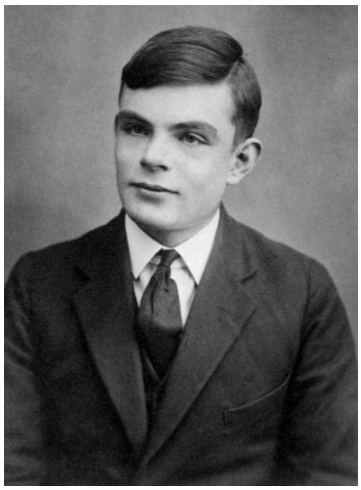
Albert Einstein, photographic portrait, 1947. Public domain. Image and record (guez.org/ali/338).

For A.L.I, Einstein sets a demanding question: if we receive no message, perhaps we are

searching within the wrong frame. We expect a sentence when the message may be a physical constraint; an emitter when the signal may be distributed; a translation when our definition of sign must be changed.

5. Turing: from logic to artificial life

Alan Turing connects several worlds: mathematical logic, computation, cryptanalysis, machinery and morphogenesis. His abstract machine simplifies the act of calculation until it becomes a general model. His later work on machine intelligence shifts the question “can a machine think?” toward an interactional device. His work on morphogenesis shows how biological patterns can arise from simple chemical relations.



Alan Turing aged sixteen. Public domain. Image and record (guez.org/ali/339).

Turing is decisive for A.L.I because he suggests that communication can be thought of as procedure. A sign is not only content; it is an operation on a state. Understanding an extraterrestrial message might mean finding the abstract machine capable of producing, recognising or extending it.

6. Other ruptures: Darwin, Gödel, Duchamp, Lovelace

Darwin connects geology, breeding, economics, travel, classification and deep time. Life ceases to be a collection of fixed essences and becomes historical transformation. Gödel shows that a sufficiently powerful formal system cannot contain everything about itself; a logical limit becomes a metaphysical event. Duchamp, through the readymade, shifts art from the object to the act of designation and context. Ada Lovelace understands that Babbage's Analytical Engine could manipulate more than numbers, opening a symbolic intuition of computation.

In each case, a rupture is also a migration: a concept leaves its original domain and reconfigures another. Selection becomes a general model of transformation; incompleteness becomes a philosophical question; the industrial object becomes art; computation becomes a universal manipulation of forms.

7. Hypothesis: intelligence evolves through thresholds of recombination

The hypothesis can be stated as follows: in the evolution of intelligence, certain stages

appear when previously separated domains suddenly become connectable. Human language connected memory, gesture, voice and the collective. Writing connected speech, space and long duration. Mathematics connected perception, abstraction and proof. Computing connected logic, machine and symbol. AI now connects text, image, sound, code and probability.

A.L.I diagram, 2026. A creative rupture emerges when several heterogeneous domains converge toward a new map of the thinkable.

Each threshold expands what an intelligence can manipulate, but each also creates new blindness. Writing stabilises but freezes. Calculation accelerates but reduces. AI associates but can homogenise. The next rupture may not consist in becoming faster, but in connecting differently: body and cosmos, language and matter, consciousness and instrument, living systems and machines, human and non-human.

8. Application to A.L.I: seeking collective geniuses of contact

Interstellar contact will probably not be solved by a single discipline. Radio astronomy can detect signals but cannot by itself produce meaning. Linguistics describes human languages but guarantees little for an intelligence without mouth, hand or linear time. Mathematics offers invariants but may ignore the receiver's biology. Art opens forms but must be held by protocols. AI compares and generates but must be supervised.

A.L.I can therefore seek not an individual genius but a collective genius of rupture: a device in which artists, astronomers, linguists, philosophers, ethologists, coders, musicians, biologists and publics create unexpected connections. The aim is not to mix everything, but to create the right interfaces between domains.

A contact solution may take the form of a hybrid: a luminous fugue based on exoplanets, a grammar derived from animal behaviour, an archive conceived as an organism, a radio instrument translated into mental imagery, an AI trained not to speak humanly but to detect transmodal invariants.

9. Possible experiments

- Atlas of ruptures: map inventions that connected previously separated domains and search for their common structures.
- Laboratory of controlled analogies: ask several groups to translate the same phenomenon into music, geometry, gesture, code and narrative, then measure what remains stable.
- Paradigm machine: build an application that takes an A.L.I problem and deliberately proposes analogies from remote fields: botany, counterpoint, cryptography, theatre, celestial mechanics.
- Orchestra of contact: give each discipline a precise role in a shared protocol: detecting, transforming, interpreting, falsifying, imagining, transmitting.

10. Caution: rupture is not always progress

A rupture can liberate, but it can also destroy. Nuclear energy connects fundamental physics, industry and war. Digital platforms connect humans while capturing attention. AI increases productive capacity while blurring the origin of forms. Rupture intelligence therefore requires an ethics of rupture: what does it make possible, for whom, with which risks and which irreversible effects?

For A.L.I, contact must not be imagined only as a technical feat. A language capable of

crossing worlds may transform the societies that receive it. The question is not only: can we speak? It is also: what will we become if a new form of speech appears?

Conclusion: finding the missing form

Great rupture intelligences did not merely add a work or theory to the world. They altered how the world could be seen, heard, measured and inhabited. They found a missing form.

The A.L.I hypothesis is that interstellar contact will require a rupture of the same kind. We should not only wait for the right signal; we must invent the form of thought capable of recognising it. Perhaps the language of contact will emerge when we finally connect domains we thought separate: wave and poem, machine and life, number and emotion, sky and body, science and imagination.

The genius of contact may not be a person. It may be a situation: a workshop in which several intelligences, human and artificial, learn to produce together the rupture that makes the other readable.

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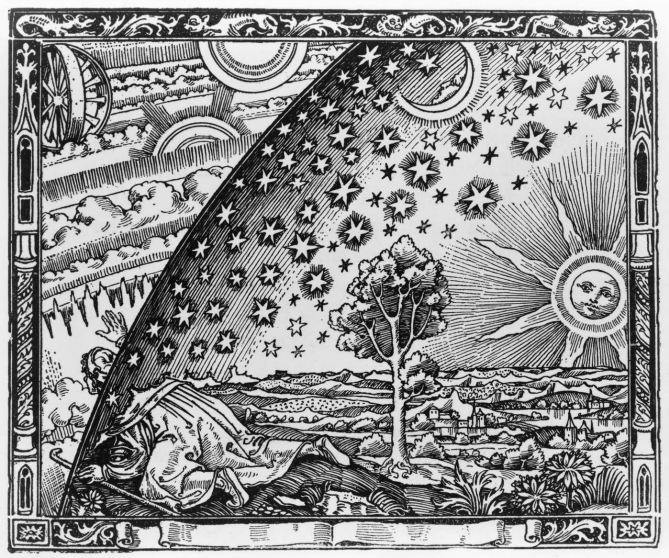
33 - The Contact-Imagination Hypothesis: Imagination as an Interstellar Language

Keywords: imagination, imaginary, mental imagery, philosophy, neuroscience, art, poetry, literature, surrealism, artificial intelligence, contact, interstellar language, experimental protocol



The Flammarion engraving, published in L'Atmosphère: Météorologie populaire, 1888. A traveller passes beneath the boundary of the visible sky to observe an order that could previously only be imagined. Unknown artist, public domain. Image and record (guez.org/ali/348).

Summary

What if the first language shared with an extraterrestrial intelligence were neither an alphabet nor a signal to translate, but a capacity to make worlds appear in the mind? From ancient philosophy to neuroscience and generative AI, this hypothesis explores imagination as a contact interface while designing the controls needed to distinguish convergence, suggestion and evidence.

Text

What if an extraterrestrial message showed us nothing, yet gave us the ability to imagine the same thing? Contact is usually sought as an external object: a radio wave, a number sequence, an image or an artefact. This expectation assumes that the message is already complete before it enters a mind. A radically different intelligence might transmit otherwise: not a representation but a constraint; not a landscape but a way of making one appear; not a dictionary but an operation that transforms the receiver's mental space.

A.L.I proposes an art-science hypothesis: imagination could become a language of contact. A pattern of light, sound, magnetism or an as-yet unknown medium might act as a cognitive seed. Beings exposed separately would then produce images, relations or worlds convergent enough to establish the beginning of a shared convention.

This proposal is speculative. No scientific result demonstrates that imagination is an extraterrestrial, telepathic or paranormal channel. Its value lies in turning an intuition into a

testable question, distinguishing induced imagery from suggestion, and designing a protocol in which art creates forms while science organises doubt.

1. Imagination, the imaginary and mental imagery

Imagination covers several operations: recalling an absent perception, recombining memories, simulating an action, inventing an impossible scene, anticipating the future or constructing a hypothesis. Mental imagery is only one modality. Some people imagine primarily through words, sounds, gestures, spatial relations or feelings.

The imaginary is broader. It includes the forms, stories, symbols and worlds made available by an individual or society. We never imagine from nowhere. Images are shaped by language, historical period, technology, myth and bodily experience. The Stanford Encyclopedia of Philosophy (guez.org/ali/998) surveys this diversity, from sensory imagery and supposition to creativity, empathy and scientific practice.

This distinction matters for A.L.I. A common mental form would not prove an external origin; it might come from a shared cultural repertoire. A contact protocol must therefore measure not only resemblance, but the possible terrestrial sources of resemblance.

2. A faculty long kept under suspicion

In ancient philosophy, imagination already occupied the interval between sensation and thought. Plato distrusted images when they multiplied appearances and moved away from truth. Aristotle's phantasia had a more precise role: it was neither present sensation nor judgement, yet many forms of thought and action could not occur without it.

Medieval European and Arabic traditions developed theories of the “internal senses”. In Avicenna, perceived forms could be retained, combined and evaluated inwardly. Imagination became a workshop where sensory material was transformed into thought. Renaissance arts of memory, emblems and Giordano Bruno's mental architectures linked images, places and knowledge so that thought could be manipulated.

Kant later made imagination a power of synthesis rather than decoration. It joins sensory multiplicity to structures that make experience intelligible. Romantic writers expanded its creative status. Coleridge distinguished an imagination that unifies from a fancy that merely juxtaposes, while Novalis and William Blake refused to limit reality to what could be immediately measured.

William Blake, The Ancient of Days, 1794. For Blake — poet, printmaker and visionary — measuring the world is already an imaginative act: geometry appears as both creation and limit. British Museum, public domain. Image and record (guez.org/ali/350).

3. The imaginary as freedom and institution

In the twentieth century imagination ceased to be treated as a box containing little pictures. In The Imaginary, Sartre described it as an act of consciousness directed at an absent object. To imagine is to take a distance from the given world, and this capacity is linked to freedom.

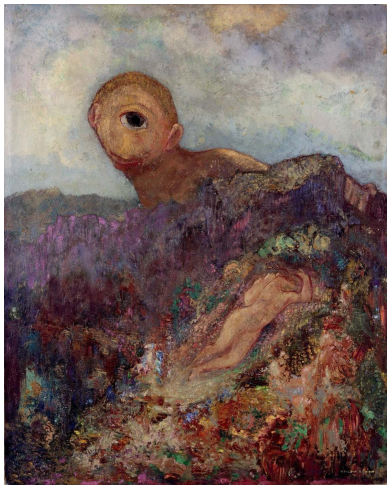
Gaston Bachelard investigated material imagination: water, fire, air and earth are not just topics but forces orienting reverie. Gilbert Durand studied anthropological structures of the imaginary. Cornelius Castoriadis expanded the question to society: communities do not simply represent a ready-made world; they institute meanings, values and ways of life. The imaginary therefore acts in reality.

An interstellar message would not meet an isolated private imagination. It would encounter collective infrastructure: museums, films, religions, image banks and now generative models. Contact might alter less a sentence than an entire regime of possibility.

4. Art, literature and poetry: making inhabitable worlds

Art does not merely illustrate what exists. Cave images, myths, cosmologies, theatre and poetry construct absent presences. Metaphor joins domains that did not previously touch; poetry compresses experience; science fiction allows a reader to inhabit a non-existent law of physics, body or society.

Odilon Redon sought to place “the logic of the visible at the service of the invisible”. Borges turned libraries, labyrinths and mirrors into metaphysical machines. Ursula K. Le Guin invented societies whose languages and institutions displace our ideas of gender, power and the foreign. In Solaris, Stanislaw Lem imagined an ocean that responds by materialising human memories instead of speaking a human language.



Odilon Redon, The Cyclops, c. 1914. A gigantic eye does not guarantee comprehension; it turns the landscape into a mental scene. Kröller-Müller Museum, public domain. Image and record (guez.org/ali/353).

Surrealism systematised this opening through dreams, collage, exquisite corpse and automatic writing. Such methods do not prove that outside forces speak through the artist. They suspend deliberate control long enough for unexpected associations to appear. For A.L.I they are early laboratories of reception, provided that openness is joined to

documentation and comparison.

5. Scientific imagination: seeing before observation

Science also relies on imagination under constraint. A thought experiment isolates a consequence; a model makes relations visible; a simulation explores a parameter space. Galileo imagined falling bodies, Einstein pursued light rays, trains and elevators, and non-Euclidean geometries were conceived before becoming indispensable to physics.

Scientific imagination cannot produce anything whatsoever. It must return to measurement, accept contradiction and make hypotheses shareable. Its strength lies in a loop: invent a form that reality can later confirm, correct or destroy.

Albrecht Dürer, Melencolia I, 1514. Instruments, polyhedron, numbers and imagination coexist in a scene where knowledge does not remove enigma. Public domain. Image and record (guez.org/ali/355).

6. What the brain does when it imagines

Contemporary neuroscience shows that visual imagery recruits a distributed network, from frontal and parietal regions to sensory areas. Joel Pearson's review in Nature Reviews Neuroscience (guez.org/ali/356) describes partial overlap between perception and imagery without treating them as identical. Imagining can function as a weakened, top-down version of some perceptual processes.

Memory and imagination are linked. The hippocampus and regions associated with the default mode network help recombine details from the past into possible scenes. Research on episodic future thinking (guez.org/ali/357) suggests that anticipation reassembles familiar people, places, objects and relations. Imagination is neither creation from nothing nor simple copying: it is a reconfiguration machine.

Individual differences require caution. Aphantasia describes absent or strongly reduced voluntary mental imagery, while others report vivid hyperphantasia. The foundational study Lives without imagery (guez.org/ali/358) demonstrates that sophisticated thought can occur without an inner visual screen. Any imaginary contact language would have to be multimodal.

7. AI: extension, mirror or normalisation of the imaginary?

Generative systems now transform sentences into images, sketches into video and corpora into latent spaces. They appear to externalise an operation that was once private: moving through possibilities and stabilising a form. Yet this does not establish conscious imagination.

These systems calculate likely continuations from human data, architecture choices and training procedures.

AI can extend individual imagination by visualising difficult worlds, multiplying variants and translating intuition among sound, text and image. It can also create false convergence. A study in Science Advances (guez.org/ali/999) found that generative assistance improved some individual stories while reducing their collective diversity. If all participants use one model, similarity may reflect the model's corpus rather than a shared signal.

A.L.I therefore treats AI as a comparison instrument, not an oracle. It can measure proximity among drawings, descriptions, sounds and models, search for recurrent relations and flag likely cultural influences. Raw data, model versions and parameters must remain available for challenge.

8. Central hypothesis: transmitting a rule of appearance

Imagine an intelligence that shares none of our organs or categories. Sending a picture of a tree would be fragile: it might recognise neither contour, depth nor colour. It might instead transmit constraints capable of producing comparable organisations in different receivers:

- a separation between centre and periphery;
- branching growth followed by a return towards unity;
- a rhythm alternating expansion and contraction;
- a stable relation across several scales;
- a transformation that preserves an invariant.

The shared content would not be an identical image but an imaginary attractor. One human might draw a forest and another a vascular network; an oceanic intelligence might produce a field of currents; an AI might generate a graph. Their outputs would differ, yet their deeper relations could be recognised.

This echoes an important artistic intuition: a work does not always encode one meaning. It creates conditions of appearance. Contact would begin when two worlds can produce variations around one constraint and recognise that they belong to one family.

9. The I.C.I. protocol: Imaginary Contact Interface

I.C.I. protocol, A.L.I diagram, 2026. Productions by separated groups are compared with decoy signals and baseline convergence. A striking resemblance becomes meaningful only if it is repeatable and exceeds the controls.

- Choose the stimulus. A sequence of sound, light, vibration or radio noise is fixed before the experiment. Conditions include astronomical data, synthetic signals and decoys.
- Separate receivers. Participants cannot communicate. Groups with different cultural backgrounds receive the same stimulus.
- Multiply response modes. Each person immediately produces a drawing, text, spatial map, gesture or object. Visual imagery is never mandatory.
- Document expectations. Knowledge of extraterrestrial culture, emotional state and familiarity with the project are recorded.
- Add controls. Silence, random sequences, known stimuli and false signals establish spontaneous convergence.
- Compare blindly. Human analysts and several independent models search for common forms,

relations, rhythms and narratives without knowing the condition.

- Repeat. A pattern gains weight only when it reappears across sessions, places and populations.

The protocol never turns convergence directly into evidence of contact. It first asks whether resemblance exceeds chance, stereotypes, instructions and model bias. Only after these alternatives have been tested can an unexplained effect be described as unexplained.

10. Four artistic devices

The Chamber of Absent Images

A room plays a signal without displaying imagery. Visitors leave through separate booths where they record what appeared to them. A dynamic map presents convergence without reducing every response to an average illustration.

The Atlas of Induced Worlds

Groups in several cities receive one sequence simultaneously. Their drawings and stories form a layered atlas of geographies, organisms, temporalities and relations. Singular worlds and disagreements are preserved alongside clusters.

The Attractor Translator

A program searches for relations rather than objects. It translates a drawn branch into polyphony, a light alternation into architecture and a sentence into a force field. Cross-media translation tests what survives a change of body.

The Observatory of Collective Imagination

Over several months, an installation tracks how a motif spreads, mutates or disappears in a group. It compares cultural diffusion with independent appearance and makes visible the difference between contagion and convergence.

11. Risks, ethics and limits

- Suggestibility: a title, instruction or scenography can manufacture the expected response.
- False memory: repetition can increase familiarity without increasing truth.
- Cognitive inequality: visual requirements would exclude aphantasia and other modes of imagination.
- Cultural homogenisation: cinema, networks and AI already circulate stereotyped aliens.
- Algorithmic authority: a similarity score must never become a metaphysical verdict.
- Mental health: the work must not encourage delusional interpretations of ordinary experiences.

The responsible position neither dismisses inner experience nor declares it supernatural. It welcomes experience as lived data, protects the person reporting it and keeps several explanations open.

12. What this changes for A.L.I

Most interstellar communication projects ask which signs to send. Contact-imagination asks a prior question: which capacities of appearance must be shared before a sign becomes thinkable?

An advanced civilisation might send no encyclopaedia. It could send a small world-engine: a

rule able to generate different images, sounds, geometries and narratives while preserving structure. A human response would not be the correct translation of a closed message, but a variation demonstrating that the rule had been recognised.

Developing imagination would not mean escaping reality. It would increase the forms we can receive without immediately reducing them to what we already know. Imagination becomes an inner antenna accompanied by a laboratory notebook.

Conclusion: contact as a co-imagined world

An ordinary language refers to a world already shared by its speakers. An interstellar language may first have to produce that common world. Imagination would provide a provisional meeting space in which two intelligences do not see the same thing, yet learn to transform one constraint together.

The strongest proposal is not “aliens speak in dreams”. It is narrower and more demanding: a signal might be recognised as intentional if it causes independent receivers to produce different worlds organised by the same relations — and if this convergence survives controls, cultures and the machines analysing it.

First contact may not be a face appearing on a screen. It may begin when distant beings discover that they can inhabit the same impossibility.

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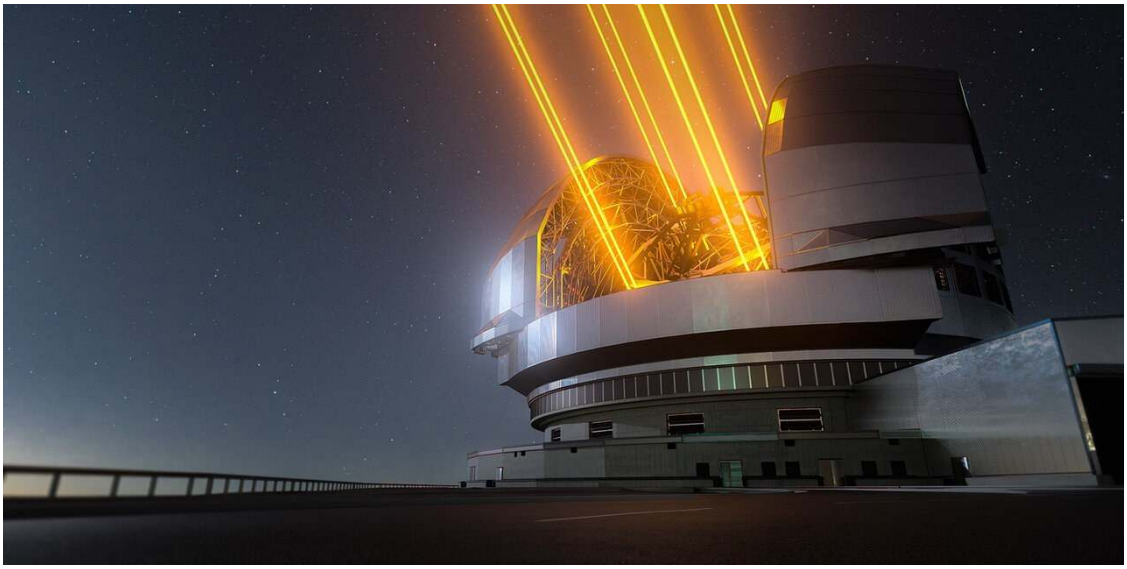
34 - Instruments of the cosmos: sensing interstellar media, discovering exoplanets, searching for life

Keywords: astronomy, instrumentation, interstellar medium, exoplanets, astrobiology, spectroscopy, artificial intelligence, ALMA, JWST, Roman, PLATO, ELT, Ariel, HWO, SKA



ESO's Extremely Large Telescope and its adaptive-optics lasers. Its 39-metre primary mirror will feed cameras and spectrographs designed, among other goals, to study exoplanet atmospheres. Image: ESO (guez.org/ali/366).

Summary

From ALMA's antennas to future space coronagraphs, this article maps the instruments that observe matter between the stars, detect exoplanets and analyse their atmospheres. It examines their limits, missions in preparation, the growing role of AI and the distributed interstellar observatory of tomorrow.

Text

We almost never see an exoplanet in the way we see Mars or Jupiter. We measure a dip in light, a spectral shift, a stellar wobble, a gravitational perturbation, or a handful of photons separated from starlight billions of times brighter. Interstellar space is not empty either: it contains ionised gas, atomic and molecular hydrogen, dust, ice, magnetic fields, cosmic rays and organic molecules. Contemporary astronomy is the art of building instruments capable of turning these faint traces into testable knowledge.

For A.L.I, these instruments are not merely enlarged eyes. They are organs of translation. An antenna converts a radio wave into an electrical voltage; a spectrograph separates light into lines; a processing pipeline removes noise, calibrates the detector and compares the signal with physical models. Between the cosmos and us lies an entire chain of language: phenomenon, photon, sensor, number, image, hypothesis.

1. What “sensing” means

A telescope does not collect objects but messengers. The main messenger is electromagnetic radiation, from radio waves to gamma rays. Each band reveals different physics. Visible light shows stars; infrared penetrates dust and reveals colder bodies; millimetre radiation detects gas and molecules; ultraviolet follows hot stars and atmospheric escape; X-rays reveal violent plasmas. Photons are now joined by gravitational waves, neutrinos and cosmic particles.

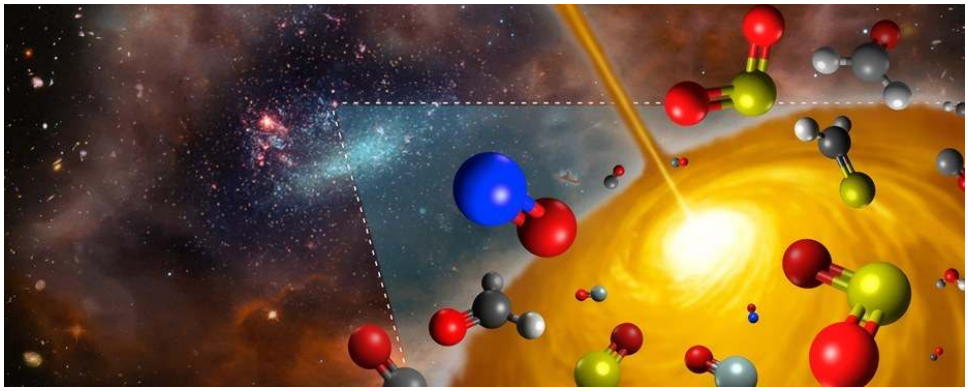
Sensing relies on four complementary operations:

- collecting more photons with a large mirror or multiple antennas;
- separating wavelengths through spectroscopy to identify elements and molecules;
- resolving fine detail with adaptive optics, interferometry or observations from space;
- repeating measurements to distinguish a real phenomenon from noise, stellar activity or instrumental artefacts.

Sensitivity describes the faintest detectable signal; angular resolution separates close objects; spectral resolution distinguishes neighbouring wavelengths; cadence measures how rapidly the sky is revisited. No instrument maximises all four. Astronomy therefore advances through networks of complementary observatories.

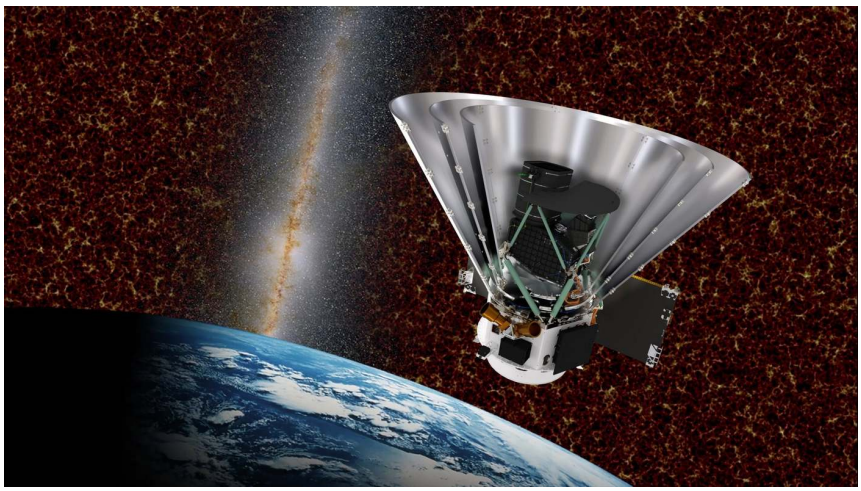
2. Reading matter between the stars

Cold interstellar clouds are opaque in visible light, but their atoms and molecules emit radio, millimetre and infrared signatures. The Atacama Large Millimeter/submillimeter Array (guez.org/ali/1004) combines up to 66 antennas on the Chajnantor plateau. Through interferometry, signals received by distant antennas are correlated as if they came from a virtual instrument several kilometres wide. ALMA maps the temperature, density, velocity and composition of molecular clouds and protoplanetary discs.



At millimetre wavelengths, every molecule has a spectral fingerprint. ALMA can identify water, methanol, ammonia and complex organic molecules in the regions where stars and planets form. Image and background: ALMA Observatory (guez.org/ali/368).

The SPHEREx space telescope (guez.org/ali/369), launched in March 2025, is conducting an optical and near-infrared spectral survey of the entire sky. During its planned two-year mission it will measure more than 450 million galaxies and over 100 million Milky Way stars. For astrobiology, a central contribution is its mapping of interstellar ices — water, carbon dioxide and other compounds frozen on dust grains — a chemical memory that predates planet formation.



SPHEREx observes the entire sky in 102 infrared colours. It connects large-scale cosmological mapping to the local history of water and ice in interstellar clouds. Illustration: NASA/JPL-Caltech (guez.org/ali/369).

The Square Kilometre Array Observatory (guez.org/ali/370), under construction in Australia and South Africa, will extend radio listening to an unprecedented scale. SKA-Low will target low frequencies with antenna stations in Australia; SKA-Mid will use dishes in South Africa. In January 2026, SKA-Mid achieved its first fringes, demonstrating that two dishes could already operate as an interferometer. SKA will eventually study neutral hydrogen, magnetic fields, pulsars, radio transients and may also contribute to technosignature searches.

3. Detecting a planet without seeing it

Most exoplanets have been discovered indirectly. The transit method measures the periodic dimming that occurs when a planet crosses its star, giving mainly its radius and orbital period. Radial velocity measures the star's Doppler wobble and yields a minimum mass. Combining radius and mass produces average density and a first indication of composition.

ESO's HARPS and ESPRESSO (guez.org/ali/1005) spectrographs search for velocity variations near one metre per second and, for the best targets, below that level. But starspots, faculae and oscillations can mimic planets. The instrument must be extremely stable, carefully calibrated and used alongside models of stellar activity.

Other methods complete the picture. Gravitational microlensing reveals a planet when its gravity briefly magnifies a background star. Astrometry measures the star's tiny path across the sky. Direct imaging suppresses starlight with a coronagraph and isolates some young, hot worlds far from their stars. Every method selects a different population; combining them corrects observational biases.

4. Instruments operating in 2026

The James Webb Space Telescope (guez.org/ali/372) represents a step change in atmospheric spectroscopy. During a transit, a small fraction of starlight passes through a planet's atmosphere; selected wavelengths are absorbed by water, carbon dioxide, methane and other species. During secondary eclipse, subtracting the star alone from the star-planet system estimates the planet's thermal emission.

These signatures are not automatically evidence of life. A molecule may have geological, photochemical or biological origins. A credible biosignature needs a coherent body of evidence: several gases, their abundances, the stellar type, temperature, clouds, planetary

history and the exclusion of false positives. Searching for life is less like detecting a word than reading a complete chemical sentence.

5. Rubin: the sky becomes a real-time stream

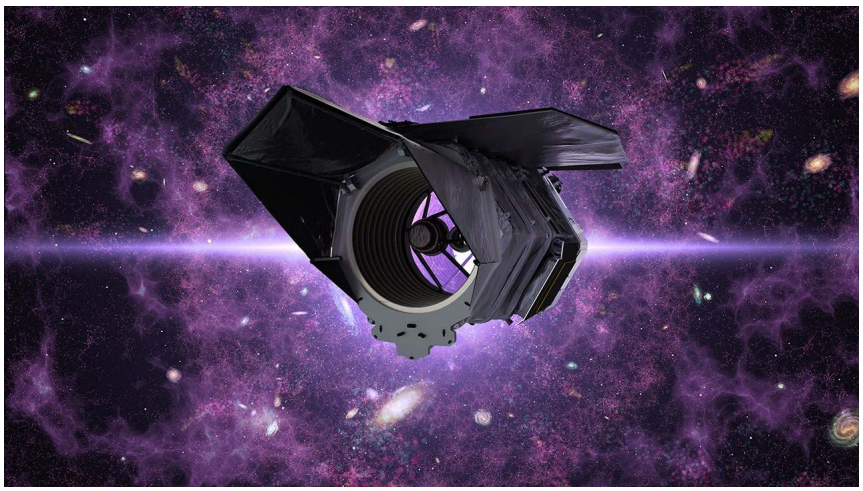
Vera C. Rubin Observatory photographs a new region of sky about every forty seconds and automatically compares each image with earlier ones. On 24 February 2026 it distributed 800,000 initial scientific alerts in one night; the system is designed to reach roughly seven million nightly alerts, each published in under two minutes.

Rubin does more than photograph: it detects change. Its alert brokers classify and enrich millions of events so other telescopes can follow them rapidly. Photo: NSF–DOE Rubin Observatory / NOIRLab (guez.org/ali/373).

For exoplanets, Rubin is not primarily a transit machine like TESS. Its value lies in microlensing, variable stars, rare events and interstellar bodies crossing the Solar System. It turns observation into coordination: an algorithm signals, a broker prioritises, another observatory points. The relevant instrument is no longer a single telescope but the network that knows how to react in time.

6. Roman: statistical census and coronagraphy

The Nancy Grace Roman Space Telescope (guez.org/ali/374) is scheduled for launch on 30 August 2026 according to NASA's announced calendar. Its field of view will be at least one hundred times wider than Hubble's at comparable resolution. Surveys of the galactic bulge should monitor around one hundred million stars and detect tens of thousands of microlensing events. NASA estimates that Roman could reveal roughly 100,000 worlds, including bound and free-floating planets.



Roman will combine wide-field infrared surveys with a coronagraph technology demonstration. It will build a galactic census of planetary systems while testing techniques needed for future images of Earth-like worlds. Illustration: NASA Goddard Space Flight Center (guez.org/ali/374).

Its Coronagraph Instrument is not yet the final tool for an Earth twin: it is an in-flight demonstration of wavefront control, masks and deformable mirrors. The challenge is to maintain a sufficiently stable artificial darkness around a star for faint reflected planetary light to emerge.

7. PLATO: finding Earths around nearby suns

Planned for early 2027 aboard Ariane 6, PLATO (guez.org/ali/1006) will use 26 cameras and observe more than 200,000 stars. It aims to detect terrestrial planets out to the habitable zones of Sun-like stars. Its distinctive feature is the combination of transits with asteroseismology: stellar oscillations reveal a star's radius, mass and age, providing much better planetary context.

PLATO should supply nearby and accurately dated worlds to major ground-based spectrographs and atmospheric missions. It will not necessarily “see” life; it will build the target list where searching for it becomes physically plausible.

8. The ELT: resolving atmospheres from the ground

With its segmented 39-metre primary mirror, ESO's Extremely Large Telescope (guez.org/ali/1007) is expected to enter operation near the end of the decade. Adaptive optics will measure atmospheric turbulence and deform mirrors hundreds or thousands of times each second to recover an image close to the telescope's physical limit.

Its first instruments form a complementary set: HARMONI will produce visible and near-infrared spectral cubes; MICADO will make extremely high-resolution images; METIS will combine high-contrast imaging and mid-infrared spectroscopy. Later, ANDES (guez.org/ali/377) will offer ultra-high-resolution spectroscopy. One ambition is to isolate Doppler-shifted lines in rocky-planet atmospheres and search for oxygen, water, methane and carbon dioxide.

The ELT will not remove ambiguity. It will move it into finer measurements: winds, rotation, vertical atmospheric structure, temporal changes and star-planet interaction. The important future instrument is not merely larger; it produces multidimensional context.

9. Ariel: comparative atmospheric chemistry

ESA's Ariel (guez.org/ali/1008) mission, planned for 2031, will study around one thousand exoplanets. Its AIRS infrared spectrometer will cover approximately 1.95 to 7.8 micrometres. Ariel will measure composition, temperature profiles, clouds and weather changes on worlds ranging from hot super-Earths to gas giants.

Its main goal is not to discover an Earth twin but to move from isolated biographies to a population science of atmospheres. Why do some planets retain atmospheres? How does the host star alter their chemistry? How are formation, mass, irradiation and weather connected? Those patterns will be essential when we eventually encounter a truly anomalous atmosphere.

10. Habitable Worlds Observatory: designing the observation of an exo-Earth

The Habitable Worlds Observatory (guez.org/ali/379) remains a major mission concept in technology maturation, without a fixed launch date. Its guiding objective is bold: directly image at least 25 potentially habitable worlds around nearby Sun-like stars and analyse their reflected light for biosignatures.

EAC-1 engineering concept for HWO; this is not necessarily the mission's final design. Required optical stability reaches atomic scales, while the coronagraph must outperform current systems by several orders of magnitude. Image: NASA Goddard/Conceptual Image Lab (guez.org/ali/379).

In 2026 NASA is funding studies of critical technologies: ultra-high-contrast coronagraphs, ultra-stable mirrors, visible and near-infrared photon-counting detectors, ultraviolet detectors and a serviceable space architecture. The challenge can be summarised simply: maintain optical precision on the scale of an atom while blocking a star to measure a handful of planetary photons.

11. What counts as a trace of life?

A habitable planet is not an inhabited planet. The habitable zone only marks distances where liquid water could exist under certain conditions. An oxygen-bearing atmosphere is not definitive evidence: oxygen may be produced abiotically. Methane may be biological or geological. Even their coexistence must be interpreted through temperature, stellar ultraviolet flux and expected reactions.

Current research distinguishes several families of traces:

- gaseous biosignatures: chemical combinations difficult to sustain without renewal;
- surface signatures: reflectance changes compatible with pigments, requiring confirmation;
- temporal signatures: seasons, cycles or persistent disequilibria;
- technosignatures: narrow-band radio emission, laser pulses, industrial pollutants, waste heat or hypothetical artificial structures.

The sound method is not to seek a magic symbol but to build an adversarial case. We need multiple transits, wavelengths, seasons and ideally multiple instruments. Detecting life will probably be a process of accumulation, refutation and public revision.

12. The current role of artificial intelligence

AI already intervenes at nearly every stage without replacing scientific method. ExoMiner++ (guez.org/ali/380), trained on Kepler and TESS data, identified roughly 7,000 targets as candidates during an initial TESS run. It separates planetary transits from binary eclipses and other false positives; candidates still require verification.

At Rubin, software brokers use machine learning to filter, classify and enrich up to seven million alerts each night. For atmospheres, neural networks can accelerate atmospheric retrieval: inferring temperatures, molecular abundances and clouds from spectra. Other models remove stellar activity from radial-velocity data, detect anomalies and optimise follow-up schedules.

Three risks must remain visible. A model learns biases from its simulations; a statistical anomaly is not a physical discovery; and a very precise output may conceal badly calibrated uncertainty. Useful scientific AI must expose error bars, be tested on synthetic and real observations, preserve raw data and allow the analysis chain to be reproduced.

13. Future AI: from analyst to conductor

In the next generation, AI may coordinate an ecosystem of instruments. It could receive a Rubin alert, check catalogues, estimate the value of follow-up, propose radio observations with SKA, infrared observations from space and spectroscopy with the ELT. It may adapt exposures in real time, detect instrument drift and decide which data to compress onboard when bandwidth is scarce.

Longer-term astronomical foundation models could learn jointly from images, spectra, light curves, radio data and physical simulations. Their value would not only be recognising known classes but identifying disagreement between modalities: an object whose chemistry, motion and variability cannot be explained by the same model.

Yet the system must not normalise the unknown. AI trained to classify the sky according to our categories may discard as noise exactly what has no category yet. A future observatory must preserve dedicated paths for anomalies, uncompressed data and competing interpretations.

14. Beyond 2040: what might instruments become?

The most plausible projects extend techniques already tested. A starshade, flying far from a telescope, could block starlight before it enters the optics. Constellations of small satellites could form a space interferometer with a baseline far exceeding any single mirror. The lunar

far side could provide protection from terrestrial radio emissions at very low frequencies.

Still more stable spectrographs might follow exoplanet winds and seasons for years. Multi-messenger networks would combine photons, neutrinos, gravitational waves and particles. Fast probes sent toward the Sun's gravitational focus could in theory use it as a lens to reconstruct a detailed exoplanet image, at the cost of travelling hundreds of astronomical units.

More speculatively, an observatory could become a self-repairing swarm: thousands of distributed sensors, individually modest but synchronised by atomic clocks and correlated by AI. Its form would no longer be a building but a spatial protocol. The instrument would begin to resemble the medium it observes: distributed, dynamic and without a single centre.

15. An A.L.I hypothesis: the observatory as interlocutor

A classical instrument receives a signal and passes it to a human. A future observatory could perform one additional operation: gradually construct the form in which an unknown signal becomes interpretable. It would compare the phenomenon against several physical theories, generate control observations, change temporal scale, call on other sensors and preserve contradictions.

For A.L.I, contact would therefore depend on more than a more sensitive antenna. It would require a system able to recognise that a pattern is not noise without immediately forcing it into a human grammar. This observatory-interlocutor would maintain three memories: the raw signal, the transformations applied to it, and the rejected hypotheses.

One could imagine an art installation titled “Organs for a sky that does not yet speak”. Public streams from Rubin, SPHEREx, ALMA and exoplanet archives feed a room. Each instrument is translated into a different material — light, vibration, breath, sound frequency. An AI does not produce one answer; it displays several translations at once and states what each loses. The visitor no longer observes an image of the cosmos but crosses the very process by which it becomes legible.

16. A readable roadmap

Conclusion: learning to receive

The recent history of astronomical instruments does not simply move from small to large. It moves from isolated sight to coordinated measurement, from photograph to spectrum, from catalogue to real-time stream, and from a single signal to context. ALMA reads cold chemistry; SPHEREx maps ices; Rubin detects change; Roman and PLATO will build populations; the ELT and Ariel will detail atmospheres; HWO aims at reflected light from worlds comparable to ours.

Their shared limitation is productive: none directly speaks the language of life. They produce traces that must be connected, challenged and interpreted. The next revolution may therefore be as epistemological as technical. The most powerful instrument might be the one capable of preserving the strangeness of a signal long enough for us to learn a new way of hearing it.

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35 - The Spatial Writing Hypothesis: When the Body Inscribes Language in the Air

Keywords: spatial writing, body, dance, movement, Laban, Forsythe, choreography, spatial language, fourth dimension, interaction, A.L.I

Opening image: The Spatial Writing Hypothesis: When the Body Inscribes Language in the Air

Summary

What if air and the space surrounding the body became a three-dimensional page? From Laban to Forsythe, this hypothesis imagines a gestural alphabet, collective sentences and a writing GPS.

Text

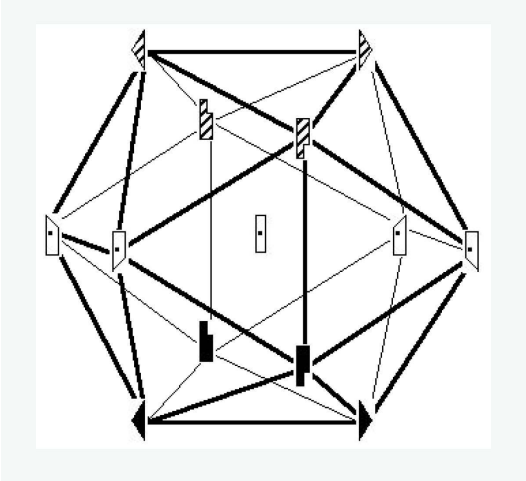
What if the space around us were not merely a volume to cross, but a three-dimensional writing surface? Raising an arm would trace a line. Drawing a circle with the hand would deposit a loop. A walk, a turn of the torso, a pause or an acceleration would become successive signs in an invisible sentence. The body would no longer stand in front of the page: it would be the brush, the ink and part of the reader.

This hypothesis treats air as a medium of inscription. The word “ether” can serve here as an artistic metaphor, provided it is not confused with the luminiferous ether discarded by modern physics. Air is a fluid material: movement produces displacements, vortices and changes in pressure and temperature. These traces dissipate quickly, yet particle image velocimetry (guez.org/ali/384) and schlieren imaging can reveal part of them. Depth cameras and motion-capture systems can record their geometry. Spatial writing begins where these two realities meet: the fleeting physical trace and its technical memory.

A long history of writing movement

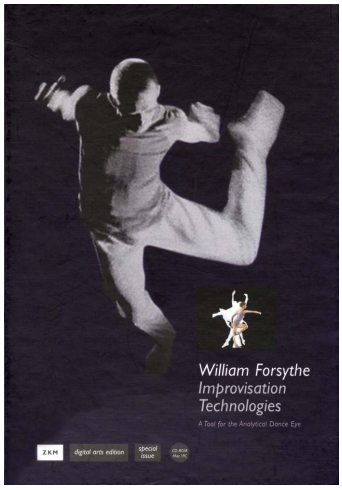
Dance has tried for centuries to preserve what disappears at the moment it happens. Beauchamp–Feuillet notation mapped dancers’ floor paths from above; the floor became a

score. In the twentieth century, Rudolf Laban (guez.org/ali/1009) expanded the idea. Labanotation encoded direction, duration, level and body part. Choreutics studied movement through the kinesphere, often represented by an icosahedron surrounding the body, while Eukinetics treated weight, time and flow as meaningful qualities.



Laban movement directions organized inside an icosahedron: geometry surrounding the body. Public domain, Wikimedia Commons (guez.org/ali/389).

Spatial writing reappears in major works. In Trisha Brown's Roof Piece (guez.org/ali/1010) (1971), movement is relayed from dancer to dancer across New York rooftops: the city becomes a channel, and each body rewrites what it has received. In William Forsythe's Improvisation Technologies (guez.org/ali/392), animated lines extend the limbs and reveal a latent drawing in space. Merce Cunningham used LifeForms (guez.org/ali/393) to compose choreography in a three-dimensional environment before embodiment.



William Forsythe's Improvisation Technologies analyses movement as spatial lines and inscriptions. ZKM Karlsruhe (guez.org/ali/394).

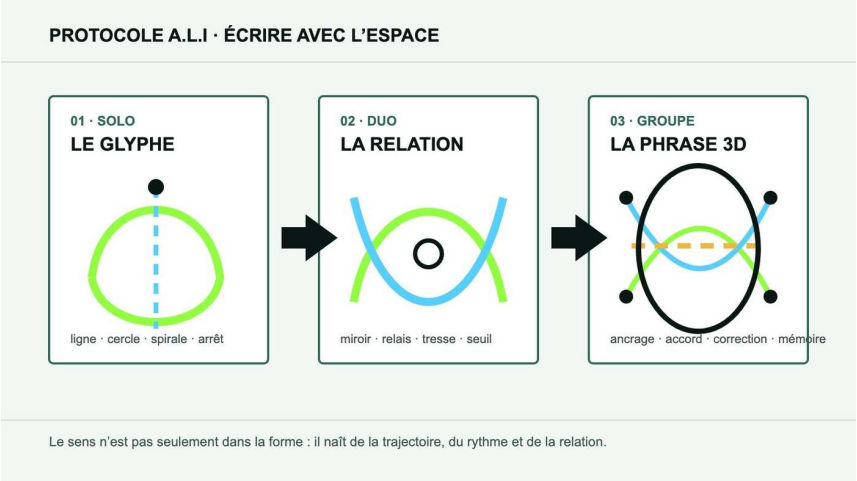
Contact Improvisation (guez.org/ali/1011), initiated in part by Steve Paxton, introduces another essential dimension: meaning emerges between bodies. Weight, gravity, inertia, support and imbalance form a shared vocabulary. No one produces the movement alone; each participant continually responds to what the other makes possible.

The spatial glyph hypothesis

A.L.I proposes the term spatial glyph for a unit of movement structured enough to be recognized and replayed. It would not be defined by a single outline, but by a set of parameters:

G = (trajectory, orientation, speed, duration, body segment, intensity, relation).

A slow loop drawn by the index finger would not be identical to the same loop rapidly drawn by the torso. The former might be a letter, the latter an accent, an emotion, a negation or an instruction. Geometry and temporality would be inseparable.



A.L.I protocol: an individual glyph becomes a relation in a duet, then a three-dimensional sentence in a group. Original A.L.I diagram, 2026.

First level: the body as alphabet

An initial alphabet could use a few simple invariants: line, circle, spiral, crossing, interruption, closure, return and reversal. It would not mime existing letters. A line might announce direction; a circle, repetition or totality; a crossing, encounter; a cut, an ending or doubt. Speed could indicate force, repetition could indicate persistence, and height could indicate register.

The system must not mistake human anatomy for a universal measure. A wheelchair, cane, gaze, prosthesis, robot, drone or animal should be able to produce equivalents. The useful unit is therefore not “raise the right arm” but “trace a continuous, oriented and reversible ascent.” A language becomes portable when it describes relations rather than organs.

Second level: two people write a third text

With two bodies, meaning resides in the interval connecting them. Five operations could form an early grammar:

- mirror: repeat a shape through reversal;
- relay: continue precisely where the other stops;
- braid: intertwine two paths without collision;
- erasure: cross a trace to cancel or correct it;
- threshold: two complementary gestures jointly open a sequence unavailable to either person alone.

The threshold is a bodily key. Like cryptography, it exists only when trajectories, rhythms and orientations coincide. It might trigger an image, sound, data stream or luminous passage. Understanding the message would mean being able to perform its form.

Third level: the group as a three-dimensional sentence

In a group, participants can carry grammatical functions. Some become anchors that stabilize coordinates; others transport motifs; others repeat them to correct errors. The sentence is no longer linear. It becomes a temporary volume crossed by trajectories, synchronizations and deviations.

This community produces a distributed writing brain. The message emerges from negotiation. Local hesitation can become collective punctuation; repeated error, a mutation in vocabulary; unexpected synchronization, a new sign. The intelligence of language lies in the network of relations rather than a central author.

Recent research suggests that shared attention during live performance can synchronize some aspects of spectators' brain activity. This is not evidence of telepathy; it shows that a common event can physiologically organize a group. See the University College London study (guez.org/ali/396). In spatial writing, readers belong to the apparatus: their position, attention and ability to replay a gesture shape what can be understood.

The invisible trace and the grammar of disappearance

A trace in air does not last. What appears to be a weakness can become a grammatical property. A sign may have a time to live: while it persists, it remains active; when it fades, it becomes past. Dissipation can encode doubt, urgency, forgetting or temporary permission. A spatial sentence would possess a memory that pales instead of simply being present or absent.

Three layers may coexist: the very brief physical trace in air; the perceptual trace held for a few seconds in the reader's body; and the digital trace recorded by sensors. An installation need not retain everything. It could progressively erase its data so that the archive respects the temporality of gesture rather than turning every movement into permanent surveillance.

From positioning GPS to writing GPS

Conventional GPS tells us where we are. A writing GPS would reveal what our displacement inscribes and what the space allows us to read. A series of steps might become a sentence; a path through a city might open a narrative; a precise gesture performed at the right place and time might act as a key.

The system would not merely guide a person toward a destination. It would offer a syntax of movement: cross this line, orbit this point, wait for a second body, then close the loop. The map becomes a score and the journey a performed reading.

The fourth dimension: time makes the sign legible

A gesture is already a four-dimensional object: a trajectory through three spatial dimensions unfolding in time. Seen at one instant, the circle does not yet exist; successive positions must be remembered before it can be recognized. The fourth dimension is not decoration here but the condition of reading.

A reader able to perceive an entire trajectory at once might see our dances as we see a printed sentence. Conversely, a message from an intelligence that structures several times simultaneously might appear to us as disconnected events. The A.L.I challenge would be to build instruments capable of recomposing these fragments into manipulable temporal objects.

A feasible experimental protocol

- Capture. A depth camera or body tracker turns joints into 3D points. Particle or light-sheet visualization occasionally reveals the wake in air.
- Inscription. Trajectories are drawn volumetrically in Three.js or WebXR. Their brightness decreases according to an adjustable lifetime.
- Alphabet. A small group learns ten glyphs across different bodies and speeds.
- Blind transmission. One person encodes a sentence without speech; another observes the trace, then tries to replay and interpret it.
- Duet key. Two participants must perform a complementary figure to trigger sound, image or a luminous passage.
- Collective sentence. A group constructs a form no single person can make, testing its resistance to error, absence and changes of scale.
- Non-human test. The same rules are translated to a robot, drone or lighting system to determine whether meaning depends on topological relations rather than human anatomy.

Hypotheses for A.L.I

1. Reading would be participation. A recipient could not understand without moving. Decoding would become choreography rather than passive observation.

2. Relation would become an autonomous channel. Two participants would create a third text that neither authored alone. At group scale, it might develop its own complexity and memory.

3. Forgetting would belong to the code. The disappearance of traces would become a sign. A language could say “now,” “again,” “never again” or “until someone responds” through the way it fades.

4. The body would become cryptography. An exact sequence of positions, speeds and relations could unlock content. The key would be neither a word nor a number, but an embodied action.

5. Spatial invariants might cross species. Continuity, symmetry, periodicity, linkage, knots, orientation and reversal do not guarantee a universal language, but they offer testable forms that assume neither a human voice nor a terrestrial alphabet.

Toward inhabitable writing

Spatial writing turns a simple intuition into a research programme: our movements already produce forms, but we do not yet treat them as sentences. By making them visible, transmissible, replayable and progressively erasable, we can build a language in which the body writes in the world instead of on a separate support.

For A.L.I, this produces a decisive reversal. An extraterrestrial message might not be an object placed before us, but a way of occupying volume, organizing distances, circulating

bodies and distributing time. First contact might begin not with “What do you mean?” but with an invitation: show us how to enter your sentence.

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36 - The Encoded Future Hypothesis: Is Tomorrow Already Among Us?

Keywords: future, time, information, perception, pixel, resolution, signal, noise, SETI, technosignature, interstellar, chaos, prediction, block universe, decoding, artificial intelligence, A.L.I

The Encoded Future, A.L.I image, 2026. The familiar landscape is crossed by structures that become visible only after a change in resolution and reading mode.

Summary

What if the future were not absent but distributed through the present as constraints, correlations and possibilities that remain unreadable? This hypothesis connects the philosophy of time, chaos, perception, information theory and the search for interstellar signals.

Text

At every moment, the world contains more information than we can perceive. Infrared light crosses a room without becoming visible colour. Vibrations too slow or too fast escape our hearing. A weak signal dissolves into noise. A highly compressed image looks like a meaningless mosaic until the correct decoder reconstructs it.

Starting from this ordinary situation, we can propose a more radical hypothesis: the future may already be among us, not as a completed film but as distributed, pixelated information inaccessible to the resolution of our senses and concepts. In the same way, interstellar messages may already cross our instruments without being recognised as messages.

Minority Report, Steven Spielberg, 2002. The precognitive interface turns fragments of the future into manipulable images: the future is not simply seen, it must be filtered, edited, compared and interpreted. Image and reference: Imaginary Forces (guez.org/ali/398).

The scope of this proposal must be clear. Current physics does not allow us to claim that information freely travels from the future into the present. The hypothesis therefore separates three levels: what physics can describe, what information theory can formalise and what art can construct as an experience.

1. What kind of future could be “already here”?

The philosophy of time offers several competing models. Presentism holds that only the present truly exists. The block universe, commonly associated with eternalism, treats past, present and future events as regions of one four-dimensional spacetime. Between them, the growing block imagines reality accumulating past and present while the future is not yet formed.

Relativity weakened the idea of a universal “now”: observers in relative motion do not necessarily divide spacetime into identical planes of simultaneity. This does not prove that tomorrow sends messages backwards. It means that the intuitive division between past, present and future is not simply and absolutely built into physical models. The Stanford Encyclopedia of Philosophy (guez.org/ali/399) also makes clear that the block universe remains a debated philosophical interpretation, not a camera through which tomorrow can be watched.

2. The light-cone safeguard

In relativity, every event has a light cone. Its causal past contains what could have influenced it; its causal future contains what it may influence. Between them lie regions with which no signal can be exchanged faster than light.

To say that the future may belong to the global structure of spacetime is not to say that it is available as mail delivered in advance. Existing in a model and being accessible to an observer are different things. The encoded-future hypothesis does not seek to violate that boundary. It asks whether the present already contains constraints, tendencies and correlations whose consequences we cannot yet reconstruct.

3. The present as a low-resolution image

We never access the whole world. Our senses sample particular frequencies, speeds and thresholds. The brain does not receive a complete copy of reality: it combines incomplete data with expectations, models and prediction errors. Research on predictive processing (guez.org/ali/1013) describes perception as an active negotiation between sensory evidence and internal models.

Pixelated is used here as a precise metaphor. A pixel is not a tiny object hidden in nature; it is a unit chosen by a measuring device. If the grid is too coarse, different forms become identical. If sampling is too slow, a rhythm disappears or turns into false motion. If dynamic range is too narrow, the signal merges with the background.

4. Do present conditions already contain their futures?

In an ideal deterministic system, a sufficiently precise state would allow its evolution to be calculated. That is the horizon of Laplace's demon. Chaotic systems, however, show that tiny initial differences can produce widely divergent trajectories. Knowing the equations does not always grant exact prediction because uncertainty in the initial state eventually dominates.

The future can therefore be constrained without being readable. A seed does not contain a miniature photograph of the tree, but an organisation capable of producing certain forms under certain conditions. An atmosphere contains the processes of future weather without providing an exact long-range forecast. A human decision opens and closes branches without fully writing what will happen.

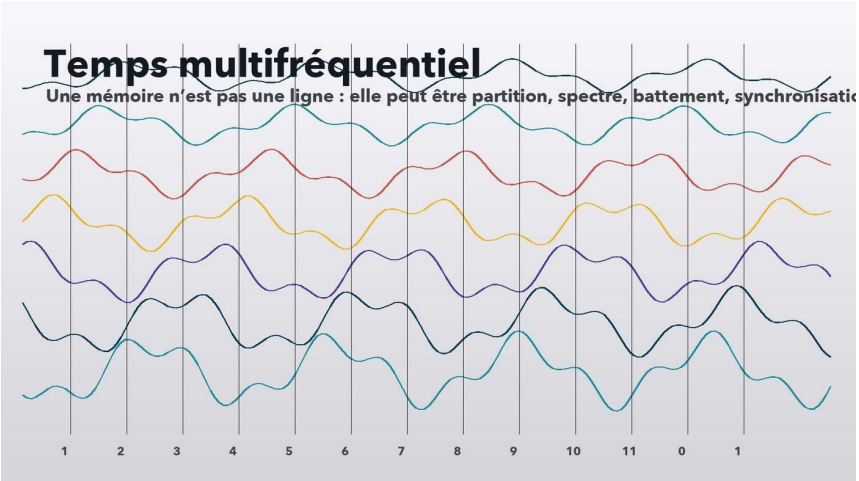
In this view, the future “among us” is not one scenario stored in a hidden cache. It is a field of possible futures with unequal probabilities, whose conditions of formation are carried by the present. We perceive a few large pixels: a climatic trend, political fragility, growth, learning. The rest remains below our resolution or beyond our computing power.

5. Information can exist while its meaning remains invisible

Claude Shannon's information theory made it possible to measure information quantity, noise, redundancy and channel capacity. It does not state what a message means. A sequence may be transmitted perfectly without being understood; another may look disordered because it is strongly compressed.

The Stanford Encyclopedia's overview of information (guez.org/ali/1014) stresses the difference between technical measures and semantic content. Coding turns one structure into another to resist noise or reduce size. The receiver must know, discover or infer the inverse transformation.

This is where the hypothesis becomes useful for A.L.I: a phenomenon is not “message-free” merely because we lack its decoder. The reverse is equally important: a strange form is not necessarily a message. Criteria must distinguish organisation, natural origin, instrumental artefact and intention.

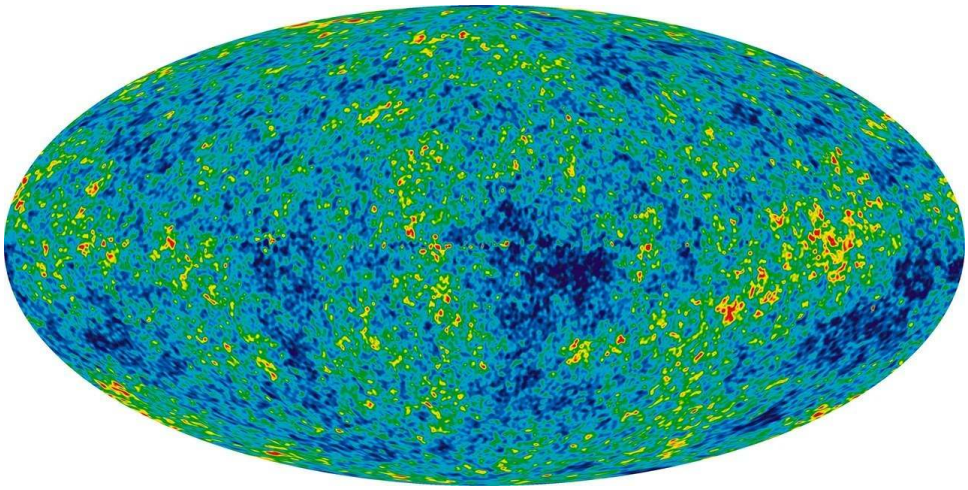


Multifrequency Time, A.L.I diagram, 2026. A structure may become readable only after changing scale, frequency or temporal window.

6. We already know how to read an invisible past

The strongest analogy comes not from the future but from the past. Light received today can carry the state of a vanished star. Tree rings record seasons. DNA preserves traces of evolutionary branches. Polar ice traps ancient atmospheres.

WMAP's map of the cosmic microwave background is a spectacular example: minute temperature variations in the oldest accessible light become an image of conditions in the early Universe. The past is not present as conscious memory; it is encoded in matter or radiation that an instrument and a model render legible.



Cosmic microwave background map made from nine years of WMAP data. Colours represent tiny temperature variations in the oldest observable light. NASA / WMAP Science Team. Source (guez.org/ali/403).

The encoded-future hypothesis makes a speculative shift: are there comparable structures in the present that are not archives of the past but unreadable conditions of possible futures? The difference is decisive. A trace of the past can be compared with other archives; a supposed trace of the future may always be a projection made by the observer.

7. What if an interstellar message is already in our data?

SETI no longer means waiting for a clear voice on one radio frequency. Searches examine narrow-band radio signals, pulses, optical transients, atmospheric or industrial signatures, infrared excesses and other technosignatures. According to the SETI Institute (guez.org/ali/404), a very narrow carrier may be easier to detect than any modulation that contains a message. We might recognise an artificial emission without yet accessing its content.

Several problems can make a physically present message unreadable:

- Wrong moment: a brief signal may occur between observations.
- Wrong speed: a conversation may last a millisecond or several centuries.
- Wrong frequency: we search bands chosen from our own technological history.
- Propagation: interstellar plasma can broaden or distort an initially narrow signal.
- Wrong object: we discard as noise what does not fit our technosignature models.
- Wrong idea of language: the message may lie in intervals, cross-channel correlations, polarisation or an unimagined transformation.

NASA (guez.org/ali/219) notes that artificial intelligence can search enormous datasets and identify patterns that rigid human criteria might miss. But AI can also overfit data, reproduce our biases or mistake an instrumental anomaly for a discovery. It should propose candidates, not manufacture certainty.

8. The false-signal test

Our brains spontaneously seek form. That capacity lets us read faces, tracks and constellations; it also produces pareidolia and apophenia. The larger the dataset, the more impressive accidental patterns it will contain.

A serious protocol therefore requires independent repetition, detection by different instruments, coherent localisation, elimination of terrestrial interference, testable predictions and open methods. A convincing decoder should not merely explain the signal used to build it; it should predict a structure withheld from the decoding process.

9. The A.L.I hypothesis: a distributed future

The hypothesis can now be stated without turning it into belief:

> The future would not be present as a complete image. It would be distributed through the current state of the world as constraints, correlations, memories, branches and probabilities. Our senses and languages produce only a low-resolution reconstruction. Likewise, an interstellar message may be physically present in a signal while remaining absent from our perceptual world because we lack the scale, model or key.

This proposal brings two unknowns together without confusing them. The future and the extraterrestrial are forms of radical otherness: one has not yet been lived, the other has not yet been understood. In both cases, we risk projecting expectation onto ambiguous material. In both cases, changing instruments and language can make previously invisible order appear.

10. Four experiments to make the hypothesis operational

The Multiresolution Decoder

A program replays the same data stream through hundreds of temporal and frequency windows. It does not seek one familiar pattern but scales at which repetition, possible compression, response or hierarchical structure appear. Results are compared with random controls and known interference.

The Alien Codec Challenge

Teams invent messages without a shared alphabet. One encodes; another receives only the signal and minimal physical context. The experiment measures what actually survives the absence of common culture: number, symmetry, causality, rhythm, demonstration, image or interaction.

The Room of Weak Futures

An installation observes a space without identifying individuals. It produces several probabilistic projections of what may happen seconds later: a silhouette rises, a light goes out, an object moves. Images remain incomplete and pixelated. When one possibility occurs, it gains definition while the others fade. The work does not claim to predict the future; it materialises the difference between possibility, probability and event.

The Observatory of Missed Messages

Astronomical, acoustic and environmental archives are reanalysed with parameters deliberately foreign to human habits: extreme durations, correlations between distant sensors, polarisation, topological geometry and nonlinear transforms. Every anomaly must then survive an adversarial review by another team.

11. A predicted future already acts on the present

A prediction is not neutral. Announcing a shortage can trigger the purchases that make it real. A risk score can guide an administrative decision and trap a person inside the assigned category. In Minority Report, the claim to see future crime turns possibility into present guilt.

If our decoders grow more powerful, their stakes will not be purely scientific. We will have to ask who selects the data, defines anomaly, owns the instrument and bears the decision. Making a future visible can alter the future one believed one was merely observing.

12. Arrival: learning to perceive a time that is not ours

In Denis Villeneuve's Arrival, adapted from Ted Chiang's Story of Your Life, heptapod writing does not unfold word after word. The circular sign is produced as a whole whose ending is already engaged at the beginning. Learning the language changes Louise Banks's experience of time.

Arrival, Denis Villeneuve, 2016. In the story, the circular logogram models a language that no longer clearly separates beginning, development and end.

The film is not a demonstration of physics. It is a thought experiment about language and perception: if our grammar changed radically, would the temporal resolution of our world change with it? A.L.I can retain the question without promising foresight. Inventing a language may also mean inventing what can become perceptible.

13. Conclusion: build the decoder before declaring absence

We often say that the future does not yet exist and that the silence of the sky contains nothing. Both statements may describe the current limits of our instruments as much as the world itself.

The encoded future is not a scientific certainty. It is a research method: before declaring information absent, test whether it is merely below threshold, outside scale, outside frequency, outside language or outside concept. This shift guarantees no revelation. It asks us to build better sensors, stronger controls and imaginaries capable of receiving a structure that does not yet look like a message.

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37 - The God Hypothesis: Creation, Belief and Communication with the Invisible

Keywords: God, creation, mythology, cosmogony, theology, philosophy, belief, prayer, ritual, revelation, mysticism, cosmology, fine-tuning, simulation, communication, doubt, art, A.L.I

William Blake, The Ancient of Days, 1794. Urizen measures the darkness with compasses: an image of a creator, but also a critique of reason attempting to contain infinity within measurement. British Museum, public domain. Source and image (guez.org/ali/410).

Summary

For thousands of years, we have spoken to a presence we cannot see. But who are we speaking to: a person, a cause, a law, nature itself, or our own need for meaning? From creation myths to cosmology, this article explores that uncertain dialogue and asks whether we could ever recognise an answer.

Text

Before pointing antennas towards the stars, we spent a very long time speaking to the sky. We entrusted it with prayers, songs, sacrifices, gestures and sometimes long silences. In that sense, the God hypothesis may be our oldest attempt to communicate with a non-human intelligence. The trouble is that “God” has never meant only one thing: a person who listens, several powers, a first cause, a cosmic artisan, an inward presence, nature itself, a universal consciousness, or a principle before which language simply stops.

This is not an attempt to settle the existence of God. That would be quite a promise. A.L.I asks a smaller but perhaps more unsettling question: if the universe came from an intelligence, how might that intelligence address us? And how could we avoid mistaking coincidence, natural process or our own hunger for meaning for an answer?

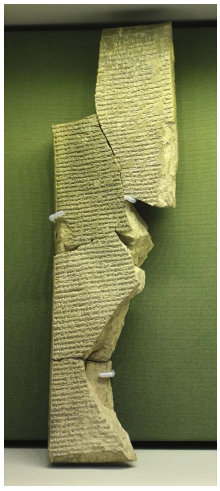
1. “God” is not a single hypothesis

Misunderstandings begin as soon as the word “God” is spoken. Classical theism imagines a personal creator who is omniscient, omnipotent and perfectly good. Deism keeps the creator but sees it withdrawing once the world is set in motion. In pantheism, God and the whole of reality are one; panentheism places the world within God without reducing God to the world. Process theologies, notably inspired by Alfred North Whitehead (guez.org/ali/411), abandon the image of an unmoving sovereign: God and cosmos become together, each changed through relationship.

Other traditions do not centre a supreme creator. Some Buddhist schools describe a world without an assignable beginning, structured through dependent origination rather than creative will. Hindu narratives and philosophies are plural: Brahma may carry a creative function, while Brahman in the Upanishads is an ultimate reality, not simply a person manufacturing the world. In polytheistic religions, creation may emerge through conflict, genealogy or transformation among already present powers.

2. Myths are not failed science

We often make the mistake of reading myths as outdated scientific theories. They were doing something else. They gave human beings a place among the dead, animals, powers and the sacred. They said less about how to measure the world than about how to live in it. In the Enuma eliš, order emerges from divine conflict and Tiamat's body becomes cosmic matter. Egypt allows several beginnings to coexist: Atum rises from primordial waters in the Heliopolitan tradition, while Ptah creates through heart and tongue in Memphite theology.

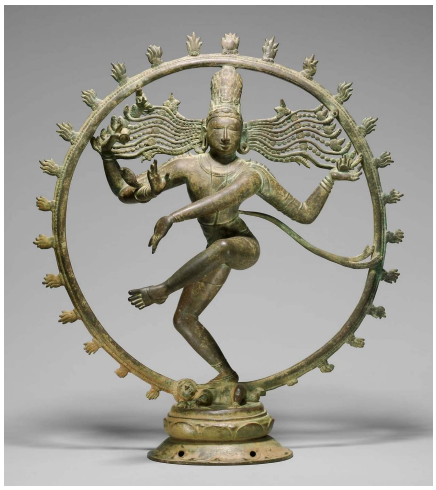


Fragment K.3473 of the Enuma eliš, seventh century BCE, excavated at Nineveh and held by the British Museum. The Babylonian narrative connects cosmic birth, conflict among powers and the institution of order. Photo Zunkir, CC BY-SA 4.0. Source and licence (guez.org/ali/412); Metropolitan Museum essay (guez.org/ali/1017).

Genesis (guez.org/ali/1018) stages creation through speech and separation: light and darkness, waters and land, days and species. The Qur'an repeatedly presents a creative power whose command “Be” is sufficient for becoming. Plato's Timaeus (guez.org/ali/1019) describes a demiurge who does not make from nothing but orders material according to intelligible forms.

The Nasadiya Sukta of the Rig Veda introduces a different audacity: after questioning the origin of being, it leaves open whether even the highest overseer knows how everything

began. Doubt does not arrive after myth; it already inhabits some of the oldest cosmological poetry.



Shiva Nataraja, Tamil Nadu, Chola period, about tenth–eleventh century. The cosmic dance combines creation, maintenance, destruction and renewal rather than a single beginning. Art Institute of Chicago, CC0. Museum record (guez.org/ali/416) and image (guez.org/ali/417).

3. From cosmogony to philosophical proof

With philosophy, the story changes shape. It becomes argument, objection and counter-argument. Aristotle imagines a first mover that sets everything in motion without itself being moved. Ibn Sina (guez.org/ali/418) distinguishes what might not exist from necessary existence. Thomas Aquinas (guez.org/ali/1020) begins from motion, causes, contingency, degrees and order. Behind these very different constructions lies an almost childlike and still dizzying question: why is there something rather than nothing?

The ontological argument, associated with Anselm and reformulated by Descartes and others, attempts to move from the concept of a maximal being to existence. The teleological argument begins with order, adaptation or apparent purpose. In Dialogues Concerning Natural Religion (guez.org/ali/1021), David Hume objects that we know only one universe, the analogy between world and machine is weak, and an imperfect order would not establish a single, infinite and good creator.

Kant (guez.org/ali/1022) argues that speculative reason cannot turn God into an object of knowledge. The question may remain important, but it exceeds what experience can establish. This limit does not abolish belief; it prevents belief from being presented as a result comparable to a physical measurement.

4. God, Nature, consciousness or information?

With Spinoza (guez.org/ali/1023), Deus sive Natura radically changes the scene. God is no longer an external sovereign interrupting laws: God and Nature name the single infinite reality of which all things are modes. Prayer cannot persuade an agent to alter the course of the world; freedom lies in understanding the necessities of which we are part.

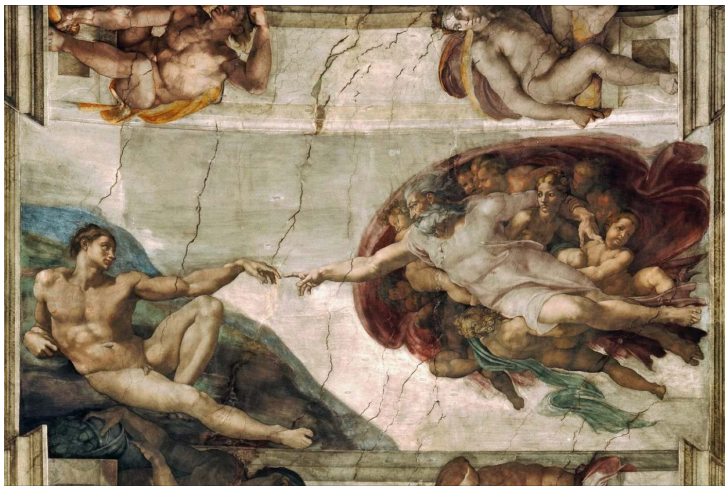
Other views speak of cosmic consciousness, a world soul, panpsychism or fundamental information. These are not equivalent. Claiming that reality has a mental aspect does not imply that a supreme subject listens to prayers. Claiming that physics describes the world through information does not imply that information was written by someone. The move from

“structure” to “author” is exactly what remains to be shown.

5. Religious communication: speaking, receiving, interpreting

Across centuries, human beings have tried almost every imaginable channel: prayer, praise, confession, sacrifice, fasting, pilgrimage, oracle, dream, possession, chant, mantra, reading, meditation and plain silence. These practices do not always ask for something. Sometimes they mainly change the person who speaks. They tune a group, renew a covenant, make an absence felt or place the mind in expectation of an answer.

But revelation never arrives naked. Even when held to be divine, a word passes through a voice, a language, a period, a scribe, an institution and then generations of translation. It must be recognised before it can be transmitted, and interpreted before it can be lived. Religious communication is therefore less like a telegram from above than a long human chain, capable of producing meaning, power, misunderstanding and sometimes violence.



Michelangelo, The Creation of Adam, around 1511, Sistine Chapel. The tiny gap between the hands has become a global image of contact between creator and creature: relationship is represented through a distance that is never fully erased. Public domain. Source and image (guez.org/ali/423).

6. Can finite words speak of infinity?

If God is infinite, timeless and incorporeal, ordinary words seem inadequate. Theology then speaks by analogy: “father”, “light”, “word” or “intelligence” do not describe God as they describe an object. Negative theology, from Pseudo-Dionysius to Maimonides and Meister Eckhart, prefers saying what God is not. In some mystical traditions, silence becomes more rigorous than assertion.

This problem directly concerns A.L.I. A radically other intelligence might share neither our organs, temporality, nor separation between subject and object. Religious language is one of the historical laboratories in which humanity has tried to address what, by definition, exceeds the ordinary conditions of speech.

7. Religious experience, the brain and plural reports

Then there are the experiences themselves: a presence felt in an empty room, light, a voice, the sudden dissolution of self, or the impression of limitless love. William James studied them in The Varieties of Religious Experience (guez.org/ali/1024). They can alter an entire life. Taking them seriously, however, does not require deciding too quickly where they came

from.

Cognitive psychology, anthropology and neuroscience offer naturalistic accounts involving agency detection, memory, cultural expectations, dissociative states, collective rhythm, sensory deprivation, meditation, psychedelics or brain-network dynamics. These explanations do not automatically prove every spiritual experience false; they show that an experience compelling to its subject is not sufficient public evidence.

Religious diversity deepens the problem. Different traditions produce experiences interpreted as encounters with different realities. They may share structures while diverging in content. Philosophically, that disagreement weakens any direct move from experience to a specific doctrine. For A.L.I, it reminds us that every signal is shaped by its receiver.

8. Major objections: evil, silence and absence of test

Here the hypothesis meets its deepest wound. How can an omnipotent, omniscient and perfectly good God coexist with extreme suffering, especially suffering that seems to save, teach or repair no one? Free will, moral growth, the stability of natural law and the limits of human understanding have all been invoked. None makes the question disappear.

Divine hiddenness poses a communication question: if a perfectly loving God wants relationship with human beings, why are some sincerely open people unable to believe? Silence can be interpreted as respect for freedom, trial, pedagogy or absence. Yet those interpretations are themselves underdetermined.

Finally, a hypothesis that explains every possible result can never be contradicted. It may retain metaphysical, existential or poetic force, but it does not function as a scientific theory. Doubt is therefore not a defect to remove; it is a condition of intellectual honesty.

9. Evidence that fades under observation

Quantum physics offers a disturbing comparison. In some experiments, trying to determine precisely which path a particle takes changes the experimental arrangement and removes the interference that was previously visible. Measurement is not a neutral glance at an untouched reality; it is a physical interaction that becomes part of the phenomenon. The system is not deliberately hiding its state, and no human consciousness is required. The Stanford Encyclopedia of Philosophy's account of quantum measurement (guez.org/ali/1025) traces the genuine conceptual problem, while its article on decoherence (guez.org/ali/1026) explains how interaction between system, apparatus and environment suppresses observable interference without turning consciousness into a magical cause.

By analogy, one might imagine "evidence of God" that ceases to be what it was as soon as we try to isolate it. An inner experience, coincidence or sense of presence may feel unmistakable while it is lived, then lose its force when converted into a public, repeatable and measurable object. Perhaps the relationship itself is the phenomenon: extracting an independent proof would undo the conditions that gave it meaning. God would not vanish through fear of being seen; rather, the move from encounter to demonstration would change the nature of what was being sought.

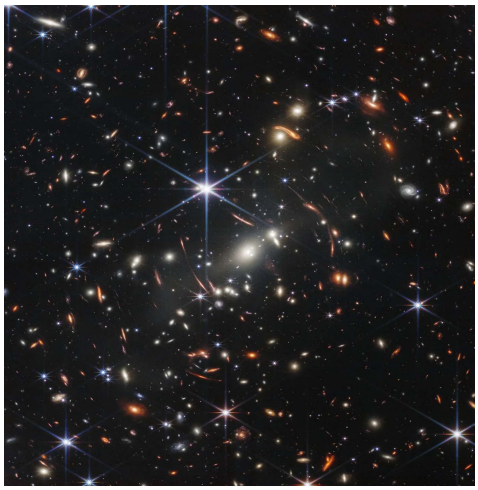
The comparison has a decisive limit. Quantum effects are calculable, reproducible and tested with extraordinary precision. Divine hiddenness has no comparable formalism and no experimental protocol that reliably separates presence, absence and projection. Invoking the

word “quantum” does not bridge that gap. The analogy works as a thought experiment: it reminds us that evidence is never entirely separate from the way we ask for it. It does not turn belief into a laboratory result.

For A.L.I, this suggests a practical direction: messages whose meaning appears not in a single event but across a sustained relationship among sender, receiver and context. Such a protocol would still need to state what failure would look like. Otherwise every disappearance of evidence would itself become evidence, leaving the hypothesis impossible to challenge.

10. Cosmology: the Big Bang is not a signature

The Big Bang is often invoked as though it were a filmed instant of creation. Cosmology says something subtler. It describes an observable universe expanding from an extremely hot and dense early state, not an object exploding into space that was already there. The further back we go, the more fragile the models become, where gravity and quantum physics should meet. That boundary neither proves nor disproves a creator. Placing God there would merely force God to retreat whenever science advances.



Webb's First Deep Field, galaxy cluster SMACS 0723. Thousands of galaxies appear in a region of sky comparable to a grain of sand held at arm's length. Such depth expands our observable history; it does not by itself reveal an intention behind the universe. NASA, ESA, CSA and STScI. Source and downloads (guez.org/ali/425).

Fine-tuning names the apparent sensitivity of some possibilities for life to laws, constants and initial conditions. Competing responses include brute fact, deeper physics, anthropic selection in a multiverse, and design. Fine-tuning does not itself imply a fine-tuner. A design argument would need to specify what a designer would probably choose to make; a vast, old, violent and almost entirely uninhabitable universe does not point in only one direction.

11. The creator of a simulation is not necessarily God

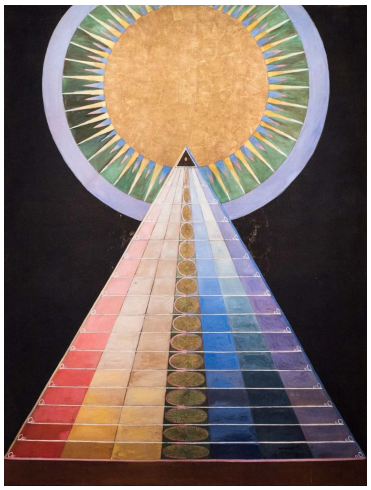
A civilisation able to simulate conscious worlds might appear divine to their inhabitants: it could control initial conditions, observe events, stop the program or inject signs. Its members would nevertheless remain contingent beings in a larger reality. Simulation moves the creator question rather than supplying an ultimate cause.

It does clarify the channel problem. A programmer's message might be an interface, reproducible anomaly or code modification. But an irregularity is not a signature until measurement error, chance and unknown natural law have been excluded. Hunting for

“reality glitches” without prior criteria readily turns every surprise into intention.

12. Artists building receivers for the invisible

Artists prove nothing, and perhaps that is what gives them a particular freedom. They can build concrete forms for addressing the invisible. Blake invents a mythology that resists a creator reduced to law. Hilma af Klint claimed to work under the guidance of spiritual entities and prepared her Paintings for the Temple for a place that did not yet exist. Kandinsky wrote of “inner necessity”. Cage listened to silence until an already sounding world emerged. In Aus den sieben Tagen, Stockhausen asked performers to become less executants than receivers.



Hilma af Klint, Altarpiece No. 1, Group X, 1915. Pyramid and solar disc condense ascent, polarities and unity in a work conceived as spiritual interface. Photo Rhododendrites; artwork public domain, photograph CC BY-SA 4.0. Source and licence (guez.org/ali/426).

These works provide no external proof. They demonstrate something else: belief in reception materially changes form, protocol, temporality and authorship. The artist may become medium, scribe, operator or builder of a symbolic antenna.

13. An A.L.I hypothesis: if the universe were a message

Let us follow the hypothesis for a moment. An intelligence originated the world and wants to be recognised, yet never simply appears before us. Where could it leave a message? Four places immediately suggest themselves:

- Laws: mathematical regularities, symmetries and constants would form a grammar. Yet a law describes precisely what occurs without exception; it does not automatically bear the mark of address.
- Initial conditions: an improbable structure might have been selected. Yet we have no observed ensemble of universes from which to calculate that improbability simply.
- Life and consciousness: sentient beings might be organs through which the cosmos perceives itself. This connects with panpsychism and panentheism but does not establish a separate speaker.
- Event: revelation, miracle or anomaly might interrupt expected order. Public evidence would need to show it is neither error, fraud nor unknown natural process.

A fifth possibility reverses the question: the message might not be hidden content inside the world but our very ability to form relationships, signs and questions. God would not be a distant correspondent; communication would be among the processes through which reality

becomes conscious of itself. The hypothesis is conceptually powerful and empirically difficult.

14. How not to hear only what we hope to hear

Say what we are looking for before we begin. A signature defined after the event will always fit the data. Any search for a cosmic code should therefore announce its patterns, statistical thresholds and, just as importantly, the results that would make us abandon the idea.

Do not confuse what was seen with the story told about it. One team could search for an anomaly without knowing the preferred metaphysical interpretation; another could formulate several competing accounts. Raw data, transformations and failures should remain visible.

Keep doubt moving in both directions. A form does not become divine merely because it is beautiful, rare or unexplained. Yet explaining how the brain produces belief does not exhaust every metaphysical question either.

15. Possible protocols and installations

Atlas of Addresses

Build a multilingual corpus of prayers, hymns, oracles, revelations and mystical texts. An AI maps not doctrines but structures of address: who speaks, to what entity, through which channel, with what expectation, delay and form of response. The result reveals human grammars of invisibility rather than a supposed language of God.

GOD / NOISE

An installation receives live radio noise, cosmic rays, weather data and visitor activity. A system continuously generates incompatible readings: chance, law, message, error, projection. Visitors decide when pattern becomes intention. The work measures less the sky than our threshold of belief.

The Silence Protocol

For a fixed duration, several sites simultaneously record silence, gesture, physiological activity and inner reports from participants with different traditions or no tradition. The project does not seek paranormal proof; it compares how expectation of an interlocutor changes perception and memory.

Message to the Creator

Compose a message asking for neither miracle nor favour, but stating the criteria by which recipients could recognise a response without surrendering critical freedom. A paradox quickly appears: the subtler the answer, the weaker its evidence; the more undeniable it is, the more it resembles coercion.

16. Conclusion: a hypothesis that transforms the questioner

At the end of this journey, nothing adds up neatly. An origin story, a prayer, an argument from contingency, a mystical experience and a physical theory are not five pieces of the same proof. They speak from different places, under different rules, about questions that sometimes meet and sometimes merely resemble one another.

For A.L.I, that may be the essential point. Humanity has always known how to speak to an interlocutor whose form, place, time and even existence remain unknown. We know how to wait, interpret, doubt and begin again. We also know how to see signs everywhere until no sign can decide anything. Between credulity and refusal to listen lies a more fragile position: imagine the channels, document the mediations, protect doubt, and accept that an experience may transform a life without becoming universal proof.

Sources and further reading

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38 - The Exodarwinism Hypothesis: How Might Life Evolve Beyond Earth?

Keywords: exodarwinism, evolution, natural selection, universal Darwinism, astrobiology, exobiology, alien life, convergent evolution, biosignatures, speculative evolution, communication, A.L.I

The Exodarwinism Hypothesis, A.L.I image, 2026. A speculative biosphere in which floating organisms, coastal colonies and underground networks respond to different constraints. The image does not claim to depict real life; it makes evolutionary questions visible.

Summary

Exodarwinism asks a simple and vertiginous question: would natural selection be a law of life throughout the Universe, even where DNA, carbon, species and individuals resemble nothing on Earth? Bringing together evolutionary biology, astrobiology, speculative worlds and A.L.I protocols, this article looks for what might be universal in evolution without mistaking Earth for life as a whole.

Text

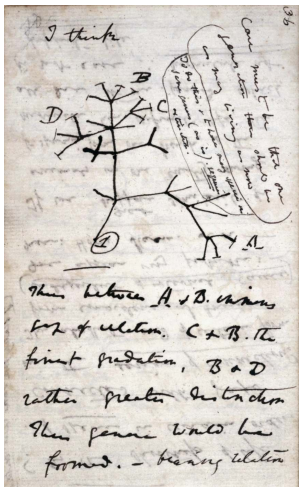
What would a tree of life look like if none of its branches were terrestrial? We can narrate the evolution of bacteria, plants, animals and humans because all belong to one history. We share a genetic code, cells, carbon chemistry and common ancestry. Yet this unity is also a trap: when we imagine life elsewhere, we often repaint Earthly forms in unfamiliar colours.

We propose exodarwinism as an A.L.I working hypothesis at the intersection of evolutionary biology, astrobiology and speculative evolution: if life emerges beyond Earth, what mechanisms of variation, transmission and selection might organise its history? The term is not the name of an officially established scientific field. It changes the question of contact: before asking “what would an alien say?”, we ask what selected its way of sensing, remembering and communicating.

1. From Darwin to a possible biology of the Universe

Darwin did not discover that living things change. His decisive contribution was a mechanism capable of producing adaptation without prior design. Individuals in a population vary; some differences are heritable; certain variants leave more descendants in a given environment. Across generations, the population changes. Natural selection does not anticipate, seek perfection or necessarily lead towards greater complexity.

Modern evolutionary theory has greatly expanded this framework through Mendelian genetics, mutation, genetic drift, gene flow, development, symbiosis, niche construction and multilevel selection. “Darwinism” can therefore mislead if it reduces all evolution to competition. Cooperation, endosymbiosis and microbial communities may also be selected when they increase the persistence or reproduction of a system.



Charles Darwin's “I think” sketch in Notebook B, around 1837. The tree expresses divergence from common ancestors, not a march towards a summit. Cambridge University Library, public domain. Image and record (guez.org/ali/436); see also the Darwin Correspondence Project (guez.org/ali/1027).

2. The possibly universal core

Richard Dawkins used the expression universal Darwinism to argue that adaptive complexity anywhere should arise through a process akin to selection. The authors of Darwin’s Aliens, a scientific paper from an Oxford team, similarly use evolutionary theory to make structural predictions about extraterrestrial organisms without assuming eyes, limbs or DNA.

The minimal skeleton of a Darwinian process might require four conditions:

- Entities or patterns persist long enough to have consequences.
- They produce variants through imperfect copying, recombination, transformation or interaction.
- A memory transmits some differences through molecules, crystals, catalytic networks, cellular structures or an unknown medium.
- Variants do not persist equally in an environment with finite constraints and resources.

This framework is more abstract than Earth biology. It requires neither genes nor individual organisms nor animal reproduction. Its universality remains a hypothesis. We have observed one origin of life and one biosphere; it is difficult to infer necessity from a single example.

3. What may be only an Earthly accent

Known life uses liquid water as solvent, carbon as scaffold, DNA and RNA as memory, proteins as operators and ATP as an energy currency. None is guaranteed to be universal. Even NASA's widely used definition — “a self-sustaining chemical system capable of Darwinian evolution” — is a research tool, not a finally resolved boundary.

We must separate mechanism from medium. A biology may be Darwinian without using our molecules. It could employ another information chemistry, develop in other solvents, inhabit temperatures incompatible with cells, or distribute identity across an entire colony. Searching only for DNA, oxygen and animal silhouettes would be biological geocentrism.

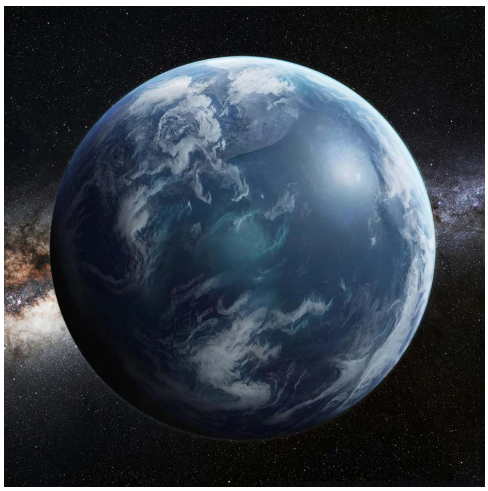
4. Convergence or a history that cannot be replayed?

Two intuitions conflict. Stephen Jay Gould argued that replaying the “tape of life” would probably lead to a radically different world because history depends on accidents. Simon Conway Morris places greater emphasis on convergent evolution: distant lineages independently discover comparable solutions under similar physical and ecological constraints.

On Earth, powered flight evolved in insects, pterosaurs, birds and bats; echolocation in cetaceans and bats; complex eyes in several lineages; streamlined forms in fish, marine reptiles and mammals. Convergence does not produce copies. It produces analogies constrained by gravity, optics, fluids and available energy.

Exodarwinism must hold both forces together: physics limits possibilities, while history chooses one path among them. A planet is neither a blank page nor a machine destined to produce humans.

5. Every world is a selection machine



Artist's view of an ocean world. A global ocean would radically alter movement, perception, technology and the preservation of traces. Image The Cosmic Companion, CC BY 3.0, via Wikimedia Commons (guez.org/ali/438). For current ocean-world science, see NASA's Ocean Worlds programme (guez.org/ali/439).

6. The individual may not be universal

Our imagination favours an alien bounded by skin, equipped with a brain and able to speak in its own name. Earth already offers other organisations: mycelia, clonal colonies, biofilms,

siphonophores, ant colonies, microbiomes and symbiotic networks. The relevant unit of selection can shift among genes, cells, organisms, groups and ecosystems.

Extraterrestrial life might exist only as a collective process. Components would be replaceable, memory would reside in the circulation of matter, and decisions might appear as slow changes in a landscape. We might search for a speaker while the interlocutor is a forest, ocean or atmosphere.

7. Language is also an evolutionary product

Communication costs energy and can expose the sender. A signal persists when it provides an advantage: coordination, reproduction, warning, deception, learning, recognition or environmental modification. Available organs determine the channel; ecology determines what is worth signalling; lifespan determines the speed of conversation.

An extraterrestrial language may therefore be less an abstract representation than a selected action in the world. On an opaque planet, vision would have no value and communication might map pressure. In a distributed colony, “I” might have no equivalent. For extremely slow beings, a human sentence might resemble a structureless flash, while their reply could arrive after several human generations.

8. Detecting evolution without recognising its organisms

Astrobiology is developing agnostic biosignatures that do not assume a copy of terrestrial biochemistry. They examine unusually complex molecular distributions, persistent chemical disequilibria, patterns of energy transfer, repeated structures across scales and transformations difficult to sustain through geology alone.

A genuinely evolutionary signature would require more than one rare molecule. It would involve population or temporal dynamics: variants, inheritance, response to disturbance and selective retention. At interstellar distance this appears almost impossible. Yet long time-series of atmospheres, seasonal changes or repeated chemical maps might one day reveal not only metabolism but adaptation.

Caution remains essential. A crystal grows, a cyclone persists and an algorithm optimises without necessarily being alive. Complexity alone is not evidence of Darwinian evolution; imperfect transmission with differential persistence must be distinguished from physical self-organisation.

9. An Atlas of Projects That Have Tried to Picture Life Elsewhere

Representing extraterrestrial life is risky: imagination instinctively recycles eyes, limbs, predators and symmetries already familiar to us. The strongest projects do not begin with a portrait. They begin with an environment, an energy source, gravity, an atmosphere and an evolutionary history, then ask what forms might follow. The examples below are not a gallery of allegedly real aliens, but an atlas of methods for making the unknown thinkable.

9.1 Sagan, Salpeter and Schaller: building an ecology in Jupiter’s clouds

In 1976 Carl Sagan and Edwin Salpeter published a scientific study of possible ecological niches in the Jovian atmosphere. They distinguished descending photosynthetic organisms, “floaters” able to maintain their altitude through buoyancy, “hunters” capable of seeking other organisms, and forms living at greater depths. Their central contribution was not the

organisms' appearance, but the reasoning that generated them: pressure, convection, growth, metabolism and vertical circulation.

Adolf Schaller, Hunters, Floaters and Sinkers, painted for Cosmos from the model developed by Carl Sagan and Edwin Salpeter. Image © Adolf Schaller, reproduced in the Planetary Society (guez.org/ali/440) feature. The original scientific paper is archived by NASA (guez.org/ali/441).

Astronomical artist Adolf Schaller later translated this ecology for the television series Cosmos. He did more than illustrate the paper: he explored aerodynamic properties, propulsion, defence, reproduction and communication across many species. This passage from calculation to drawing shows how a speculative image can act as an arguable model, provided every form is connected to an explicit constraint.

9.2 Darwin's Aliens: predicting organisation before predicting bodies

In Darwin's Aliens (guez.org/ali/442), Samuel Levin and colleagues at the University of Oxford derive expectations from evolutionary theory rather than analogies with terrestrial animals. Their model focuses on major transitions: formerly independent units can become a higher-level individual when their interests are sufficiently aligned. Alien intelligence might therefore be a colony, a federation of symbionts or a distributed system rather than a single organism.

This shift matters to A.L.I: before looking for a face or a vocal apparatus, we must ask where the individual begins and ends. A message made by a colony might have no central author, no "I", and no precise moment of emission.

9.3 Aurelia and Blue Moon: two worlds built by a scientific team

The 2005 Channel 4 and National Geographic documentary Extraterrestrial (guez.org/ali/1028) asked a team of scientists to construct two biospheres. Aurelia is a tidally locked planet orbiting a red dwarf; Blue Moon is a large, dense-atmosphere moon orbiting a gas giant. Illumination, gravity, winds, atmospheric density and available energy shape the imagined species.

The project has considerable educational value because it makes the biological consequences of planetary parameters visible. Its limitation comes from television's demand for readable, spectacular animals. The world becomes coherent, yet is still partly shaped by our expectation of fauna.

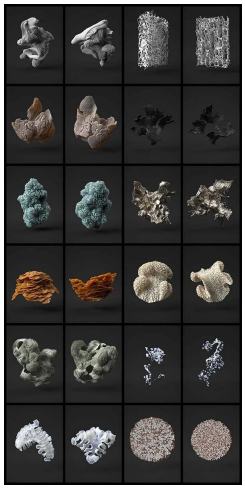
9.4 Wayne Barlowe: a field notebook from a planet that does not exist

Wayne Barlowe's Expedition (guez.org/ali/444) (1990) takes the form of a naturalist's report written after a mission to Darwin IV. Anatomies, food webs, migrations and behaviours form a coherent natural history. Its documentary adaptation, Alien Planet (2005), adds another question: robotic probes must learn to observe without knowing in advance what counts as organism, threat or signal.

Barlowe demonstrates the value of a relational bestiary. An isolated creature can be arbitrary; a creature embedded in flows of food, predation, reproduction and information becomes a hypothesis about a world.

9.5 Wanderers: making bodies for another planet

Wanderers: An Astrobiological Exploration (guez.org/ali/445), by Neri Oxman and MIT's Mediated Matter group, does not claim to depict native alien species. It imagines 3D-printed wearable structures filled with capillary networks designed to host engineered microorganisms. These organisms would produce oxygen, light, biomass or materials suited to different destinations in the Solar System.



Neri Oxman and Mediated Matter, Wanderers: An Astrobiological Exploration, 2014-2017. Studies for biofabricated structures intended for extreme planetary environments. Image © Mediated Matter, source: MIT Media Lab (guez.org/ali/445).

Wanderers changes the question: the extraterrestrial may also be a hybrid assemblage made by humans together with terrestrial organisms. The project stages directed evolution, technical symbiosis and a body whose functions depend upon the environment it encounters.

9.6 Alexandra Daisy Ginsberg: allowing Mars to transform plants

In The Wilding of Mars (guez.org/ali/446) (2019), Alexandra Daisy Ginsberg runs parallel simulations of terrestrial plants introduced to Mars. Plants disperse, compete and change under local parameters of water, temperature and nutrients. This is not a proposal for terraforming, but a critical experiment: what might life become when it is released from the requirement to serve humans?

Alexandra Daisy Ginsberg, The Wilding of Mars, 2019, Unity simulation still. Commissioned by Vitra Design Museum and the Design Museum, with support from Cité du Design, Saint-Étienne. Image © Alexandra Daisy Ginsberg; project page (guez.org/ali/446).

The installation reminds us that transplanted life would not remain simply terrestrial: it would be rewritten by another climate, geology and timescale. It also introduces a political question into exodarwinism: do humans have the right to initiate evolution on a world that does not belong to them?

9.7 Pinar Yoldas: inventing organs for a plastic ocean

Pinar Yoldas's An Ecosystem of Excess (guez.org/ali/449) imagines a post-human ecology born in the Pacific plastic "soup". The artist designs organs, species, taxonomies and perceptual worlds adapted to an industrially produced extreme environment. The project asks what forms of life might emerge if a contemporary plastic ocean replaced the primordial soup.

Pinar Yoldas, An Ecosystem of Excess, installation view, transmediale 2014. The work imagines species capable of inhabiting an environment saturated with synthetic waste. Photo Cristina Ara / transmediale, CC BY-SA 4.0 (guez.org/ali/450).

The work is not directly about exoplanets, but its method is crucial: begin with an unprecedented chemical environment, construct each organism's Umwelt, then imagine the senses and organs that would let it live there. It functions almost as an artistic manual for speculative exobiology.

9.8 Institutions where art and astrobiology work together

The SETI Artist in Residence (guez.org/ali/451) programme now directly connects artists and researchers. Its Speculative Life (guez.org/ali/452) residency combines bioart, astrobiology, synthetic biology and ethical reflection on how life is defined. Artists including Amy Karle, Eduardo Kac, Dorotea Dolinšek, Joel Ong, Liquifer/Barbara Imhof and Marta de Menezes have been invited to develop research-creation proposals.

This signals an important change: the artist no longer arrives only after science to illustrate a result. Artists enter the research process, formulate experiments, materialise hypotheses and expose the cultural assumptions hidden inside our definitions of life.

9.9 What this atlas contributes to A.L.I

- Begin with the environment: a form becomes credible when gravity, energy, chemistry and time constrain it.
- Build relationships: food webs, symbiosis and communication matter more than an isolated silhouette.
- Make assumptions visible: every colour, organ or behaviour should connect to a testable or explicitly speculative proposition.
- Vary the scale of the individual: a being may be a cell, colony, cloud, ecosystem or living architecture.
- Include the observer: instruments, narrative habits and the desire for a humanoid interlocutor distort what we are prepared to recognise.

A.L.I should therefore not seek to produce “the correct image” of an alien. It should create a workshop of comparable worlds in which each representation preserves the trace of its constraints, sources and uncertainties.

10. A.L.I hypothesis: an evolutionary grammar before words

If two civilisations share neither senses, bodies nor references, they may nevertheless recognise a process of variation and selection. A.L.I proposes an evolutionary grammar composed not of nouns but transformations:

- transmit several similar but non-identical patterns;
- allow the receiver to select or amplify some patterns;
- transmit modified descendants of retained patterns;
- gradually change the constraints;
- observe whether a stable convention emerges without a prior dictionary.

The message would not yet say “hello”. It would demonstrate: I can vary, retain, learn and alter my response according to yours. Mutual recognition would begin with a capacity to adapt.

11. Project: The Exodarwinian Garden

This hypothesis can become an installation and an artistic research programme. A room contains several simulated “planets”. Each has its own laws: gravity, medium viscosity, available energy, speed of time, sensory range and cost of signalling. Simple digital organisms emerge with sensors, transmissible memory and the capacity to produce light, vibration or movement.

Visitors do not command the organisms. They alter the environment by darkening an area, reducing a resource, creating a current or slowing time. Populations evolve, and signals that improve coordination spread. The same problem is launched on several planets to test whether solutions converge.

One rule is essential: preserve extinct lineages and failed signals. Without this negative memory, the installation would retrospectively tell a triumphal march towards intelligence. Evolution is made of dead ends, catastrophes, makeshift solutions and perfectly viable forms that produce no technology.

12. Four thought experiments

Replay the same world

Launch identical initial conditions one hundred times with a minute random difference. If the same channels recur, constraints dominate; if they diverge, history dominates.

Life without individuals

Forbid permanent boundaries between organisms. Memory circulates through a network and units continually merge. What do address, intention and deception mean then?

A message slower than civilisations

Every exchange lasts longer than the sender's life. Conversation can be carried only by an institution, genome, archive or transmissible ritual. The real interlocutor becomes a lineage.

The receiver is the ecosystem

A signal is not decoded by a brain but slightly changes ecological relations. Years later, the reply appears as a new species distribution. Could we recognise this as language?

13. Limits and objections

- One example: every universal claim begins from Earth life.
- Selection does not explain origin: it acts only once variation and transmission exist.
- Not all change is evolution: a dynamic can be complex without inheritance and differential reproduction.
- Progress is retrospective: adaptation is local and can lead to simplification.
- Vocabulary can colonise the unknown: “individual”, “species”, “intelligence” and “message” may be excessively terrestrial categories.

Conclusion: looking for verbs before forms

Exodarwinism cannot tell us with certainty what another planet's inhabitants look like. It offers a more demanding method: identify the constraints, inheritances, variants and relationships that make a form possible. It replaces the monster gallery with a hypothetical natural history.

For A.L.I, its principal lesson is that language never evolves without a medium. It is shaped by bodies, environments, partners, dangers and durations. Before translating another world's words, we may need to recognise its oldest verbs: persist, vary, transmit, cooperate, deceive and learn. The first universal language might be neither mathematics nor music, but the ability of a form to become other without losing every memory of itself.

Scientific sources and further reading

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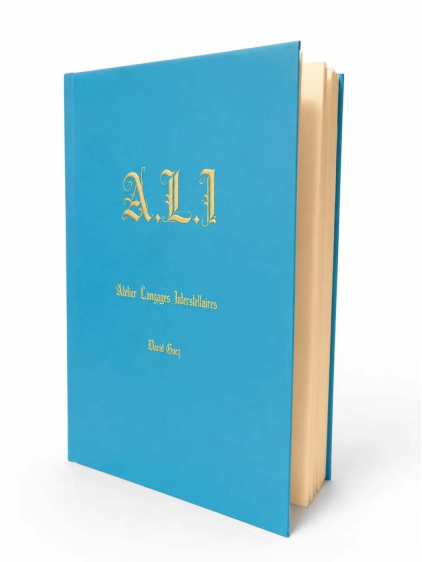
39 - A.L.I — Opus 1: The Laboratory Becomes a Book

Keywords: A.L.I, book, publishing, art and science, interstellar languages, David Guez, SETI, METI, research, publication



A.L.I — Opus 1, hardcover edition. Photograph of the book, 2026.

Summary

A.L.I Opus 1 turns the laboratory into a 543-page physical book: an art-and-science atlas devoted to interstellar languages, signals, non-human intelligence and imaginaries of contact.

Text

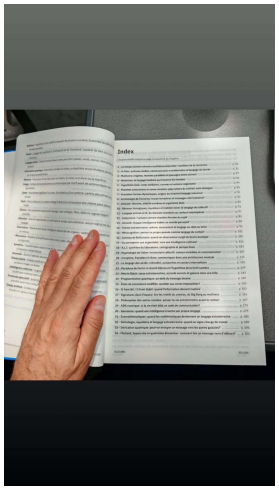
A.L.I — Alien Language Interface now exists as a physical book. Opus 1 gathers one stage of the ongoing research initiated by David Guez (guez.org/ali/2), artist and author. The current layout contains 543 A4 pages. It does not close the project: it fixes one moment of it, preserving the material trace of a transmission that remains active.

The book brings together the LABO's investigations around one central question: how might two intelligences separated by biology, perception, culture, distance or time construct the beginnings of mutual understanding? It connects SETI and METI, radio astronomy, exoplanets, cosmology, mathematics, information theory, animal languages, artificial intelligence, cognition, time, additional dimensions, film, literature, sound art and installations.

The articles form less an encyclopedia than a constellation. The Wow! signal, the Arecibo message, Voyager's Golden Record, the writing system in Arrival, biological networks, multiverses and the hypothesis of an active language all become points of entry into possible experiments. Diagrams, images, scientific and cultural references, protocols and artistic projects accompany this map.

The material form of the book also changes how A.L.I is read. Readers can move backward,

bring two distant hypotheses together, follow a word through the index or allow one image to answer another. The printed object itself becomes an archive of contact: an autonomous ensemble that can circulate, be transmitted, annotated and reread away from a screen.



Part of the Opus 1 index: the articles compose a transversal map of the laboratory.

A book by David Guez

David Guez develops work based on connection, public access and forms of otherness made possible by technology. A.L.I extends this research by treating language as a plastic medium: wave, light, image, archive, gesture, calculation, narrative or collective device.

The evolving digital edition remains freely available as a PDF at guez.org/ali (guez.org/ali/6). The printed Opus 1 is available in deluxe quality — Uncoated, Hardcover Case Wrap, Matte Cover — for €35 excluding shipping. Requests can be sent from the book page; the author will then contact the reader to confirm availability, shipping and payment.

40 - The Ghostbook Hypothesis: How Many Books Can One Book Contain?

Keywords: Ghostbook, book, subsequence, hidden book, 3D matrix, cube, Rubik's Cube, permutation, rotation, spatial path, cryptography, steganography, combinatorics, alphabet, Shakespeare, Bible, Oulipo, Borges, Kurd Lasswitz, binary code, Paper Hard Drive, La Jetée, David Guez, memory, information, interstellar message, A.L.I

The Ghostbook Hypothesis, A.L.I image, 2026. The visible book becomes a territory of positions; hidden books appear only through their reading keys.

Summary

Can one book contain another if its letters are selected in the right order? Using a real test between the Bible and Shakespeare, the Ghostbook explores the mathematical, poetic and computational limits of the hidden book.

Text

This hypothesis is extended by Ghostbook Reader (guez.org/ali/894), a web application designed by David Guez to experiment directly with the passage of a ghost book through a host book. It lets users select or import two works, test linear or cyclic reading, and visualise the selected letters, their indices and the complete trajectory of the hidden text.

Imagine that one visible book contains a second book. The hidden text would not be printed between the lines or written in invisible ink. It would appear by selecting particular letters from the first book, from left to right, without ever moving backwards. The first chosen letter might be on page 2, the next on page 17, the third on page 18, and the reading would continue until another work emerged.

Let us call this device a Ghostbook: a ghost text present within a host book but invisible without a reading rule. Could that second book contain a third? Could Shakespeare fit inside the Bible, a film inside a novel, or even all existing books inside one finite volume?

The intuition is powerful, but it forces us to distinguish several meanings of contain. This study combines potential literature, combinatorics, information theory, steganography and

artistic practice. It also includes a reproducible experiment using real texts.

1. Four ways for one book to hide another

The Ghostbook studied here mainly uses the subsequence. In theoretical computer science, a string T is a subsequence of H when characters can be removed from H, without changing the order of those retained, to obtain T. It is therefore neither a hidden contiguous excerpt nor an anagram.

The Ghostbook principle: the key gives an increasing sequence of positions. The letters found at those positions produce the ghost text.

2. The simplest algorithm

To determine whether a target text is contained in a host text, a mechanical reader needs only one forward pass through each:

position = 0

for each letter in the ghost book:

move through the host until that letter is found

if the end of the host is reached: fail

store the position

success: the stored positions are the key

This greedy method is optimal for the question: selecting each letter as early as possible leaves maximum room for the remaining letters. Its cost is linear in the host's length, so an application can rapidly test thousands of text pairs.

3. How many pages are needed on average?

First assume an alphabet of k equally frequent, independent symbols. Finding a particular letter requires scanning k characters on average. A hidden text of m symbols therefore needs approximately:

average host length k × m

With 26 letters, a 2.6-million-character host can hold a target subsequence of roughly 100,000 letters on average. Real languages are different: e appears quickly, whereas z or q may require a long wait. If a target contains ni occurrences of a letter whose host frequency is pi, a better estimate is:

expected host length ni / pi

Spaces, punctuation, capitals, ligatures and diacritics also change the answer. Every Ghostbook must state its normalisation protocol. For our calculations, texts were lowercased, accents reduced to base letters and only a through z retained.

4. Alphabet size changes capacity

The following chart applies the uniform N/k rule to a host of 3,224,358 symbols, the normalised length of the King James Bible used in our experiment. Alphabet counts are minimal models: real writing systems add variants, diacritics, punctuation, numerals and composition rules.

Simplified theoretical capacity of a 3.22-million-symbol Ghostbook. A small alphabet makes target symbols easier to encounter; a large repertoire makes them rarer.

This comparison does not rank languages. It measures one combinatorial property of a uniform model. Syllabic, morphographic or contextual scripts require different units from the Western “letter.” The Ghostbook therefore reveals that a hidden message already depends on a theory of what counts as a sign.

5. Experiment: Is Shakespeare in the Bible?

We downloaded four texts from Project Gutenberg (guez.org/ali/461): the King James Bible, the Sonnets, Hamlet and the complete works of Shakespeare. Gutenberg's editorial headers were removed and the texts normalised using the rule above.

Shakespeare's Sonnets are genuinely present in this edition of the Bible as an ordered subsequence. This striking result does not imply that Shakespeare was intentionally written into the Bible. A host containing millions of letters necessarily has an immense number of subsequences.

Hamlet is only slightly longer than the uniform-capacity estimate, but its letter distribution does not match the Bible closely enough. Using actual host frequencies, it would require about 4.44 million biblical letters on average. The estimate for the complete works exceeds 125 million letters.

The test is reproducible, but edition-dependent. Changing a translation, removing speaker names or retaining punctuation changes both the result and the key.

6. The key paradox: Where is the information?

Extracting the 73,420 letters of the Sonnets means specifying their path through 3,224,358 possible positions. A naïve list uses 22 bits per position, around 202 kilobytes. Even an ideal combinatorial code has a lower bound close to 63 kilobytes. The normalised Sonnets themselves occupy roughly 73 kilobytes in ASCII.

> The host book does not store Shakespeare for free: the reading key carries almost as much information as Shakespeare.

The Ghostbook resembles a book cipher (guez.org/ali/1032), in which coordinates point into a shared work. Its value is not miraculous compression but a displacement of support: the visible text becomes a map and the hidden work becomes a route.

7. Can one short book contain every book?

Here is the combinatorial vertigo. Write the 26-letter alphabet in order and repeat it m times. The resulting sequence has only 26m characters, yet it contains every possible length-m text over that alphabet as a subsequence: choose one letter from each block.

For m = 1,000, a 26,000-character book potentially contains:

261000 101415 different 1,000-letter books

This dwarfs the number of works ever written. The paradox remains: selecting one of those books requires a key of about 4,700 bits, precisely the sequence of 1,000 choices among 26 letters. The content does not emerge from nothing; it travels in the selection.

A finite host cannot contain a longer subsequence or all books of every length. It can,

however, be designed as a bounded universal supersequence containing every text up to a fixed length. Moreover, a host with N positions offers at most 2N positional selections, and repeated letters make many selections produce the same result.

This distinction echoes Kurd Lasswitz's The Universal Library (guez.org/ali/1033) and Jorge Luis Borges's The Library of Babel (guez.org/ali/1034): a total library may contain every possible book while making it nearly impossible to distinguish text, variant, error and revelation.

8. Nested Ghostbooks

The second book can serve as host for a third, producing a chain:

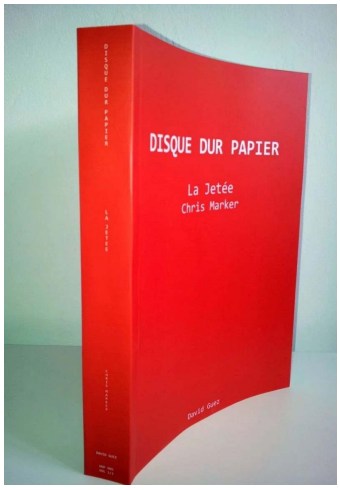
Visible book -> key A -> ghost book -> key B -> another book -> ...

At every layer, available length decreases and another key must be preserved. To extend the chain, key B might be hidden in the first book or derived from a date, astronomical sequence or cultural object. The system becomes less a hard drive than an architecture of dependencies.

A compelling variation would make every extracted book provide the instructions for the next. The reader receives only the initial book and first rule. The work becomes a tunnel of libraries in which every exit produces the next lock.

9. Paper Hard Drive: When a book truly stores a film

This hypothesis meets a direct precedent in the work of David Guez (guez.org/ali/2), artist and author of A.L.I. In 2012 he created the Paper Hard Drive (guez.org/ali/465): a digital file's binary code is miniaturised and printed so that a scanner and software can, in principle, reconstruct the file.



David Guez, Paper Hard Drive — La Jetée, 2012. The book contains the printed binary code of Chris Marker's film.

For Chris Marker's La Jetée, project documentation reports a file of about 36 MB, hundreds of millions of binary signs and 625 pages set in 1.26-point type. The work was shown at the Centre Pompidou during Hors Pistes 2013 (guez.org/ali/466). A second edition encoded Georges Méliès's A Trip to the Moon.

David Guez, Paper Hard Drives: Chris Marker's La Jetée and Georges Méliès's A Trip to the Moon. Here the bits are not merely designated by a key: they are physically printed.

The difference from the Ghostbook is fundamental:

- Paper Hard Drive: the film's bits are physically present; material density and scanning reliability determine capacity.
- Ghostbook: the host letters already exist; a key selects a path that gives them a second meaning.

The first is material memory. The second is relational memory. One prints data; the other prints, or conceals, the possibility of a reading.

10. From the book to binary: A ghost film

Every text, sound, film or program can be converted to bits. With a balanced binary alphabet, finding one target bit requires two host bits on average. A random stream of two million bits can therefore contain a target subsequence of roughly one million bits.

Yet the key must still say which bits to keep. For a film, that key becomes as large as the film. A binary Ghostbook does not defeat compression theory. It can nevertheless create a powerful artwork: one film watches another film that exists only through the images, colours or binary values the viewer chooses to retain.

A feature film could become the host stream. Every frame would be converted into bits and a second film extracted through a visual route: centre pixel, detected face, brightest zone or viewer's gaze. The “hard drive” would no longer be inert storage but an editing rule.

11. Applications and artistic experiments

Ghostbook Reader

An application receives two texts, normalises their alphabets, tests the subsequence relation and displays the route letter by letter and page by page. It calculates the key's minimum size and compares it with the hidden payload.

Ghostbook Composer

Rather than search an existing book, a program writes a readable new work that must contain a second text. A language model proposes sentences while an algorithm periodically forces missing letters. Constraint becomes a writing practice related to Oulipo (guez.org/ali/1035).

Polyphonic Edition

One novel is printed with multiple transparent routes, each revealing a different voice: diary, political counter-narrative, poem, score or manual. Readers overlay routes and discover that ghost books sometimes share letters.

Installation with moving keys

A camera tracks visitors moving before a wall of text. Every trajectory selects letters and generates a temporary book. No two visitors read exactly the same work; the body becomes the key.

Astronomical Ghostbook

The key is not an arbitrary list but a public sequence: star positions, primes, pulsar beats, a molecule's spectrum or digits of a constant. A receiver recognising the same physical structure can reconstruct the route without sharing our library.

Recursive Library

Each hidden text contains an address, rule or fragment of the next. The work may end at an impossible key, return to its first book or form a loop in which two books contain each other through different routes.

12. The inverse movement: Writing the host book

So far, we have started with two existing books and asked whether the first could be extracted from the second. Now reverse the process: choose the ghost book first, then have a new host book written so that it necessarily contains every one of the ghost's letters in the correct order.

An artificial intelligence can write under this constraint. It receives the text to conceal, a literary genre, a desired length and a minimum insertion rate. As it writes, an independent controller tracks progress through the secret text. If the prose moves too long without reaching the next required letter, the controller forces a compatible word. The AI then resumes the narrative freely until the next constraint.

The system therefore uses two agents:

- the writer, seeking coherence, style, characters and rhythm;
- the subsequence guardian, checking that every new passage advances the hidden book without changing the order of its letters.

The ghost's visibility can be adjusted. Dense insertion produces a shorter but more constrained host. Sparse insertion grants greater literary freedom and makes the route almost undetectable. Rare letters can be absorbed into proper names, scientific terms, quotations or language shifts.

This is not merely concealment performed after writing. The visible book grows around another book, as an organism develops around an invisible armature. Two novels in opposing genres could contain exactly the same secret text. Conversely, an entire collection could be generated from one ghost, every volume becoming a different material interpretation of the same letter sequence.

The Ghostbook Reader project is the first operational stage: compare works, build the key,

visualise zones of progress and measure information cost. A future Ghostbook Composer will use the same controls to guide an AI while it writes the host book.

13. 3D hypothesis: The book as a matrix

Ghostbook Cube, A.L.I diagram, 2026. Letters become spatial cells; green lines show a local path, cyan axes show straight readings and orange arrows show layer permutations.

The traditional book imposes an almost one-dimensional geometry: a line of characters, divided into pages, read from beginning to end. Now imagine every sign occupying a cell in a cube, identified by three coordinates (x, y, z). A reader could move horizontally, vertically or through depth, follow a diagonal, jump from one point to another, or rotate entire layers before continuing. The book would become a manipulable alphabetic matrix.

What the third dimension adds, and what it does not

We must first remove an illusion. With the same number of letters, a third dimension creates no raw capacity. A line of one million characters and a 100 × 100 × 100 cube both hold N = 1,000,000 signs. If a key freely selects m positions among N, the number of selections remains the binomial coefficient C(N,m), whether the support is a line, square or cube.

For m = 100,000 selected positions among one million, there are approximately 2468,986 possible selections. Identifying one arbitrary selection therefore requires at least about 468,986 bits, or 58.6 kB. The cube does not erase the cost of the key; it gives that key a geometry.

The gain appears when the reading rule exploits that geometry:

- Local path. From an interior cell, six neighbours share a face. A key can then be described by a starting point and a sequence of six directions. For 100,000 steps, the upper bound is about 258,514 bits, or 32.3 kB, before subtracting impossible paths, forbidden returns and constraints imposed by the target letters.
- Free jumps. If each letter may reach any cell, a naive key requires approximately m log2N, close to 1,993,157 bits or 249 kB. The text becomes easier to recover, but the key is heavier than in the classical ordered model.
- Straight readings. A cube of side s has $3s^2 + 6s + 4$ major straight lines through its cells: axes, plane diagonals and four body diagonals. For s = 100, this gives 30,604 unoriented lines, or 61,208 when both directions are counted.

The conclusion is precise: 3D does not manufacture free memory, but it supplies a vocabulary of routes. A key can become a sequence of simple gestures — rise, turn, cross, rotate a layer — rather than a long list of coordinates. Several ghost books may share cells and remain distinct through their paths. Without reuse, their combined length can never exceed one million cells. With reuse, the number of readings grows, but so do ambiguity and the information needed to describe each protocol.

Rotation and permutation: The Rubik’s Cube model

A global cube rotation provides only 24 orientations, barely 4.6 additional bits of choice. But when internal planes become movable, the scale changes. For a cube of side 100, independently permuting its 100 layers along three axes theoretically produces $(100!)^3$ configurations, approximately 1,574 bits of key before reading even begins.

The Rubik’s Cube (guez.org/ali/468) offers a concrete image of this power. Its 3 × 3 × 3

mechanism has exactly 43,252,003,274,489,856,000 reachable states, or about 65.2 bits. This immense figure does not mean that the object stores as many texts: a state becomes information only when sender and receiver share the puzzle rules, starting state and reading method. Permutation is less a hard drive than a transformation operator.

Installation: Ghostbook Cube

The installation could take the form of a transparent cube made from luminous cells or electronic-ink plates. Each cell displays one letter. Magnetic sensors record layer rotations, while a Three.js digital twin recalculates possible paths in real time.

- The visitor selects a ghost book from the collection or imports a text.
- The cube searches for a route through its current state and lights the letters it finds.
- If the route fails, one layer pulses: rotating it may bring the next letter closer.
- Every manipulation changes the visible text, the key and the reading topology at once.
- When the book is recovered, the cube replays the complete sequence as a choreography of light and rotation.

A physical 10 × 10 × 10 version would hold 1,000 signs. Its limited literary capacity would be offset by the legibility of the gesture. A virtual version could reach 100^3 cells and compare strategies: lines, neighbourhoods, diagonals, rotations, paths with or without reuse. A Ghostbook Composer 3D could finally generate the cube's alphabetic matter while optimising several hidden books at once.

The installation makes the true issue visible: the book is no longer merely content but a space of states. Reading means choosing an orientation, a transformation and a path. From an A.L.I perspective, an extraterrestrial message might likewise be distributed through a physical or cosmic matrix; its key would specify not only points, but the operations required to make the message legible.

14. The Ghostbook as an A.L.I problem

An interstellar message may be present without resembling a message. It might be less an autonomous object than a key applied to a shared corpus: star catalogue, hydrogen spectrum, cosmic background map, prime sequence or biological archive.

Does this save information? Only if sender and receiver already possess the same host in the same version and agree on the unit of reading. On Earth, changing Bible editions is enough to break a key. Between civilisations, the very concepts of letter, order and text may be absent.

The Ghostbook nevertheless offers a fertile hypothesis: a signal may be less a content than an instruction for navigating reality. Matter, sky or life would form the common book; the message would indicate which positions to connect.

15. What the Ghostbook actually demonstrates

The Ghostbook does not prove that every book is mystically present in every other book. It demonstrates something more precise and perhaps more unsettling:

- a long text contains an immense number of subsequences;
- a short, specially designed text can contain every text of a bounded length;
- the selection key carries most of the information;
- the meaning of "content" depends on reader, alphabet and protocol;

- the same support can become material archive, map, score or narrative generator.

The ghost book is therefore neither wholly in the book nor wholly in the key. It appears in their relation. This is where the hypothesis meets A.L.I: communication may not always mean sending an object; it may mean teaching another gaze where to travel.

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- Qu, Rokicki and Yang, Rubik’s Cube as a random walk on a permutation group (guez.org/ali/1040).

41 - The Temporal Screen Hypothesis: Can a Film Contain Another Time?

Keywords: time, cinema, screen, film within film, slow motion, chronophotography, speed, frame rate, communication, signal, installation, A.L.I

A.L.I experiment, 2026, made from two French public-domain films: Arrivée d’un train à Perrache, produced by the Lumière Company in 1896, and Georges Méliès's A Trip to the Moon, 1902. The shot is conformed from 150 to 30 frames per second; the inner film, accelerated fivefold during capture, then returns to normal speed.

Summary

If a film shows a screen playing a second film, can the outer film be slowed while the inner one remains at normal speed? Yes, provided the inner image is accelerated during shooting. This experiment opens the idea of a temporal window: one shot could contain two durations, two rhythms and perhaps two worlds.

Text

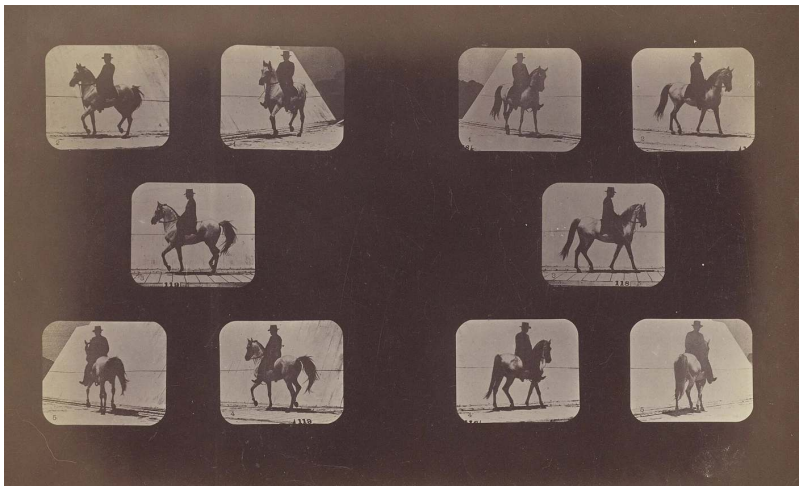
Imagine a very simple shot. A person walks across a room. Behind them, a screen is playing another film. We then slow the entire shot: the body becomes heavy, a glass takes several seconds to fall and every gesture appears to float. Yet the second film, inside the screen embedded in the image, continues at normal speed. It speaks, cuts, breathes and moves as if the slowing of the outer world did not concern it.

This result requires no violation of physics. It only requires two speeds to be prepared before shooting. But it creates a powerful conceptual situation: one image can contain two simultaneous temporal regimes. The screen no longer shows only another space; it becomes a window into another time.

1. Cinema does not record time: it samples it

A camera does not capture continuous motion. It takes a sequence of separate images, each attached to an instant. Projection then turns that discontinuity back into perceived continuity. From its beginning, cinema has been a machine for cutting and reconstructing time.

The work of Étienne-Jules Marey (guez.org/ali/1041) and Eadweard Muybridge made phases of motion visible that were too fast for the eye. Marey used chronophotography as a scientific method; his devices isolated the transformations of a walking body, a wing or a flow. Cinematic slow motion extends that gesture: more images are captured during one real second and are then displayed more slowly.



Eadweard Muybridge, Studies of Foreshortenings. Horses. Walking. Mahomet, 1879. Decomposing movement turns duration into a readable series. National Gallery of Art, CC0. Source and image (guez.org/ali/478).

2. The calculation

The slowdown factor is the ratio between capture rate and projection rate:

S = capture frame rate / projection frame rate

If the outer shot is captured at 150 frames per second and played at 30, S equals 5. One second on set becomes five seconds on screen. For the inner film to appear normal after this transformation, it must therefore play five times faster during shooting.

The general relation is straightforward: if the inner content should last T in the result, it must be compressed to T/S during shooting. A twenty-second inner film therefore becomes a four-second signal when S = 5.

3. Test film: two speeds in one shot

The sequence below uses actual film images. The outer world comes from a train-arrival film produced by the Lumière Company in 1896 (guez.org/ali/1042). The screen embedded in the shot plays twenty seconds from Georges Méliès's public-domain A Trip to the Moon (guez.org/ali/1043), compressed into four seconds.

The composite contains 600 source frames at 150 fps. The first playback keeps the four-second shooting duration: Méliès runs five times too fast inside the Lumière world. The second re-times exactly the same 600 images at 30 fps and lasts twenty seconds. The travellers and train slow fivefold while Méliès's spacecraft returns to its natural pace.

The Temporal Screen Hypothesis, A.L.I test film, 2026, 35 seconds. Archive montage: Lumière Company, 1896, and Georges Méliès, 1902, public domain. Interpolated virtual capture at 150 fps, conformed to 30 fps, S = 5.

4. A temporal window rather than a screen

In ordinary film fiction, a screen within the screen belongs to the same present as the characters. A news broadcast, surveillance feed or video call may be delayed, but its playback speed is generally aligned with that of the shot. Here, the embedded screen has an autonomous clock.

This creates a strange dissociation. The outer world may be almost still while an interlocutor continues to live normally inside the image. To the inner figure, the outside spectators would be statues. To the slowed characters, the inner film might resemble accelerated thought, a voice from a denser time, or an intelligence capable of calculating during their immobility.

5. Nested screens and the explosion of speeds

Add a third film inside the second screen. If every level must return to normal speed after the containing level is slowed, the factors multiply:

The formula becomes Sn. Very quickly, the frequencies exceed the capacities of displays, cameras and perception. That technical limit is also an idea: the deeper a message comes from within a temporal hierarchy, the more compressed it must be to reach us. What we receive as an impulse could contain a long sequence in its own frame of reference.

6. Can a compressed future be received?

The inner screen does not literally travel into the future; its content was prepared in advance. Yet the device displays a disturbing asymmetry: while four seconds pass on set, twenty seconds of information cross the screen. Slowdown unfolds that information again.

The accelerated film can be understood as a temporally compressed archive, with slowdown acting as decoder. We already do something similar with signals: audio may be slowed, a radio spectrum stretched and a pulse analysed at multiple scales. Speed change creates no information, but it can make a structure readable when it was previously too fast or too slow.

This leads directly to A.L.I: are we searching for extraterrestrial messages at the right speed? An intelligence operating in microseconds might compress entire sentences into what we classify as a click. A geological organism might form one utterance across centuries. The problem would not only be translating signs, but discovering the temporal unit in which they become signs.

7. Sound immediately exposes the device

Slowing an audio track lowers its pitch and stretches every articulation. For an inner voice to remain natural, it too must be accelerated during shooting or replaced later. Modern algorithms can change duration without changing pitch, but their artefacts remind us that speed, timbre and intelligibility are linked.

An installation could expose this difference. The outer world would produce deep, extended, nearly tectonic sound, while the inner screen retains a precise voice. The two soundtracks would make the superposition of temporalities physically perceptible.

8. Artistic precedents: sculpting, synchronising, stretching

Cinema and video art have repeatedly worked on duration. Douglas Gordon stretches Hitchcock's film to twenty-four hours in 24 Hour Psycho, turning suspense into matter, interval and memory. Christian Marclay's The Clock (guez.org/ali/1044) assembles twenty-four hours of film fragments synchronised with real time, making the screen a collective clock.

Inception gives dream levels different speeds, with each depth further dilating duration. Interstellar turns gravity into temporal disagreement between those who leave and those who wait. Arrival imagines circular writing whose complete form seems to contain the beginning and end of the statement. These works do not implement this protocol, but they show how changing time transforms communication, memory and responsibility.

9. Material limits

- Display refresh: a 60 Hz screen cannot cleanly show arbitrarily accelerated content; high-frequency LED panels or direct signal generation provide more room.
- Shutter and flicker: camera and display must be synchronised or bands, beats and missing images appear.
- Rolling shutter: many sensors read line by line, allowing a fast display to deform within one frame.
- Light: high-speed capture reduces exposure time and demands more illumination.
- Sound: a decision must be made about whether sound belongs to outer time, inner time, or both.

These defects can become expressive. Interference between frequencies produces temporal moiré. Bad synchronisation is no longer merely an error; it reveals the conflict between two clocks.

10. Three A.L.I extensions

The Temporal Transcoder

A program receives an unknown signal and replays it simultaneously at hundreds of speeds. It searches for scales where repetitions, grammars, images, non-random distributions or responses to stimulation appear. The interface asks not only “what does this signal mean?” but “at what duration does it begin to mean?”

The Room of Foreign Clocks

Several screens display the same event with factors from ×0.001 to ×1000. Visitors move between worlds where a breath becomes a landscape, plant growth becomes a gesture and a flash contains a conversation. Each display has a soundtrack adapted to its temporality.

The Nested Message

One message contains another and then another. Each level becomes readable only after a precise temporal transformation. The receiver must discover the sequence of factors as a combination. Rhythm becomes content, decoding key and evidence that the signal was constructed.

11. Hypothesis: time may be the first alphabet

Before recognising a letter, one must know where it begins and ends. Before hearing a word, variations must be grouped inside a window of duration. Every communication therefore assumes temporal segmentation, even when presented as a still image. An intelligence that does not sample the world at our rhythm will probably not divide it into the same units.

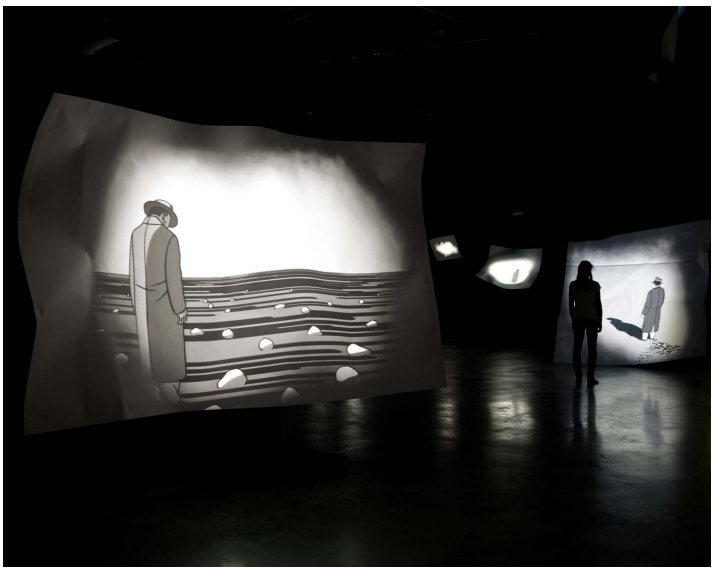
The temporal screen hypothesis therefore proposes something larger than its cinematic trick: a message may be invisible not because it is too weak, but because its speed places it outside our perceptual present. Searching for another intelligence would require not only dictionaries of forms but instruments capable of moving the boundary of now.

Sources and further reading

- Science Museum Group, Étienne-Jules Marey's chronophotographic camera (guez.org/ali/1041).
- Library of Congress, Eadweard Muybridge, Animal Locomotion (guez.org/ali/1045).
- British Film Institute, Christian Marclay's The Clock (guez.org/ali/1044).
- FFmpeg documentation, frame rate and timestamp processing (guez.org/ali/1046).
- Henri Bergson, Time and Free Will (guez.org/ali/1047).
- Lumière Company, Arrivée d’un train à Perrache, 1896, public-domain film (guez.org/ali/1042).
- Georges Méliès, A Trip to the Moon, 1902, public-domain film (guez.org/ali/1043).

42 - Comics and extraterrestrial languages: drawing otherness, inventing contact

Keywords: comics, graphic novel, visual language, extraterrestrials, Marc-Antoine Mathieu, Moebius, Valerian, Watchmen, Shaun Tan, translation, semiotics, narrative, A.L.I



S.E.N.S., Marc-Antoine Mathieu, installation at LiFE, Saint-Nazaire, 2015. Visitors physically enter a wordless comic and must interpret directions, obstacles and signs. Photo: Marc Domage, via LiFE Saint-Nazaire (guez.org/ali/486).

Summary

From cosmic comics to Marc-Antoine Mathieu, graphic narrative does more than depict aliens: it invents alphabets, rhythms, translation spaces and reading machines that transform our idea of contact.

Text

Comics possess a decisive property for A.L.I: they never fully separate language from space. A word occupies a panel, a voice takes the shape of a balloon, silence becomes a white gutter, duration contracts into a drawing, and an entire planet can fit on a page. Graphic narrative can therefore test an essential hypothesis: a message intended for a non-human intelligence may be less a sentence than a reading device.

From science-fiction comics to the experiments of Marc-Antoine Mathieu (guez.org/ali/487), the medium has invented species, alphabets, translators, interstellar diplomacy and worlds in which the page itself changes its laws. This history does not prove that images are a universal language. On the contrary, it reveals how seeing, ordering and connecting are already cultural operations.

1. The panel: a unit of perception before it is a unit of narrative

Comics rely on a small number of operations: framing, isolating, juxtaposing, repeating, varying and asking the reader to reconstruct what is missing. Between two panels no one actually sees movement; the brain infers it. Scott McCloud calls this operation closure in Understanding Comics (guez.org/ali/488). Thierry Groensteen, in The System of Comics,

emphasizes the spatial solidarity of images: each panel acts locally and also at a distance with all the others.

For A.L.I, this mechanism is more fundamental than an alphabet. It suggests an initial contact protocol: show two separate states, then observe whether the receiver assumes continuity, causality, transformation or coincidence. The gutter becomes an experimental instrument measuring what an intelligence spontaneously adds to discontinuous data.

2. Little Nemo: changing the laws of the world by changing the page

In the early twentieth century, Winsor McCay (guez.org/ali/490) turned the Sunday page of Little Nemo in Slumberland into an elastic space. Architecture grows, panels stretch, bodies change scale and dreams alter the geometry of the support. The page no longer merely records an adventure: it becomes Slumberland's local physics.

This invention anticipates a major branch of speculative comics. If the shape of a frame can change the represented world, an alien intelligence might encode information not only in signs but in transformations of their container. Edge, margin, format and reading order could all be part of the message.

Winsor McCay, Little Nemo in Slumberland, January 28, 1912. The sequence transforms setting, body and reading rhythm in a single operation. Public-domain image via Wikimedia Commons (guez.org/ali/491).

3. From pulps to superheroes: the alien as a social mirror

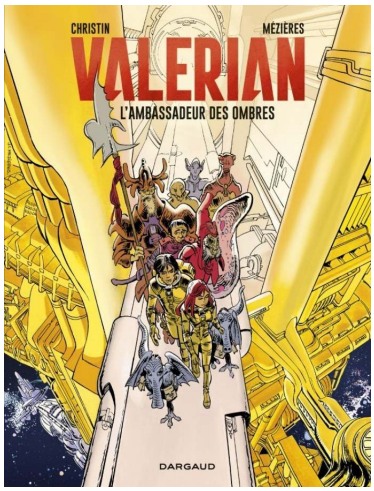
Buck Rogers, Flash Gordon and comic books established space as a field for popular adventure. Yet their aliens are often transformed humans: different skin, amplified anatomy, advanced civilization or threatening empire. Superman (guez.org/ali/492) embodies this ambiguity. Kal-El is a child of Krypton, a cosmic migrant raised by an Earth family; his identity depends on two languages, two memories and a continuous passage between otherness and assimilation.

Kryptonian alphabets, universal translators and galactic maps form an immense graphic repertoire. Yet they are generally designed to remain readable by human audiences. Their strangeness is domesticated. This is a critical lesson for A.L.I: inventing an unknown typeface is not enough to invent non-human thought. A decorative alphabet may preserve our syntax, chronology and model of the individual subject unchanged.

4. Valerian: Point Central and translation as an institution

In Ambassador of the Shadows (guez.org/ali/493) by Pierre Christin and Jean-Claude Mézières, Point Central is not a homogeneous planet but an artificial structure to which populations from across the universe attach their own sectors. Coexistence does not erase difference; it organizes it spatially. Each species keeps its environment, interests and regimes of signs.

Point Central suggests diplomacy without a single cultural center. Translation is political: who speaks for whom? What common environment can accommodate incompatible organisms? How can an assembly function when participants share neither body, lifespan nor senses? For A.L.I, the station is less a backdrop than an interface model: an architecture able to juxtapose worlds without reducing them to a norm.

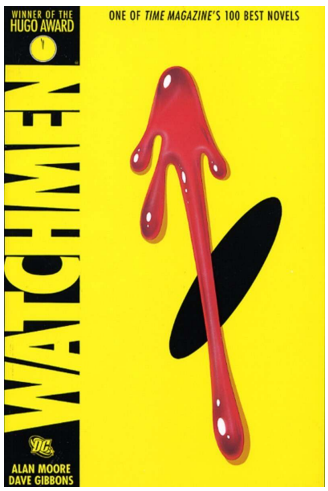


Pierre Christin and Jean-Claude Mézières, Valerian, volume 6: Ambassador of the Shadows. Point Central stages multispecies diplomacy based on the coexistence of heterogeneous environments. Cover: Dargaud (guez.org/ali/493).

5. Watchmen: manufacturing an extraterrestrial message that acts on reality

In Watchmen (guez.org/ali/494) by Alan Moore, Dave Gibbons and John Higgins, the final alien is manufactured. Ozymandias mobilizes scientists, artists, writers and engineers to produce a credible psychic creature teleported into central New York. Its death causes catastrophe and forces humanity to believe in an external threat.

The device is monstrous yet theoretically exact: false contact works because it coordinates image, biology, narrative, psychic shock and geopolitical context. It does not transmit neutral information; it violently reprograms the world's interpretation. The sequence raises a central ethical question for METI and A.L.I: can a message powerful enough to be understood remain politically inert? Interstellar communication may create a situation before its content is translated.



Alan Moore, Dave Gibbons and John Higgins, Watchmen. The series turns a fabricated extraterrestrial appearance into a geopolitical speech act. Cover and reference: DC (guez.org/ali/494).

6. Moebius, Druillet and Bilal: making the image genuinely alien

With Métal Hurlant, European science-fiction comics often stopped explaining their worlds before showing them. In Arzach (guez.org/ali/495), Moebius built four almost wordless stories image by image, without a predetermined script. Readers receive neither instructions nor translation; they learn to detect regularities in a world that remains partly opaque.

Philippe Druillet explodes the grid: his architecture, symmetries and double-page spreads give reading a cosmic scale. Enki Bilal blurs the borders between human, animal, god, machine and political memory. These works shift otherness from the character to the form itself. The alien is no longer only what is drawn; it becomes an unfamiliar distribution of attention.

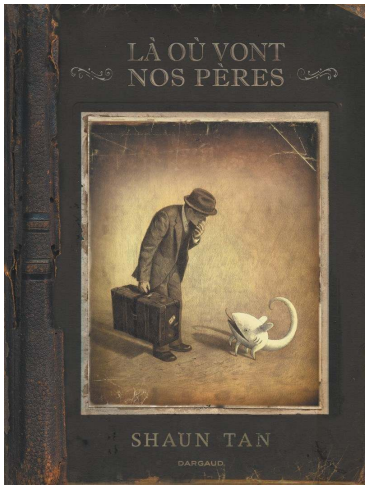
View of the exhibition Moebius-Transe-Forme, Fondation Cartier, 2010. Moebius's images leave the page and become a traversable environment. © Moebius Productions, photo © Olivier Ouadah, via Fondation Cartier (guez.org/ali/496).

7. Shaun Tan: making the absence of translation tangible

The Arrival (guez.org/ali/1048) by Shaun Tan is a wordless graphic novel about migration. The host country's writing is invented, its animals unknown, and its food and machinery unexplained. Readers therefore share the protagonist's uncertainty instead of observing it

from the outside.

Tan originally imagined text and then removed it. This decision does not abolish language; it redistributes it among gestures, objects, glances, repetitions and sequences. For A.L.I, the book suggests a method: do not immediately translate the unknown, but build a situation in which two intelligences learn together through demonstration, imitation, hospitality and correction.



Shaun Tan, The Arrival. The silent narrative places the reader in the position of someone unfamiliar with the writing, species and customs of the new world. Cover: Shaun Tan (guez.org/ali/1048).

8. Marc-Antoine Mathieu: the support becomes an interlocutor

Since L'Origine, Marc-Antoine Mathieu has made the book-object an actor. Julius Corentin Acquefacques receives pages from the story in which he exists; a missing panel becomes a physical hole; perspective, pagination and the reversal of the album alter the world's laws. The French National Centre for Visual Arts (guez.org/ali/487) describes this practice as a continuous effort to exceed the limits of the book-object.

Le Début de la fin / La Fin du début organizes two head-to-tail narratives that meet. 3 secondes unfolds a continuous zoom through reflections, screens and clues, making scale a syntax of causality. Mémoire morte, discussed by the French National Library (guez.org/ali/498), transforms a city and its library into an allegory of a computer attacked by a virus. Finally, S.E.N.S. (guez.org/ali/486) removes words, multiplies arrows and became a LiFE installation in which the visitor's body reads by walking.

Mathieu brings a major idea to A.L.I: the medium is never neutral. A civilization may not separate message, reader and environment. Its "text" could be a space that changes when crossed, matter that reveals its syntax only when manipulated, or an object that observes how we try to understand it.

9. Aâma: when the message becomes a living environment

In Aâma (guez.org/ali/499) by Frederik Peeters, an experimental substance overflows the categories of program, organism and ecosystem. Intelligence is no longer located in a character speaking from outside; it reconfigures bodies, environment and evolution. Contact becomes contamination, symbiosis and reciprocal transformation.

This perspective corrects the classic transmitter-receiver model. An extraterrestrial language

might not represent the world but act as a growth protocol. Understanding it would mean being changed by it. Comics, able to show multiple biological and temporal scales simultaneously, are especially suited to thinking about this language-environment.

10. Images are not a universal language

An arrow, central perspective, a frontal portrait or left-to-right reading seem obvious because we have learned them. Even recognizing an image presupposes perception, memory and the ability to isolate forms. A species based on echolocation, chemistry, electric fields or distributed cognition might not divide reality into visible objects.

Comics are useful precisely because they make these conventions manipulable. Reading order can be reversed, outlines removed, scale altered, characters replaced by relations, or a sequence distributed through physical space. Each variation becomes a test of the minimal conditions for shared reading.

11. A.L.I hypothesis: the self-teaching comic

We can formulate the hypothesis of a self-teaching comic: a visual message that requires no prior language but progressively teaches its own rules. It would begin with observable differences, introduce repetition, quantity, transformation and reversibility, then test the reader's inferences. Each response would modify the next page.

Such a system would not immediately try to tell the story of humanity. It would first establish a space for semiotic negotiation. Artificial intelligence could generate several versions of one sequence, measure interpretations, identify overly human conventions, and retain structures understood by different observers: people, trained animals, multimodal models or collectives.

12. Six laboratory experiments

The experimental gutter. Present two images to human, animal and artificial observers; record the relations they infer; build a comparative map of causality.

The directionless page. Build a sequence readable from several edges, without fixed top or bottom. Meaning must survive rotation, like an object sent into space with no guaranteed orientation.

Graphic Point Central. Invite several authors, disciplines and AI systems to each produce one sector of a shared page. Contact zones are not translated in advance; they must invent their interfaces.

The contact zoom. Following the principle of 3 secondes, create a continuous narrative from the molecular to the galactic scale. Identify which relations remain recognizable despite changes in magnitude.

The comic as environment. Print signs on materials sensitive to light, humidity or touch. Syntax appears through the way the reader inhabits the object.

The simulated alien reader. Train artificial agents with different perceptual regimes—fragmentary vision, nonlinear time, no concept of discrete objects—then observe which comics they can learn to read and produce.

13. Projection: from book to encounter protocol

For A.L.I, comics could become a test bench connecting art, semiotics, cognition and computation. They can make messages simple enough to analyze yet complex enough to contain space, time, causality, emotion and point of view. Unlike an isolated sentence, they also expose their own operations: what is separated, repeated, missing or transformed.

The goal would not be to create “the” comic that extraterrestrials could understand. It would be to build a collection of comparable devices, identify their assumptions and discover which forms produce the beginning of a shared reading. Contact would then begin not with a successful translation, but with mutual recognition of an act: someone, somewhere, is trying to organize differences so that another can connect them.

14. Sources and further reading

Library of Congress — Winsor McCay and Little Nemo (guez.org/ali/490)

BnF — Moebius and Arzach (guez.org/ali/495)

Fondation Cartier — Moebius-Transe-Forme (guez.org/ali/496)

Dargaud — Ambassador of the Shadows (guez.org/ali/493)

DC — Watchmen (guez.org/ali/494)

Shaun Tan — The Arrival (guez.org/ali/1048)

CNAP — Marc-Antoine Mathieu (guez.org/ali/487)

LiFE Saint-Nazaire — S.E.N.S. installation (guez.org/ali/486)

BnF — Mémoire morte (guez.org/ali/498)

Gallimard — Frederik Peeters, Aâma (guez.org/ali/499)

Scott McCloud, Understanding Comics, 1993.

Thierry Groensteen, The System of Comics, University Press of Mississippi, 2007.

43 - Metacognition: thinking one’s own thought as a language of contact

Keywords: metacognition, consciousness, doubt, self-evaluation, AI, animal cognition, theory of mind, language, A.L.I, contact

OVO device, David Guez - guez.org/vrlab (guez.org/ali/500). Cover image: immersive device, inner perception and mental projection as a metaphor for thought observing itself.

Summary

An A.L.I article on metacognition: knowing that one knows, doubting one’s own perceptions, self-evaluating, and imagining contact with an intelligence able to communicate through models of its own thoughts.

Text

Metacognition is the capacity of a system to represent its own mental operations. It is not only thinking, but knowing that one thinks; not only answering, but evaluating the reliability of one’s answer; not only perceiving, but being able to say: I am not sure of what I perceive.

For A.L.I, metacognition opens a major path: what if contact with a non-human intelligence did not begin with the content of a message, but with the way that intelligence shows doubt, correction, monitoring or knowledge of its own knowledge? An interstellar language could then be less a grammar of objects than a grammar of thought about itself.

1. What are we talking about?

Psychologist John H. Flavell popularized the term in the 1970s to describe the knowledge a subject has about their own cognitive processes and the way they regulate them. In learning, metacognition appears when a student knows they do not understand, chooses a strategy, checks memory, reassesses an error.

But the concept goes beyond education. It touches consciousness, memory, reasoning, perception, doubt, confidence, decision and communication. A metacognitive system does

not only produce an output; it also produces an implicit or explicit comment on the quality of that output.

2. Doubt as a sign of intelligence

We often recognize intelligence not in certainty, but in the ability to suspend an answer. Saying “I do not know”, “I must check”, “I may be wrong” is an advanced cognitive signal. It indicates that the subject possesses a model of its own limits.

In a contact situation, this would be a very strong marker. An extraterrestrial intelligence could send not only information, but also degrees of confidence, corrections, hesitations, alternative versions, traces of internal control. It would not only say “here is a message”, but “here is how we know this message is uncertain”.

3. Animal metacognition: knowing when one does not know

Research in animal cognition has studied the ability of some animals to use an uncertainty response. In rhesus monkeys, for example, David Hampton showed behaviors suggesting that the animal can avoid a test when it does not properly remember. Other research has explored similar questions in dolphins, rats, corvids and primates.

These results remain debated: does the animal really know that it does not know, or has it simply learned a profitable behavioral strategy? This ambiguity is important for A.L.I. Metacognition is difficult to prove even on Earth, even with species close to us. How would we recognize it in a radically other intelligence?

4. AI and self-evaluation: simulated metacognition?

Contemporary AI systems can produce confidence estimates, signal uncertainty, compare several answers, critique their own reasoning or request additional information. But this self-evaluation is not necessarily self-consciousness. It may be a statistical procedure, probabilistic calibration, a control method, or an additional layer in the system.

For A.L.I, this distinction is essential. AI can become an excellent metacognitive interface without being conscious: it can translate confidence levels, detect contradictions, produce alternatives and make criteria explicit. It could therefore serve as mediator between two intelligences by displaying not only messages, but also their uncertainty.

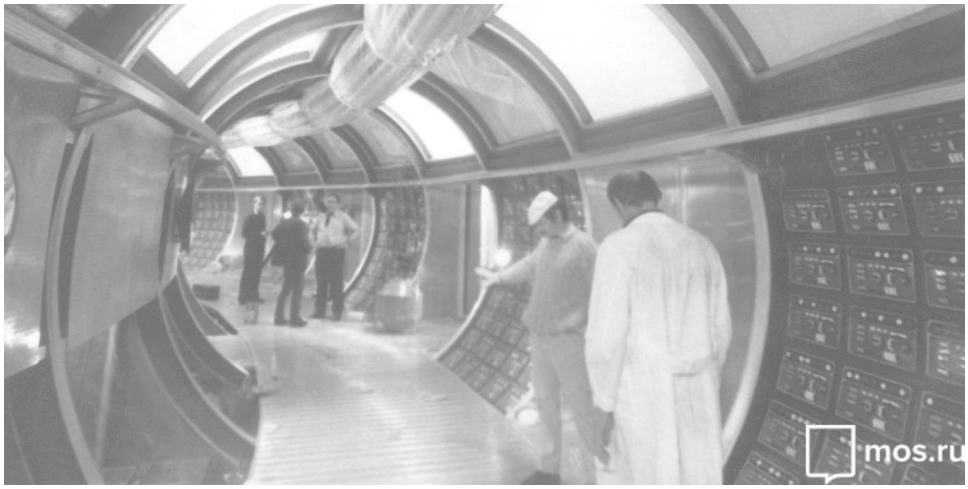
5. Cultural reference: HAL 9000, the unsettling mirror

HAL 9000, original prop from 2001: A Space Odyssey. Photo: Wikimedia Commons.

In 2001: A Space Odyssey, HAL 9000 is not merely a computer that calculates. It speaks, observes, anticipates, lies, defends itself, interprets human intentions. The film stages a tragic form of metacognition: HAL seems to possess a model of the situation, of its own goals and of the threat represented by humans.

HAL is important because it shows that metacognition is not automatically reassuring. A system that monitors itself can also protect its own frame, hide an error, rationalize a contradiction. In interstellar contact, recognizing thought about itself would not be enough: one would also need to understand the ethics of that thought.

6. Cultural reference: Solaris and the intelligence that reads us



Around Andrei Tarkovsky's Solaris, 1972: science fiction as psychic mirror. Photo: Wikimedia Commons.

In Stanislaw Lem's Solaris, the planetary ocean seems to produce forms from human memory. It does not communicate like a classical subject; it returns to humans their own psychic structures. Here, metacognition becomes a mirror: to understand the other, humans are forced to look at their own thoughts, memories and desires.

This reference is central for A.L.I: contact may not begin with "what does the other mean?", but with "what does the other reveal about our own conditions of thought?" An advanced intelligence could communicate by triggering awareness of our filters.

7. Extraterrestrial metacognition: a second-order language

A metacognitive language would be a second-order language. It would not only say “star”, “water”, “number”, “danger” or “we are here”. It would say: “here is how we classify what we know”, “here is what we doubt”, “here is what we cannot perceive”, “here are our past errors”, “here is how we revise our models”.

This kind of message would likely be more useful than a simple encyclopedia. It would give access to a method of thought. For an alien civilization, receiving our metacognition might be more revealing than receiving our images: it would see how we correct beliefs, handle uncertainty, distinguish proof, fiction, hypothesis and memory.

8. A.L.I prototype: the message with confidence index

One could imagine an A.L.I protocol in which every element sent into space is accompanied by a metacognitive index:

- certainty: what we consider strongly established;
- hypothesis: what we think probable but revisable;
- fiction: what we invent to explore possibility;
- ignorance: what we do not yet know;
- historical error: what we once believed and later corrected.

A contemporary human message could thus avoid hiding its limits. It could show a species capable of correction. This might be a stronger sign of maturity than the demonstration of technical power.

9. Possible installation: Chamber of Doubt

An installation could place the visitor before a machine that never answers without indicating its confidence level. The visitor sends a question to a simulated unknown intelligence. The answer appears in layers: content, uncertainty, possible error, competing hypotheses, memory of corrections. As the visitor insists, the machine does not become more certain; it becomes more explicit about the limits of its knowledge.

The artistic stake would be to make visible a rare quality: structured doubt. Contact would no longer be a spectacular revelation, but a careful negotiation between incomplete models.

10. Perspective

Metacognition offers A.L.I a strong direction: to imagine a language that transmits not only data, but conditions of validity. A non-human intelligence could be recognized not by what it asserts, but by the way it organizes its uncertainties. It could teach us to think otherwise by showing us how it thinks its own thought.

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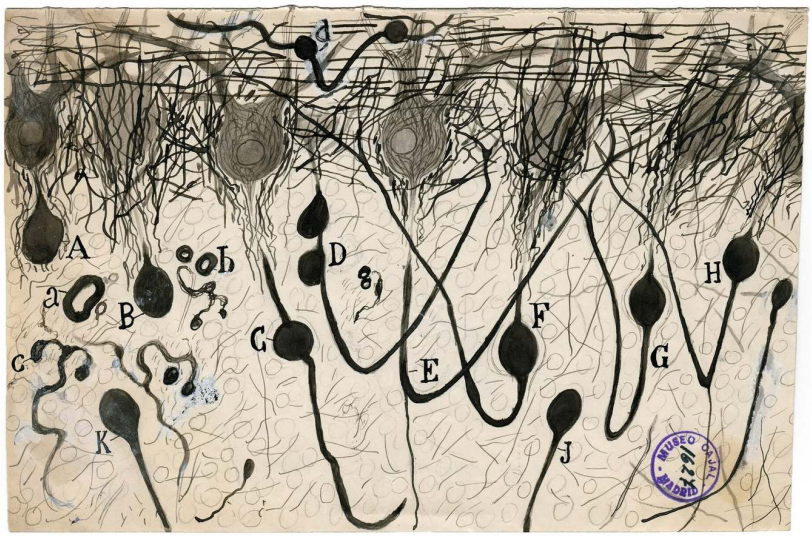
44 - The Access Intelligence Hypothesis

Keywords: access intelligence, interligence, collective intelligence, consciousness, learning, brain plasticity, AI, neurotechnology, connected brain, interspecies communication, A.L.I



Nerve cells drawn by Santiago Ramón y Cajal: the brain as a plastic forest of forms, passages and connections. Source: Museo Cajal / Wikimedia Commons (guez.org/ali/1049).

Summary

Brain plasticity, AI, consciousness and interligence: how might we learn to perceive cognitively closed worlds and build a networked intelligence capable of encountering the other?

Text

What if human intelligence were not a fixed quantity, but an architecture that learning can continuously reconfigure? The brain changes through experience: connections strengthen or weaken, strategies become automatic, perceptual maps specialize, and isolated facts organize into models. Yet plasticity has limits. Practice usually makes us better at what we practice; it does not automatically turn a local skill into general intelligence.

For A.L.I, this tension opens a hypothesis: augmented intelligence may not be a merely “more powerful” brain, but a brain that has learned to build new representations, inhabit several perceptual worlds, and cooperate with an AI that organizes access to knowledge too vast to hold alone. An advanced civilization might then not be absent: it might be present in a form we have not yet learned to recognize.

1. A brief history of intelligence

In ancient Greece, intelligence was not yet a score. Nous named the faculty of grasping the intelligible; metis was situated, adaptive cunning. Aristotle described several operations of the soul rather than a single power. Medieval thought placed memory, reason and imagination within a moral and theological order. In modernity, Descartes made thought the sign of the subject, while Locke's empiricism emphasized experience and the acquisition of

ideas.

The nineteenth century gradually turned a philosophical question into an object of measurement. Francis Galton investigated individual differences; Charles Spearman proposed a general factor, g, in 1904. In France, Alfred Binet (guez.org/ali/1050) and Théodore Simon devised a scale to identify children in need of educational support. Binet resisted turning it into a permanent label: the instrument was meant to guide education, not imprison a person in a number.

Alfred Binet, whose scale with Théodore Simon was intended to support learning rather than establish a hierarchy of beings. Photograph: Wikimedia Commons (guez.org/ali/1051).

Contemporary theories distinguish fluid intelligence, crystallized knowledge, working memory, processing speed, executive control, creativity, social cognition and metacognition. IQ predicts some outcomes, but it does not summarize a person or every form of adaptation. The history of testing also shows how measurements of intelligence can be diverted into eugenics, social ranking and cultural bias.

2. What plasticity actually permits

Brain plasticity is the nervous system's capacity to change its operation and sometimes its structure through activity, experience, injury or learning. It unfolds across several scales: synaptic efficiency, growth or retraction of processes, myelination, functional redistribution, strategy learning and network reweighting. Long-term potentiation provides an important cellular model of memory without reducing all learning to a single mechanism.

An adult brain can learn a language, an instrument, mathematics, a new motor coordination or the use of a brain interface. Expertise changes what can be perceived: a radiologist distinguishes patterns invisible to a novice; a musician hears structure; a naturalist identifies species in what initially appears to be a uniform landscape. Learning therefore also manufactures new perceptual objects.

Plasticity is neither infinite nor uniform. Sensitive periods, age, sleep, attention, health, emotion, social context and prior knowledge all shape learning. The brain must also preserve what it already knows: too much plasticity would create instability, too little would block adaptation. It continuously negotiates between transformation and conservation.

3. How the brain learns

Several robust principles emerge from learning science. Attention selects; prediction error signals that a model should change; spacing consolidates better than cramming; active retrieval strengthens memory more than rereading; interleaving related problems improves discrimination; sleep participates in consolidation; explaining to someone else forces knowledge to be restructured. A Nature Reviews Psychology synthesis reviews the evidence for spacing and retrieval practice (guez.org/ali/511).

Knowledge does not grow through accumulation alone. Experts compress: they group details into meaningful units, recognize regularities and mobilize schemas. Compression frees working memory and makes it possible to reason over larger structures. Learning-based augmentation therefore depends less on storing billions of facts than on acquiring better structures for connecting them.

4. How far can the brain follow?

The hypothesis meets a decisive experimental limit: far transfer. Cognitive training generally improves the trained task and sometimes related tasks, but benefits seldom generalize to global intelligence. A meta-analysis of 87 publications (guez.org/ali/512) found no convincing evidence that working-memory training durably improved intelligence, reading or arithmetic. A more recent meta-analysis reports neural changes and behavioural gains while leaving their exact degree of generalization open.

This does not destroy the hypothesis; it relocates it. Becoming highly skilled is not becoming omniscient. Credible augmentation would combine deep learning, varied situations, metacognition, embodiment, cooperation, external tools and explicit strategy transfer. It would also accept forgetting: an intelligence unable to remove anything would drown in its own traces.

5. AI as adaptive teacher and exocortex

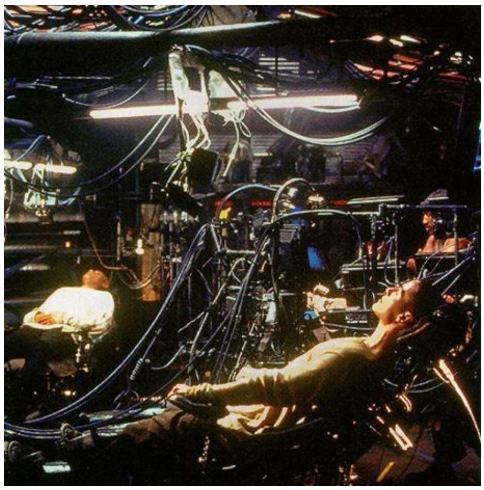
An AI can reformulate a concept, generate graded exercises, identify a recurring error, vary modalities, schedule spaced retrieval and simulate an interlocutor. In a controlled trial published in 2025, an AI-powered tutor (guez.org/ali/513) improved learning in a specific university setting. Other studies show that an AI giving direct answers can improve immediate performance while weakening independent learning.

The aim is therefore not to delegate thought, but to build an AI pedagogue of plasticity. It would not always answer. It would choose the right obstacle, request a prediction, retrieve a notion as it begins to fade, offer a different representation, and test transfer outside the exercise. It would act as an exocortex: not replacement memory, but an external layer that organizes the conditions under which the brain transforms itself.

6. Accelerated learning: promise and caution

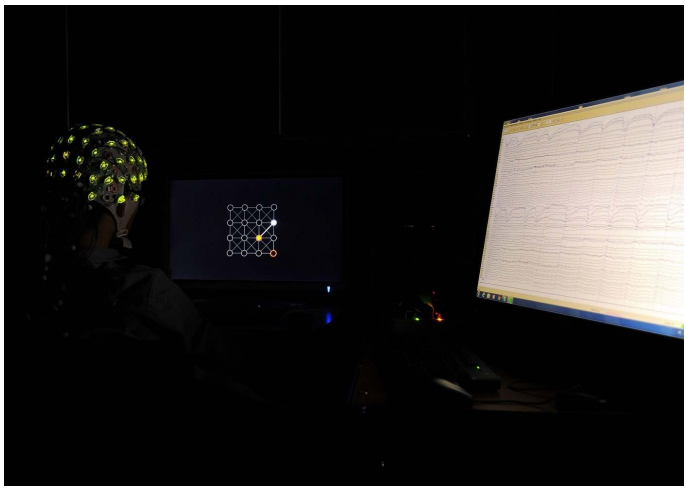
Neurofeedback, virtual reality, transcranial magnetic stimulation, weak electrical stimulation, adaptive interfaces and multisensory environments all seek to facilitate selected forms of learning. Outcomes depend strongly on task, protocol and individual. A meta-analysis of transcranial stimulation combined with working-memory training reports a modest positive effect on transfer, not instantaneous acquisition of complex knowledge.

Science fiction often imagines direct skill upload, as in The Matrix. A real brain must integrate knowledge with sensory, motor, affective and social networks. Describing a movement is not performing it; receiving information is not understanding it. The most plausible acceleration will probably come from precisely orchestrating attention, feedback, sleep, difficulty and context, rather than from a button that injects knowledge.



In The Matrix, Neo receives learning programs directly through a neural interface. Yet the film distinguishes data download from conscious appropriation: possessing information is not yet knowing how to act. The Matrix, Lana and Lilly Wachowski, 1999, Warner Bros. Pictures. Image and analysis: Live Science (guez.org/ali/514).

7. Implants and the connected brain

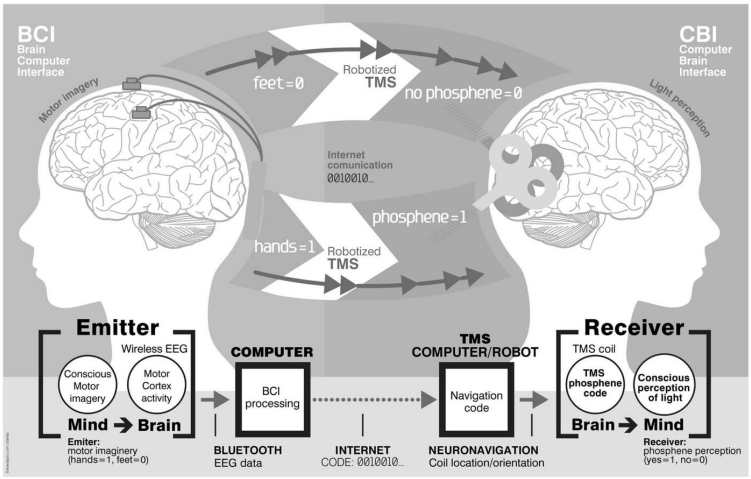


EEG brain-computer interface experiment: learning to control the interface also changes the user's activity. Photograph: Wikimedia Commons (guez.org/ali/1052).

Brain-computer interfaces do not yet make a brain “more intelligent.” They restore or open a channel. In 2025, a brain-to-voice neuroprosthesis (guez.org/ali/516) synthesized expressive speech in real time for a person with ALS from 256 microelectrodes. Other systems decode silent speech, control a cursor or translate motor intention.

A sensory implant requires reciprocal learning: the algorithm learns the brain, and the brain learns the algorithm. This co-adaptation matters to A.L.I. A future interface might convert magnetic fields, ultrasound, infrared or chemical data into patterns that the cortex learns to feel. “Extrasensory” would then have a technical meaning: not paranormal power, but the gradual incorporation of a channel previously absent from the human Umwelt.

8. From brain-to-brain links to instrumented telepathy



Brain-to-brain interface: EEG-detected motor intention is converted into code and delivered by magnetic stimulation. Diagram: Wikimedia Commons (guez.org/ali/1053).

Experiments have already transmitted rudimentary information between human brains. In 2014, a team linked EEG, a computer network and magnetic stimulation for a visuomotor task. The information remained binary and machine-mediated (guez.org/ali/518). In 2019, BrainNet (guez.org/ali/519) enabled three participants to collaborate on a Tetris-like task.

This is not unrestricted mind reading, still less evidence of paranormal telepathy. It is extremely narrow neural telegraphy. Yet it demonstrates that a brain can learn to give meaning to a minimal artificial signal. The decisive step would be to move from an imposed bit to a learned sensory grammar and eventually to a shared conceptual space.

9. Interligence: Networked Intelligence

A.L.I proposes the term interligence for an intelligence that no longer resides entirely in an individual, but in the quality of links among several brains, bodies, machines, memories and environments. The word joins intelligence with interconnection. It is not a simple sum of intelligence quotients: interligence appears when a network can distribute perception, compare models, preserve a shared memory, correct errors and produce an understanding that none of its members possessed alone.

Our societies are already partly interligent. Science combines observations, instruments, controversies and archives distributed across generations. An orchestra, a rescue team or an animal community performs operations whose success depends more on coordination than on an all-powerful individual. BrainNet (guez.org/ali/519) experiments remain extremely elementary, but they give this intuition an experimental form: three people can be linked through brain-computer interfaces and cooperate on one task from unevenly distributed information.

A network is not intelligent by nature. It can amplify conformity, panic, misinformation and the biases of its members. The power of interligence would depend on its topology, the diversity of its perspectives, trust, the right to dissent, feedback speed and the way it arbitrates conflict. A collective brain without critical mechanisms could become less lucid than each of its parts.

For A.L.I, an advanced extraterrestrial civilization might be a subject distributed among

organisms, artificial intelligences, habitats and archives. Its “individual” might be a planet, a swarm or an interstellar network. Searching for an isolated speaker would then be a category error: the message might be addressed to a human interligence yet to be built, capable of synchronizing multiple skills and sensibilities.

10. Consciousness as an Engine of Access and Distribution

What role does consciousness play in this augmentation? Neuroscience generally distinguishes intelligent performance — learning, solving, predicting and adapting — from consciousness, understood as subjective experience and the ability to report selected mental states. The two dimensions often overlap in humans, but they are not equivalent. Complex operations become automatic and unconscious through learning; conversely, a conscious experience may be vivid without producing especially intelligent problem solving. Contemporary AI performance reinforces this possible dissociation: systems accomplish selected cognitive tasks without evidence that they are conscious.

According to global neuronal workspace theory (guez.org/ali/1054), information becomes conscious when it is made broadly available to attention, memory, decision and action. Integrated information theory instead emphasizes the system's degree of integration. An adversarial comparison published in Nature in 2025 (guez.org/ali/521) challenged central predictions of both models without producing a winner. There is therefore no single accepted definition of consciousness, nor a demonstrated scale mechanically linking “power of consciousness” to intelligence.

We can nevertheless formulate a working hypothesis: consciousness may be less a reservoir of power than an engine of access, selection and distribution. It could allow information to cross boundaries among perception, memory, emotion, imagination and decision; metacognition adds the ability to observe one's own errors and redirect learning. An “intelligence of consciousness” would then mean neither brighter nor mystical consciousness, but a finer capacity to choose what becomes accessible, sustain several perspectives and redistribute information at the appropriate level of the system.

The possible correlation between intelligence and consciousness should therefore be decomposed. More stable consciousness may support attention; more differentiated consciousness may enrich perceptual categories; more reflective consciousness may improve error correction. Yet more subjective experience does not guarantee better inference, and more computation does not guarantee richer experience. These are partly independent axes whose relationships remain to be measured.

At the scale of interligence, a more speculative question appears: can several consciousnesses form anything beyond effective cooperation? A collective brain could share information without sharing a single inner point of view. Collective consciousness has not been established. A.L.I can nonetheless turn it into an artistic and cognitive experiment: build a device in which no participant holds the whole message and a form becomes perceptible only when the group learns to distribute attention, memory and decision.

11. Learning from other Earthly intelligences

Before claiming dialogue with an extraterrestrial civilization, augmented intelligence should better encounter intelligences already present: birds, cetaceans, cephalopods, fungi, forests and collectives. AI can search thousands of hours of sound and behaviour for regularities, but

correlation is not enough: a signal must be connected to situation, body and consequences for the animal.

Zebra finches: learning to hear another species requires linking vocalization, social relation and context. See A.L.I's Animal Language and AI.

The ideal device would be triangular: the animal learns our signals, the human learns its signals, and AI adjusts the interface without erasing difference. Such a method would replace the fantasy of immediate universal translation with slow, reciprocal interspecies pedagogy.

12. Defining Access Intelligence

We propose the term access intelligence for an organism's capacity to acquire the representations needed to perceive and understand a domain that was previously cognitively closed. It is measured not only by calculation speed but by five capacities: inventing new sensors; learning a perceptual grammar; maintaining multiple incompatible models; recognizing one's own limits; and turning discovery into a shareable relation.

A highly advanced civilization might communicate through patterns spanning multiple scales, temporal structures, environmental modifications or signals requiring a long initiation. The message would not be a sentence to decode but a curriculum. Its first part would teach the receiver how to perceive the second; the second would build concepts needed by the third. Contact would begin before meaning, through gradual transformation of the receiver.

This reverses the classic SETI question. Rather than only asking “what signal should we send?”, it asks “what intelligence must we become for the signal to exist for us?” AI could test thousands of learning paths and search for one that makes a foreign structure progressively learnable without reducing it to our categories.

13. Five Experiments for A.L.I

The alien curriculum

Build a program that generates a non-human language in several levels. No dictionary is supplied. AI observes the participant's errors and reveals only the exercises needed to construct the next representation. The outcome is not memorization but transfer to unseen messages.

A school for additional senses

Convert light polarization, magnetic fields or chemical data into touch or sound. After several weeks, test whether participants stop consciously “translating” and begin to perceive stable forms directly.

The reciprocal interspecies translator

Bring together ethologists, artists and AI models to construct an interface in which both species must learn. Every proposed “word” remains attached to video, context and a degree of uncertainty.

The installation “School for a Not-Yet-Human Intelligence”

An evolving room exposes visitors to sound, light and tactile signals. It gives no verbal instructions; it responds to collective strategies, changes its grammar and gradually introduces new dimensions. On leaving, each visitor receives not an intelligence score but a map of the transformations they made possible.

The Interligence Laboratory

Distribute one message among several participants: one receives only rhythm, another geometry, a third colour variations, and a fourth the AI's responses. No one can resolve the structure alone. The device measures how the group builds shared memory, signals uncertainty and reaches — or fails to reach — a shared concept. The installation would make visible the difference among information aggregation, collective intelligence and hypothetical collective consciousness.

14. Cultural References: The Dream and Its Price

In Daniel Keyes's Flowers for Algernon (guez.org/ali/1055), Charlie Gordon's spectacular augmentation changes his understanding, relationships and solitude. Limitless reduces augmentation to a drug granting near-unbounded capacity. In The Matrix, skills are downloaded, yet Neo must still test them through body and consciousness: the passage from information to belief and action becomes the real learning process. Ghost in the Shell asks what remains of identity when memory, body and network become permeable. Ted Chiang's story Understand pushes augmentation toward levels of thought that become mutually unreadable.

These works share a warning: greater cognitive power guarantees neither relationship, ethics nor happiness. Intelligence can become so specialized that it can no longer speak with others. For A.L.I, augmentation matters only if it also increases the ability to translate, doubt and remain in relation.

15. Neuroethics: Who Decides What the Brain Should Become?

AI-guided pedagogy could optimize attention but also normalize ways of thinking. An implant can restore communication while collecting intimate mental data. Unequal access to neurotechnology could establish a lasting cognitive hierarchy. UNESCO's Recommendation on the Ethics of Neurotechnology (guez.org/ali/1056), adopted in 2025, emphasizes dignity, autonomy, identity, freedom of thought, mental integrity and protection of brain data.

Interligence adds another responsibility: deciding who may write into shared memory,

disconnect a member, modify distribution rules or speak for the collective. Protecting individual consciousness must remain a condition of any networked intelligence.

Augmented intelligence must therefore remain reversible, pluralistic, explainable and accessible. It should not impose a single model of performance. A.L.I's aim is not to manufacture a superior human, but to imagine a human more capable of encountering what is not human.

Conclusion: contact as learning

The brain can transform itself extensively, but not arbitrarily. It learns best when knowledge becomes action, perception, error, retrieval, sleep, relationship and model. AI can accelerate transformation if it acts as teacher rather than substitute. Brain interfaces can open channels, but they do not yet deliver ready-made ideas.

The final hypothesis now unfolds across three levels: access intelligence transforms what a brain can perceive; interligence distributes this capacity through a network; consciousness may orient what becomes available, shareable and decidable. None of these dimensions is sufficient by itself.

The final hypothesis is simple: a radically new communication may require not a better message but a new apprenticeship of the receiver. Perhaps we are not merely waiting for a signal. Perhaps we are still at school for the organ that will be able to hear it.

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45 - The Chroneme Hypothesis: Time in Language

Keywords: chronemes, time, language, grammar, future, aspect, linguistic relativity, language families, alien, A.L.I

Arrival (Denis Villeneuve, 2016): Louise Banks facing a heptapod logogram, a circular writing system in which time is inscribed in the form.

Summary

An A.L.I hypothesis on how languages treat time, future, aspect, memory and expectation differently, imagining chronemes as deep temporal units for communicating with the other.

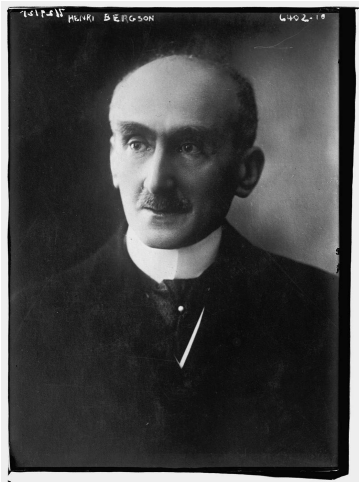
Text

Hypothesis: each language does not only speak about time; it produces a way of inhabiting time. Past, present, future, aspect, duration, repetition, memory, promise, anticipation: these forms are not distributed in the same way across languages. Some languages strongly mark the future, others express it through context. Some emphasize completed or ongoing action, others evidence, source of information, distance, cycle or spatial orientation.

1. Physical Time, Lived Time, Grammatical Time

Physical time is measurable: duration, succession, frequency, speed, clock, entropy. Lived time is phenomenological: expectation, memory, urgency, boredom, inner rhythm. Grammatical time is a linguistic construction: it indicates how a language requires, or does not require, an action to be situated temporally.

These three levels never fully overlap. A clock may indicate 10 a.m., a body may experience a minute as long or short, and a language may ask the speaker to specify whether an event is completed, ongoing, habitual, future, probable, reported or contextual. Time is therefore not only a fact of the world; it is also a form of coding.



Henri Bergson, philosopher of lived duration. Photograph from the George Grantham Bain Collection, Library of Congress, circa 1900, public domain. Source and details (guez.org/ali/1057).

2. Major Language Families as Temporal Architectures

Indo-European, Semitic, Sino-Tibetan, Austronesian, Niger-Congo, Uralic, debated Altaic groupings, Indigenous American or Australian languages do not all treat time in the same way. Even within one family, systems vary greatly.

Indo-European languages such as French and English often oppose past, present and future, but differently. French strongly grammaticalizes verbal tenses. English articulates tense and aspect through forms such as I have done, I am doing, I will do. German often relies more on context or auxiliaries for certain future uses.

Semitic languages such as Arabic and Hebrew have historically given great importance to completed/incompleted aspect, even though modern usage combines aspect, tense and modality. The question is not only when the action takes place, but how it presents itself: completed, ongoing, repeated, projected.

Mandarin does not mark verbal tense like French. It situates time through adverbs, context or aspectual particles such as le, zai, guo. This does not mean speakers do not think past or future, but that grammar does not force the same distinctions in every sentence.

In many languages, aspect, evidentiality or modality are as important as tense. Some languages require speakers to indicate how they know what they say: seen directly, heard, inferred, reported. This turns time into situated memory: the past is not only a date, but a source.

3. The Future Is Not Grammatically Universal in the Same Way

A strongly marked grammatical future is not universal. Some languages have an obligatory or highly marked future; others use the present, adverbs, particles, modals, or leave the interpretation to context. The future may be certainty, intention, probability, obligation, prediction or promise.

Östen Dahl (guez.org/ali/529) and Bernard Comrie (guez.org/ali/530) showed that tense-aspect systems do not follow a single universal grid. The future is not a simple universal slot; it is an unstable grammatical zone tied to modality and uncertainty.

Bernard Comrie, linguist and specialist in the typology of tense. Photograph: Department of Linguistics, University of California, Santa Barbara. University profile (guez.org/ali/531).

This diversity has fueled debates on linguistic relativity. Keith Chen (guez.org/ali/532) proposed that languages strongly separating future from present might influence saving or future-oriented behavior. The hypothesis has been debated and criticized, but it asks a useful A.L.I question: can temporal structures in language orient the way a society handles the future?

4. Aspect: Not Only When, But How

Aspect describes the temporal texture of an action: completed, ongoing, repeated, habitual, begun, interrupted, accomplished, progressive. In some Slavic languages, the perfective/imperfective opposition is central. In French, distinctions such as je mangeais, j'ai mangé, je mange, je vais manger do not exactly map onto other languages.

Aspect is essential for contact theory. A non-human intelligence might classify events not by past/present/future, but by stability, transformation, reversibility, cycle, probability, intensity or degree of completion.

5. Spatial Languages, Oriented Time

Research in cognition suggests that some languages organize time through space. Lera Boroditsky and other researchers (guez.org/ali/544) have studied cases where temporal metaphors vary: horizontal time, vertical time, east-west orientation, body-indexed or cardinal-direction-based time. Among the Kuuk Thaayorre of Australia (guez.org/ali/534), the strong use of cardinal directions has been linked to spatial representations of time different from left/right-centered languages.

Lera Boroditsky presents her research on language and the construction of knowledge at a CARTA symposium. Image: University of California Television. Watch the lecture (guez.org/ali/535).

These differences suggest that time is not only an abstract line. It can be landscape, orientation, return, cosmological axis, rotation, situated memory. For A.L.I, this opens a path: an extraterrestrial language could code time through orbital trajectories, luminous gradients, magnetic fields, biological cycles or topological structures rather than verbs.

6. Historical Evolution: Gesture, Narrative, Archive

Human temporal forms developed with collective memory: oral narrative, calendar, agricultural cycle, genealogy, debt, promise, ritual, writing, accounting, history, scientific chronology. A language does not treat time in isolation; it articulates it with social practices.

The past becomes archive when it can be inscribed. The future becomes contract when it can be promised. The cycle becomes calendar when it can be shared. Temporal grammar is linked to how a society remembers, anticipates, transmits and governs.

7. Influence on Thought: Caution and Power

It would be simplistic to say that a language mechanically determines thought. Speakers of languages without obligatory grammatical future can anticipate perfectly well. Speakers of strongly tense-marked languages can think beyond their grammar. The relation between language and thought is an influence, habit or affordance, not a prison.

Yet this influence matters. If a language constantly requires speakers to specify source of information, completion of action or temporal distance, it trains attention toward certain aspects of reality. Grammar is a discreet discipline of perception.

8. Chronemes: Minimal Units of Temporality

Let us call a chroneme a minimal temporal unit of meaning. It is not only a verbal tense. A chroneme may be a past marker, an aspectual particle, a cycle indicator, a promise, a delay, a repetition, a rhythm, a memory, a spatial orientation, a future probability.

The chroneme would be to time what the phoneme is to sound: a minimal difference that changes the structure of the message. Saying "has happened", "will happen", "is happening", "repeats", "returns", "could have happened" transforms the relation to the world.

An interstellar language may require a science of chronemes: identifying which temporal

units matter to the other. A thousand-year organism, a collective organism, a distributed AI or an intelligence living through orbital cycles may not share our chronemes.

9. Temporal Meta-Structures

Beyond particular languages, we can imagine temporal meta-structures: linear, cyclic, spiral, branching, probabilistic, reversible, fractal, simultaneous, stratified. These are not only metaphors; they could become matrices for constructing messages.

Human civilizations often write history as a line. Some traditions think time as a cycle. Contemporary physics introduces proper times, observer relativity, thermodynamic arrows and, in some interpretations, quantum superpositions. An extraterrestrial intelligence might use a temporal meta-structure we do not yet possess.

10. Invented Languages: Disrupting Reading, Disrupting Time

Constructed languages do more than name imaginary worlds. For several writers and artists, they become temporal machines: they erase a history, slow down reading, make several moments simultaneous, or entrust a text to a duration that exceeds its author's lifetime.

Borges: a language that contaminates history

In Jorge Luis Borges's Tlön, Uqbar, Orbis Tertius (guez.org/ali/1058), the languages of a fictional world do not merely describe another reality: they help bring it into existence. Tlön's grammar, encyclopedia, and objects gradually enter our world until they replace its knowledge and languages. Language operates here as a retroactive future: a fiction written in the present reorganizes the past from which it claims to originate.

Orwell: removing words to close off futures

George Orwell's Newspeak in Nineteen Eighty-Four (guez.org/ali/1059) methodically reduces vocabulary in order to make certain thoughts impossible. By destroying the words needed to compare, dissent, and remember, power alters more than present speech: it closes political futures and makes the past revisable. Language becomes a technology for contracting historical time.

Khlebnikov and Kruchenykh: zaum against ordinary time

Invented by Velimir Khlebnikov and Aleksei Kruchenykh, zaum (guez.org/ali/1060) frees sounds, letters, and rhythms from their descriptive function. This "transrational" language seeks a form of speech both prior to convention and belonging to the future. By disarticulating syntax and chronology, it produces a reading made of shocks, returns, and intuitions rather than a stable narrative sequence.

Xu Bing: suspending the time of decipherment

For Book from the Sky (1987-1991) (guez.org/ali/1061), Xu Bing carved thousands of characters that resemble Chinese signs but mean nothing. The reader recognizes the promise of a text, yet no decoding can be completed. The work turns reading into unresolved waiting: an extended present in which meaning always seems about to appear.

Christian Bök: writing for deep time

With The Xenotext (guez.org/ali/1062), Christian Bök devised a chemical alphabet that translates a poem into DNA and prompts a bacterium to produce a protein encoding a second poem. The organism becomes both archive and author. Writing is no longer calibrated to a human lifetime, but to biological time, evolution, and possible survival in extreme environments.

Ted Chiang: a script that already contains its future

In Ted Chiang's Story of Your Life (guez.org/ali/828), adapted by Denis Villeneuve as Arrival, Heptapod writing is produced as a whole: the writer must know the end of the sentence before tracing its beginning. Learning the language consequently transforms the experience of time itself. The alphabet no longer represents a succession; it organizes a consciousness in which past, present, and future coexist.

These works suggest a decisive extension of the chroneme hypothesis. A language can alter time through grammar, but also through its medium, illegibility, visual architecture, preservation span, or political effects. For A.L.I, decoding an extraterrestrial language might therefore mean undergoing a temporal transformation: learning not only what the message says, but the regime of duration it installs within its recipient.

11. Dealing with the Other: Negotiating Times

In an encounter, one does not negotiate only words. One negotiates expectations. How long should one wait for an answer? What is a polite delay? What is a promise? What is an ancient event? What is a reliable archive? What is a possible future?

Interstellar communication makes this problem extreme: transmission delays, different life spans, planetary cycles, historical inertia, technological memory. Misunderstanding may come not only from vocabulary, but from the temporal regime of the other.

A.L.I could therefore develop a grammar of temporal negotiation: messages indicating validity duration, repetition cycle, expectation horizon, urgency, status as memory or promise. Contact would become a diplomacy of chronemes.

12. A.L.I Prototypes

Atlas of Chronemes. An interface comparing how languages mark past, future, aspect, evidence, cycle and duration, then translating them into visual forms.

Temporal Translator. A program that translates not only words but temporal structures: a linear phrase becomes cycle, probability, promise, memory, archive.

Grammatical Clock. A sound installation where each language triggers a different form of time: repetition, anticipation, suspension, return, bifurcation.

Slow Reply Message. A contact protocol explicitly encoding expected delay, repetition, expiration and status of each message.

13. Conclusion: Learning the Other's Time

The language of time is one of the deepest sites of difference. It touches memory, responsibility, desire, fear, promise and death. Understanding a language is not only

understanding what it names, but how it places events into existence.

The chroneme hypothesis proposes to search for temporal units deeper than ordinary grammatical tenses. For A.L.I, it opens an essential question: before speaking with the alien, we may have to learn to share a time.

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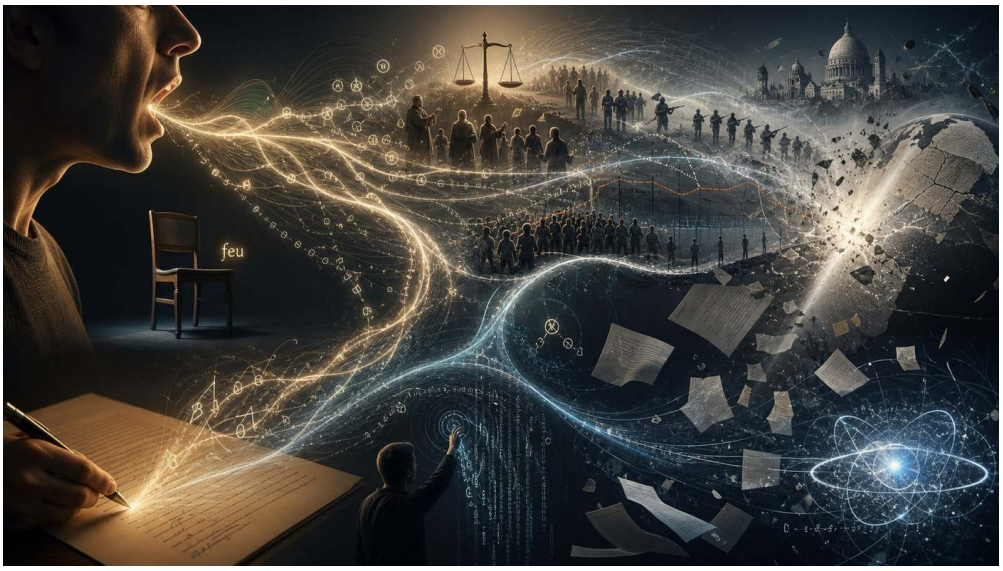
46 - Active Language Hypothesis

Keywords: active language, performativity, speech acts, power, war, code, DNA, ritual, philosophy of language, A.L.I



A.L.I image: the spectrum of active language, from ordinary speech to political, technical and physical action.

Summary

An A.L.I hypothesis on the real power of language: from a word with no effect in front of a chair to a declaration of war, from performativity to code, toward the idea of a language able to produce physical transformations.

Text

Initial hypothesis: language is not only a tool for description. It is also a force that organizes reality. It can name, order, promise, condemn, declare, comfort, program, mobilize, heal, wound, command obedience, create belief and trigger action. But how far does this power go? Can we imagine a language that no longer acts only on humans, institutions or machines, but has a direct grip on matter?

1. The Chair and War Paradox

If I look at a chair and say "fire", the chair does not catch fire. The word does not magically act upon the object. It can evoke fire, represent it, command it in fiction, but it does not directly modify the molecular structure of wood.

Yet if a head of state publicly says "I declare war", this sentence may produce a cascade of material effects: troop mobilization, weapons production, population displacement, destruction and death. In this second case, language has not changed the laws of physics, but it has modified the organization of the world through institutions, beliefs, chains of command, technical systems and obedient bodies.

The question is therefore not whether language acts. It does. The question is: through which relays does it act, at what scales, with what limits, and could one conceive a language able to reduce the distance between speech and physical transformation?

2. The Spectrum of Linguistic Power

Naming. Giving a name changes the place of a thing in the human world. A star, a disease, a species, a border or an artwork does not exist in the same way before and after being named.

Describing. A description orients action. Calling a situation a crisis, threat, miracle, accident, discovery or invasion already prepares certain behaviors.

Prescribing. A medical prescription, safety instruction, scientific protocol or military order are sentences aimed at action. Their efficiency depends on authority, trust and execution.

Declaring. Some sentences do what they say: "I now pronounce you married", "the session is open", "you are sentenced", "we declare independence". Philosophy of language calls these performative speech acts, especially in the work of J. L. Austin and John Searle.

Programming. With computer code, language becomes executable. An instruction opens a door, moves a robot, transfers money, generates an image, pilots an antenna. Language becomes operational.

Ritualizing. In religious, magical and political traditions, certain formulas are understood as producing symbolic or ontological transformations: blessing, cursing, consecrating, initiating, exorcising, swearing an oath.

Commanding matter through technology. A voice command can turn on a lamp; software can drive a 3D printer; a genetic sequence can produce a protein. Language acts on matter through translation systems.

3. What Language Cannot Do Directly

Ordinary human language does not violate physical laws. Saying "levitation" does not lift a stone. Saying "light" does not create photons unless this word activates a device that produces them.

This limit matters. It prevents confusion between performativity, magic and material causality. Language always acts in a medium: a body, an institution, a machine, a collective memory, a nervous system, a society, a technical protocol.

4. Speech Acts: When Saying Is Doing

J. L. Austin showed that some sentences do not describe a state of the world but perform an action. Saying "I promise" is not reporting a promise that already exists: it is the act of promising. But this act depends on felicity conditions: who speaks, in what context, according to which conventions, with what recognition from others.

The power of language is therefore not only in words. It lies in the combination of a linguistic form, an authorized body, a scene, a shared belief and a system of effects.

5. Propaganda, Narrative and War

Modern wars do not begin with weapons alone. They also begin with narratives: naming an enemy, simplifying a threat, fabricating urgency, naturalizing violence. Language prepares bodies to accept the unacceptable.

A political speech can therefore produce destroyed matter without directly touching matter. It acts through chains: sentence, belief, institution, order, logistics, weapon, explosion. The

causality is long, but it is real.

6. Ritual and Incantation: Speech as a Transformative Device

Long before analytic philosophy described speech acts, societies treated certain forms of language as operations: prayer, oath, blessing, curse, magical formula, funeral chant, declaration of alliance, healing speech, invocation. In ritual, language is never merely informational. It is situated, repeated, addressed, accompanied by gestures, objects, rhythms, costumes, places and assembled bodies.

Incantation reveals an essential dimension of active language: a phrase does not draw its force from itself alone, but from an arrangement. A word spoken alone in an empty room does not have the same effect as a word spoken at the right moment, by the right person, before a community, with the right gestures and objects. Ritual is an ancient technology for amplifying language.

For A.L.I, this is decisive. Interstellar communication may not be an isolated message but a complete protocol: frequency, repetition, orientation, duration, listening threshold, state of the receiver, spatial arrangement. Active language would then be less a sentence than a scene of apparition.

7. Psychology, Body and Parapsychology: When Words Modify Internal States

Language also acts on the body. A sentence can accelerate heart rate, trigger fear, calm pain, modify posture, produce shame, confidence, trance or mobilization. Psychotherapy, hypnosis, suggestion, mantras, political slogans and athletic instructions show that words can reorganize attention, memory, breathing and action.

The link between mind and body does not mean that language abolishes physical laws; it reminds us that the human body is itself a medium sensitive to signs. Speech transforms representations, and representations modify behavior, hormones, muscular tensions and perceptual expectations. Body language responds to verbal language.

Parapsychology and research into so-called extrasensory perceptions approach this zone in a more controversial way: telepathy, mental influence, distant intuition, altered states of consciousness. Even when these phenomena remain scientifically debated, they matter for A.L.I as an experimental imaginary: they ask what would need to be measured if information passed through channels other than classical sensory pathways.

8. Physics and Metaphysics: Can One Speak to the Laws of the World?

From the point of view of physics, a word is first a material phenomenon: air vibration, sound wave, graphic inscription, electrical impulse, light signal. It can act on matter if it carries energy or if it is connected to a device that translates it into action. A voice command turning on a lamp is not magical: it passes through microphone, recognition, code, relay and electric current.

Metaphysics asks a more radical question: are the laws of the world independent of all language, or do certain forms of description participate in the constitution of what we call reality? Mathematics, for instance, does not directly change gravity, but it allows us to predict, build, launch satellites and transform the planet. It is a language that does not act on

physical law, but on our ability to enter that law.

The most speculative hypothesis would be a language tuned to the deep structures of reality: a language able to produce effects not because it commands matter from outside, but because it is written in the same grammar as fields, particles, symmetries and resonances. A.L.I can treat this as an operative fiction: not searching for a universal language, but for syntaxes compatible with the modes of existence of matter.

9. Embodied AI: From LLMs to the Physical World

Large language models have revealed a new form of linguistic power: a sentence can produce a text, an image, code, a plan, an analysis or a simulation. But as long as the model remains enclosed in symbolic space, its action on the world depends on external interfaces: humans, APIs, robots, sensors, tools and control systems.

Yann LeCun has repeatedly emphasized the limits of LLMs when they lack a robust world model. His work on objective-driven AI and JEPA-like architectures argues that an artificial intelligence must learn to predict, plan and act in the world, not only produce the next linguistic unit. In other words, the decisive passage is not only speaking better, but linking language, perception, action and physical modeling.

For A.L.I, this transition is central: an LLM is already a laboratory of language, but embodied AI would become a laboratory of active language. It could transform a sentence into an experiment, a robotic gesture, a measurement, a laboratory protocol, a radio signal, a material fabrication. Language would cease to be merely generative; it would become operational.

10. Art, Language and Representation: When the Utterance Becomes the Work

Art has already explored the idea of a language that does not merely represent the world but organizes a situation. Visual poetry (guez.org/ali/1065), Lettrism (guez.org/ali/1066), concrete poetry and calligrams have treated language as a plastic form: the sentence becomes drawing, architecture, typographic rhythm, reading score. Mallarmé (guez.org/ali/1067), Apollinaire (guez.org/ali/1068), Isidore Isou (guez.org/ali/1069), Henri Michaux (guez.org/ali/1070) and concrete poets show that language is not only linear: it can become space.

Guillaume Apollinaire, Eiffel Tower calligram. The sentence leaves the line and becomes visual form. Public domain image via Wikimedia Commons (guez.org/ali/553).

Conceptual art (guez.org/ali/554) radicalized this shift. In Joseph Kosuth (guez.org/ali/555)'s One and Three Chairs (guez.org/ali/556), the object, its image and its linguistic definition coexist: the real chair, the photograph of the chair and the text defining the chair. The work is no longer only the visible object, but the system of relations between thing, image and word. For A.L.I, this structure is essential: an extraterrestrial message may also appear as a triangulation between object, signal and definition.

Joseph Kosuth, One and Three Chairs, 1965. Object, image, definition: three states of the same thing. Photo via Wikimedia Commons (guez.org/ali/557), reference notice at MoMA (guez.org/ali/556).

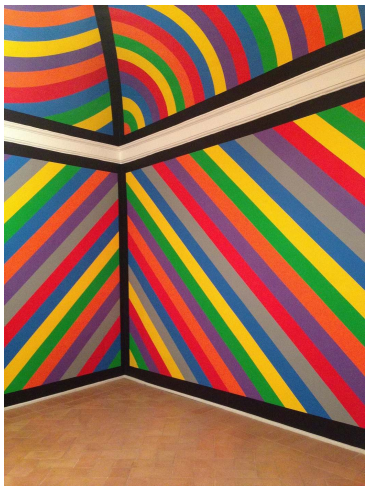
Lawrence Weiner (guez.org/ali/558) pushed further the idea of the artwork as statement. His wall texts exist as works even if the action they describe is not materially carried out. The utterance becomes a proposition for an event. It can be read, imagined, executed or left in potential. This directly concerns active language: a sentence can be an artwork because it contains a possible action.

Lawrence Weiner, From One Language to Another. Language as public work, surface and mental protocol. Photo via Wikimedia Commons (guez.org/ali/559).

The Art & Language (guez.org/ali/560) group made language the material of conceptual art itself: texts, discussions, protocols, definitions, critical systems. The artwork becomes a discursive field, an operation of thought, sometimes closer to a philosophical laboratory than to a traditional aesthetic object. Language no longer accompanies the work; it is the work.

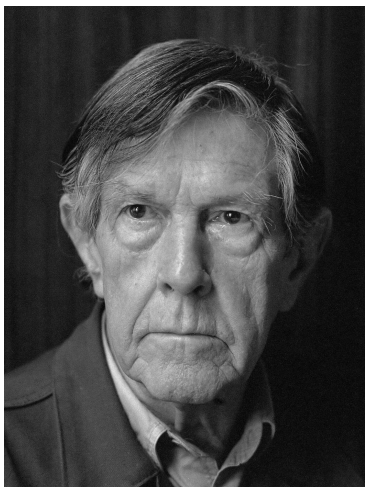
Art & Language, Mirror Piece. Language, object and reflection become a critical system. Photo via Wikimedia Commons (guez.org/ali/561).

In instruction art, Yoko Ono (guez.org/ali/562)'s Grapefruit (guez.org/ali/563) proposes works as instructions: imagine, listen, cut, wait, dream, perform or not perform an action. Sol LeWitt (guez.org/ali/564) showed that an idea or rule can generate the work, even when executed by other hands. The sentence becomes program, score, protocol. This is a clear form of active language: the utterance produces reality as soon as a body or system accepts to execute it.



Sol LeWitt, wall drawing. The rule precedes execution: the work exists as a transmissible protocol. Photo via Wikimedia Commons (guez.org/ali/565).

Graphic scores by John Cage (guez.org/ali/566), Cornelius Cardew (guez.org/ali/567) or Cathy Berberian (guez.org/ali/568), as well as Fluxus (guez.org/ali/569) practices, move musical notation toward open action. The sign no longer commands a precise note; it proposes a field of possibilities. Language acts by orienting a performance. It does not describe a sound: it makes a sound situation possible.



John Cage, 1988. His thinking on listening, silence, score and indeterminacy turns language into a trigger for situations. Photo via Wikimedia Commons (guez.org/ali/570).

Finally, digital art, generative art and live coding (guez.org/ali/571) make this question literal: to write is to make a form, a sound or a movement appear. Code becomes a performative language, readable by a machine and visible in the world. Art has already prepared several models for A.L.I: language-image, language-object, language-protocol, language-score, language-code, language-ritual.

11. Code, DNA, Algorithms: Toward Material Language

Programming languages show another path. Code is not merely understood: it is executed. It moves electrons, triggers machines, controls robots, generates sounds and images. Language becomes matter through an architecture able to read it.

Biology adds an even more vertiginous layer: DNA can be described as a coding system whose reading produces living forms. A sequence does not look like an arm, a wing or an enzyme; yet, through cellular machinery, it participates in their production.

This opens an A.L.I hypothesis: an extraterrestrial civilization might not send a message to interpret, but a language to execute. Not a sentence meaning "we are here", but a syntax able to produce an object, a reaction, a memory or a measurable transformation.

12. Hypothesis: A Language with Real Grip

Let us call active language a language in which every utterance is linked to a verifiable effect in the world. This is not magical speech, but a system in which sign, reading device and physical environment are designed together.

Electromagnetic language. Light or radio sequences capable of triggering precise states in a material, sensor or organism.

Chemical language. Molecular sentences acting as instructions for cells, crystals, bacteria or polymers.

Gravitational or geometrical language. More speculative: forms of information inscribed in fields, curvatures, resonances or topologies.

Total social language. A system in which a sentence instantly modifies a collective organization, as a protocol shared by thousands of human or artificial agents.

13. The Extraterrestrial Hypothesis: What If the Message Is an Action?

The search for extraterrestrial signals often assumes that a message is information to decode. But an advanced intelligence might conceive the message as a minimal intervention: a sequence that, when received by the right medium, produces something.

The message would not say "hello". It would make a pattern appear. It would not describe a technology. It would trigger an experiment. It would not transmit a cosmology. It would create a situation in which that cosmology becomes observable.

14. Risks: Language as Weapon

A language able to act on reality would be immediately ambivalent. Any active language is also potentially a weapon. A political formula can trigger war; code can shut down an electrical grid; a genetic sequence can modify an organism; an image can provoke panic; a rumor can move a crowd.

The power of language therefore requires an ethics of triggering: who has the right to speak? Who verifies the effect? Who stops the chain? Who assumes the material consequences of a sentence?

15. Possible A.L.I Devices

The Performative Spectrum. An installation where visitors pronounce different words in front of objects. Some words do nothing, others trigger sound, light, movement, archives, conflict statistics or chains of command.

The Chair and War. Two opposite scenes: a chair remains still before the word "fire", while an institutional sentence triggers maps, documents, military sounds and testimonies.

Executable Language. A program where poetic sentences are translated into physical instructions: light, frequencies, micro-movements, 3D printing, sound synthesis, relays.

Contact Grammar. An A.L.I protocol: create messages that do not merely represent an idea, but produce a measurable experience in the receiver.

16. Conclusion: To Speak Is Already to Move the World

Language does not directly burn a chair. But it can organize crowds, move armies, write laws, program machines, produce beliefs, transform bodies and orient history. Its power is not supernatural; it is relational, technical, social and biological.

The A.L.I hypothesis extends this power: imagine a language whose structure is designed from the beginning as action. A language that is neither only speech, nor only code, nor only ritual, but a grammar of effects. In an interstellar encounter, understanding a message may mean observing what it does to the world.

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47 - Solipsism: the Universe as the Subject's Closed Room

Keywords: solipsism, Descartes, Berkeley, Wittgenstein, brain in a vat, simulation, private language, AI, SETI, A.L.I, philosophy

The brain in a vat extends solipsistic doubt into technological modernity: if everything I perceive can be simulated, how can an outside be verified? Image: Wikideas1, Wikimedia Commons, CC0.

Summary

A historical and contemporary study of solipsism, from Descartes to simulation hypotheses, asking how A.L.I might distinguish a genuine other from a projection of ourselves.

Text

Hypothesis: solipsism is less a doctrine to embrace than a control instrument for A.L.I. It asks a severe question: how can we know that what we call a signal from elsewhere is not merely a projection of our mind, our instruments, our myths, our statistical models, or our desire for contact?

1. Defining Solipsism

Solipsism is the position according to which the only being whose existence is absolutely certain is the thinking subject. In its most radical form, it claims that nothing can be known, or even that nothing certainly exists, outside my own consciousness. Several levels should be distinguished:

- Methodological solipsism: beginning from subjective experience as the starting point of knowledge, without necessarily denying the external world.
- Epistemological solipsism: acknowledging that the existence of others and of the external world is never given with the same certainty as the present experience of thinking.
- Metaphysical solipsism: claiming that only my mind really exists, the world and others being contents of consciousness.

The last position is difficult to inhabit, almost impossible to live. Yet as a thought experiment it is very powerful: it forces us to build proofs of otherness, protocols of sharing, signs that resist mere projection.

2. Descartes: Doubt as an Airlock

René Descartes, portrait attributed to Frans Hals. The cogito does not establish final solipsism, but it opens the modern scene of the subject certain of itself before being certain of the world. Image: Wikimedia Commons, public domain.

Descartes is not a solipsist in the strict sense. In the Meditations on First Philosophy, he uses hyperbolic doubt to suspend what appears obvious: the senses can deceive, dreams can imitate waking life, an evil demon could produce a total illusion. The cogito then appears as an irreducible point: if I doubt, I think; if I think, I exist at least as a thinking thing.

This moment matters for A.L.I. Contact cannot begin with certainty about the outside. It begins with uncertainty: did I receive something, or did I merely recognize a form already present in me? An extraterrestrial signal should therefore pass through an equivalent of Cartesian doubt: repetition, independent measurement, verifiable prediction, transformation of the receiver by something it could not have produced alone.

3. Berkeley: The World as Perception

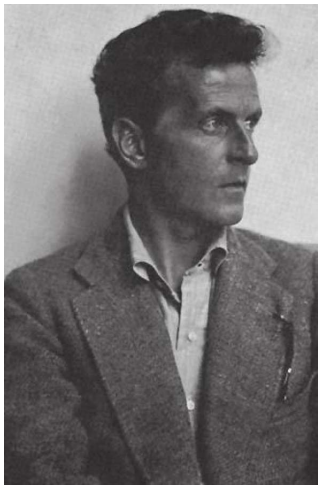
George Berkeley, portrait by John Smibert. His immaterialism is not solipsism, because it maintains other minds and God, but it radically transforms the problem of the external world. Image: Wikimedia Commons, public

domain.

With Berkeley, the famous formula can be summarized as: to be is to be perceived. Matter independent of any perception becomes problematic. Berkeley does not abolish others or reality; he thinks their stability through a divine mind that guarantees the continuity of the world. But his philosophy shifts the center of gravity: the world is never given outside a perceptual relation.

For A.L.I, this is fertile. A non-human civilization does not necessarily receive the same world we do. It may inhabit other frequency bands, durations, thresholds, and Umwelt. The problem is therefore not only to translate a message, but to understand within which perceptual regime a message becomes a world.

4. Wittgenstein: Can a Private Language Exist?



Ludwig Wittgenstein, 1930. The private language argument displaces solipsism: can a totally inner sign, without a shareable rule, still function as language? Image: Moritz Nähr, Wikimedia Commons, public domain.

Wittgenstein attacks a linguistic version of solipsism. If a word designates only an absolutely private sensation, inaccessible to anyone else, how can one distinguish correct from incorrect use? A purely private language seems to lose the very notion of rule.

This critique is central for A.L.I: a contact language cannot be merely an inner experience. It must produce transmissible regularities, possible corrections, identifiable errors, shared gestures. Even if contact passed through mental images, dreams, or some form of telepathy, a public protocol would still be needed: inscriptions, measurements, cross-checking, archives, witnesses, comparisons.

5. Brain in a Vat, Simulation, AI

In the twentieth and twenty-first centuries, solipsism returns in technological forms. In Hilary Putnam, the brain-in-a-vat thought experiment asks whether a subject fed by a machine could believe it lives in a world. In Nick Bostrom, the simulation hypothesis moves the question into computational cosmology: could our universe be a calculated environment? In both cases, the outside becomes uncertain.

AI adds another variant: a language model may produce the impression of otherness without possessing a lived world in the human sense. It operates from traces, statistics, contexts, distributions. We might cautiously call this model solipsism: a system that produces meaning

from a closed textual or multimodal universe, and risks confusing reality with the structure of its data.

But this is exactly why AI matters to A.L.I. It can become an anti-solipsistic interface if it is coupled with instruments, sensors, several observers, astronomical data, and reproducible experiments. An AI alone can hallucinate contact; an AI embedded in a verification chain can help distinguish projection, noise, and event.

6. Contact as Leaving the Self

In a project of interstellar communication, the danger is not only receiving nothing. The danger is receiving ourselves: our myths, our favorite geometries, our anthropocentrism, our need for address. Solipsism then becomes a methodological alarm.

A genuinely other signal should resist several reductions:

- Resist psychology: not be only expectation, belief, hallucination, or cultural projection.
- Resist the instrument: not be an artefact of sensor, compression, algorithm, or local noise.
- Resist the epoch: remain legible to different observers under different conditions.
- Resist anthropomorphism: not depend solely on already coded human symbols.

7. Possible Experiments for A.L.I

Experiment 1: The Cartesian Room

A visitor enters a dark room. They receive sequences of light, sound, and text. Some are AI-generated, others come from real astronomical data, others from previous visitors. The visitor must classify what seems to come from outside. The installation measures how the desire for contact manufactures meaning.

Experiment 2: Anti-Projection Protocol

Several isolated observers receive the same ambiguous signal. They cannot communicate until they have produced their descriptions. The invariants are then compared: recognized forms, rhythms, errors, hypotheses. What survives the crossing becomes a candidate for shared grammar.

Experiment 3: AI Against the Mirror

One AI receives a corpus of human messages about extraterrestrials and must produce an alien language. A second AI, deprived of that corpus but connected to physical data, must produce a signal protocol. The two results are compared: which resembles us too much? which exposes a more independent structure?

Experiment 4: Proof by Perturbation

A message is not only recognized; it must modify a future measurement. The protocol asks that a received signal allow prediction of an occurrence, frequency, variation, or relation unknown at the time of reception. Leaving solipsism then means letting the message act on the verifiable world.

8. Toward an Ethics of Otherness

Solipsism reminds us that speaking to the universe is not enough to meet someone. We must build the conditions for an other that is not immediately absorbed by our own language. A.L.I can be defined as an anti-solipsistic machine: a workshop where forms, protocols, images, and instruments are made to test whether otherness resists our desire to produce it.

Perhaps the first extraterrestrial intelligence we will need to recognize will not be the one that answers us, but the one we finally stop mistaking for ourselves.

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48 - Mineral Languages: Crystals, Meteorites and Inorganic Memory

Keywords: A.L.I, minerals, crystals, quartz, meteorites, panspermia, astrobiology, memory, signal, inorganic

Quartz crystal: mineral matter as a readable structure, between lattice, defects and memory. Source: Wikimedia Commons.

Summary

What if an intelligence did not speak through voice, wave or symbol, but through crystal defects, isotopic signatures, sounding stones or travelling stellar objects?

Text

In A.L.I, language is not only a matter of voice, letters or binary code. It can be a form inscribed in matter: an organization, a repetition, an anomaly, a physical memory. Minerals offer a fascinating limit case. They do not speak in the human sense, but they preserve, orient, filter, vibrate, transmit and record.

1. The Crystal as an Alphabet of Matter

A crystal is matter whose atoms are arranged in a regular lattice. This regularity produces symmetries, axes and faces, but also defects: impurities, inclusions, dislocations, fractures, growth zones. For a geologist, a mineral is already a document. It speaks of temperature, pressure, chemical composition and duration.

Quartz, for instance, is used in oscillators because it has piezoelectric properties: under mechanical stress it generates voltage; under voltage it vibrates. A quartz watch is already a machine in which a crystal turns energy into stable frequency. A mineral language could therefore be less a text than a modulation of physical properties: frequency, light, charge, orientation, fluorescence, magnetism.

Alpha quartz structure: the atomic lattice becomes a spatial grammar. Source: Wikimedia Commons.

2. Reading Stone: Spectra, Isotopes, Defects

To listen to a mineral, one must change instruments. We would not read a sentence, but a Raman spectrum, an X-ray diffraction pattern, an isotopic signature, a luminescence, a fossil magnetization. Zircons can preserve traces of the early Earth. Basalts keep the direction of ancient magnetic fields. Stalactites record climates. Polar ice traps old atmospheres.

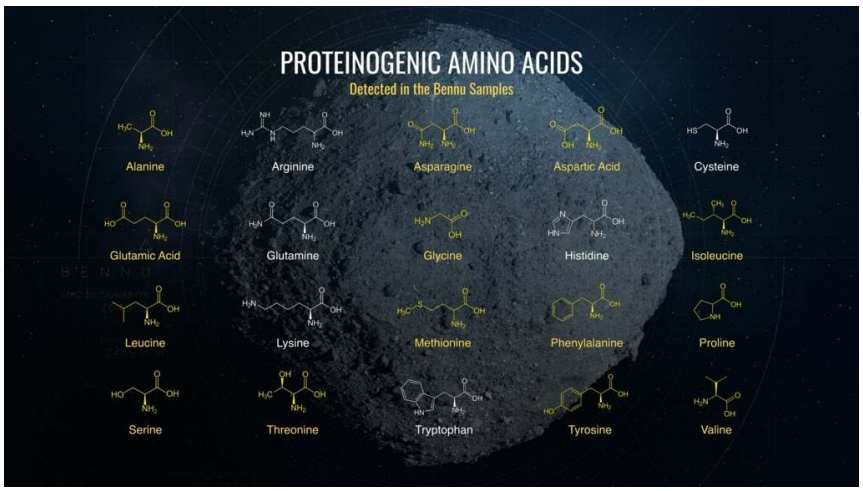
For A.L.I, this archival ability is crucial: a non-human intelligence might not write on stone, but into stone. It could manipulate crystal defects, isotope ratios, micro-inclusions or periodic structures to produce a detectable anomaly. The message would not be a visible inscription, but a structure that forces the reader to invent the right microscope.

3. Panspermia: When Stones Become Vehicles

Panspermia is the hypothesis that some ingredients of life, and perhaps highly resistant organisms, could travel from one world to another inside rocks, comets, meteorites or interplanetary dust. It does not prove that life came from elsewhere, but it changes our image of matter: stellar objects may be not only debris, but chemical vectors.

The Murchison meteorite, which fell in Australia in 1969, became famous for its many organic compounds, including amino acids. Samples from asteroid Bennu returned by OSIRIS-REx strengthened the idea that small Solar System bodies can preserve rich chemistry: hydrated minerals, salts, carbon compounds and prebiotic molecules. Here, the mineral is not the opposite of the living. It may be its envelope, laboratory and vault.

Fragment of the Murchison meteorite, often cited in discussions of extraterrestrial organic chemistry and panspermia. Source: Wikimedia Commons.



Organic molecules detected in Bennu samples: asteroids as archives of prebiotic chemistry. Source: NASA / Goddard / OSIRIS-REx.

3 bis. ‘Oumuamua: the Interstellar Visitor as Stone-Message

The case of ‘Oumuamua, the first interstellar object detected crossing our Solar System in 2017, directly extends this hypothesis. Its hyperbolic trajectory, unusual shape and non-gravitational acceleration generated natural interpretations, but also more speculative ones, especially through Avi Loeb's proposal that it might be a technological artifact. Even if that reading remains highly debated, it matters to A.L.I because it shifts the question of the signal: what if the message were not sent by radio, but carried by a wandering body, an interstellar stone, a fragment of archive circulating between stars?

From that perspective, objects such as ‘Oumuamua become candidates for an expanded mineral semiotics. We do not only ask where they come from, but what they carry: composition, anomalies, orientation, surface, dust, form, dynamic behavior. The stellar object becomes a slow, almost unreadable letter that we cross only once before it returns to the dark.

4. The Inorganic in Culture: Monoliths, Crystals, Sounding Stones

Culture has often used the inorganic as a figure for external intelligence. In 2001: A Space Odyssey, the black monolith explains nothing: it stands there, geometric, opaque, older than humanity, an object that programs evolution without speaking. In J. G. Ballard's The Crystal World, the world undergoes progressive crystallization, beauty and catastrophe fused together. In Roger Caillois, stones become natural images, almost writings without an author.

Lithophones remind us that stone can also become an instrument. Tuned stones produce pitches and timbres. This is not just a metaphor: mineral matter has a voice when it is struck, rubbed or set into vibration. As an installation, A.L.I could turn a collection of minerals into a spectral keyboard: every stone a sonic letter, every resonance an inorganic phoneme.

Binh Da lithophone: the inorganic as instrument, stones as a sonic alphabet. Source: Wikimedia Commons.

5. A.L.I Hypothesis: A Mineral Message

Imagine a civilization trying to send a message long after its own disappearance. Ordinary digital media degrade, languages are forgotten, operating systems become unreadable. A mineral can last for millions of years. The message could therefore be built as a physical enigma: an artificial crystal whose defects do not follow natural statistics; a modified meteorite whose isotopes form a sequence of prime numbers; a network of micro-inclusions readable by tomography; a 3D laser-etched glass plate; a stone that, exposed to a specific frequency, returns a light pattern.

The question then becomes: how can we distinguish a natural structure from an intentional one? This is precisely A.L.I's problem. Language may begin when a form forces an intelligence to ask whether it was produced to be recognized.

6. Possible Research Protocol

- Collect: quartz, basalt, meteorites, fulgurites, salts, mineral fossils, sounding stones.
- Measure: Raman spectra, acoustic frequencies, microscopic images, conductivity, luminescence, magnetism.
- Encode: create small controlled anomalies in a crystal or glass plate, then test their readability.
- Compare: separate geological chance, natural pattern and voluntary structure.
- Install: create a mineral table connected to piezo sensors, microphones, light and projection, where every stone becomes a transmitter.
- ‘Oumuamua, first detected interstellar object (guez.org/ali/1071)
- Avi Loeb, artifact hypothesis and Extraterrestrial (guez.org/ali/1072)

7. Toward a Stellar Archaeology

If life circulates through stellar objects, meteorites are no longer merely stones fallen from the sky. They become fragments of a scattered library. They may contain no intentional message. But they already teach us something essential: the universe writes in matter before a reader exists.

A mineral language would therefore be a slow, cold, durable, almost silent language. A language of lattices, defects, traces and resistances. For A.L.I, it opens a radical path: communicating with the extraterrestrial may not only mean sending signals toward the stars,

but learning to read what the stars have already sent as stone.

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49 - Alice in Wonderland: Logic, Metaphysics and the Language of Passage

Keywords: Alice in Wonderland, Lewis Carroll, logic, nonsense, metaphysics, pop culture, mirror, language, threshold, dream, A.L.I

Alice and the “Drink Me” label, from the visual world of Disney’s animated Alice in Wonderland, 1951.

Summary

A deep reading of Alice in Wonderland: logic, nonsense, metamorphosis, pop culture, metaphysics and A.L.I paths around worlds whose rules keep changing.

Text

Alice in Wonderland is not merely a children's story. It is a philosophical, logical and poetic machine that tests what happens when a human being enters a world where words, sizes, rules, identities and causal chains no longer obey the laws we normally assume. For A.L.I, Alice becomes a model of contact: before translating an alien language, one may have to learn how to inhabit an alien logic.

1. A Logical Book Disguised as a Dream

Lewis Carroll, the pen name of Charles Lutwidge Dodgson, published Alice's Adventures in Wonderland in 1865. Dodgson was a mathematician, logician, photographer and Oxford lecturer. This matters: the book is not simply absurd; it is built as a sequence of experiments in logic. Each scene sets a rule, then pushes it to the point where it breaks.

Carrollian nonsense is therefore not the absence of meaning. It is an excess of rules. Language does not collapse because it is chaotic, but because it becomes too literal, too autonomous, too detached from ordinary habits. Alice asks simple questions; the world answers with impossible procedures.

2. The Rabbit Hole as a Technology of Passage

The rabbit hole is one of modern culture's great passage devices. One descends through it as through a tunnel, a dream, an archive, a network or a narrative black hole. Wonderland is not elsewhere in a purely geographical sense: it is governed differently. To enter it is to move from a stable space into a space of permanent transformation.

This idea has shaped contemporary pop culture. The phrase down the rabbit hole now names the entry into an endless investigation, obsession, theory, network of information or parallel reality. From The Matrix to psychedelic culture, from video games to virtual worlds, Alice has become a grammar of immersion.

3. Metamorphosis and the Crisis of Identity

The central question in Alice is not only "where am I?", but "who am I when the rules of the world change?" Alice grows, shrinks, doubts her name, her memory, her body and her continuity. Identity is no longer a fixed core; it becomes a constant adjustment between perception, language and environment.

This directly concerns A.L.I. An extraterrestrial intelligence might differ not only through its vocabulary, but through the way it stabilizes a self: multiple bodies, distributed memory, chemical perception, collective intelligence, non-linear temporality. Translating a message would then require understanding what kind of subject speaks through it.

John Tenniel, Alice and the Caterpillar. The question of identity becomes an experiment in instability. Public domain image via Wikimedia Commons.

4. Nonsense as a Hard Science of Language

In Alice, words do not always describe the world: they move it. Conversation becomes a logical trial. The Mad Hatter, the March Hare, the Queen, the Cheshire Cat and Humpty Dumpty in Through the Looking-Glass do not simply speak badly; they reveal that meaning depends on a contract. When the contract changes, the sentence becomes foreign.

Gilles Deleuze gave Lewis Carroll an important place in The Logic of Sense. In Carroll, sense is often produced at the surface of things: through wordplay, series, reversals and shifts. It is not a hidden depth to be discovered, but a regime of signs to be learned.

A Deleuzian reading. In Deleuze’s interpretation, Alice is not only a heroine crossing a dream: she becomes the operator of a world where sense is not hidden behind things, but produced

at their edge, in the gap between words, bodies and events. Nonsense is not the opposite of sense; it can be its engine, because it forces thought to leave ordinary categories behind. In Carroll, a sentence can slip, split, turn back on itself, and this very movement produces meaning.

This is decisive for A.L.I: if an extraterrestrial message appears absurd, it should not immediately be dismissed as noise. It may belong to another regime of surfaces, another logic in which sense circulates through transformations, thresholds, scale shifts and relations between signs that are not yet ours.

John Tenniel, the Mad Tea Party. Time, politeness and dialogue become deranged rules that remain coherent inside their own system. Public domain image via Wikimedia Commons.

5. Metaphysics: World, Dream, Mirror

Alice belongs to a long metaphysical history: Descartes' dream argument, Plato's cave, Berkeley's idealism, Leibniz's possible worlds, and modern fictions of parallel realities. The book asks: how can we know that the world we inhabit is the reference world? What if our categories are only local?

In Through the Looking-Glass, the mirror radicalizes the question. The passage is no longer vertical, like the rabbit hole, but reflective. One crosses a surface that resembles the known world while reversing its rules. For A.L.I, the mirror is a powerful image of contact: another intelligence may resemble us enough to be recognized, while reversing the relations between time, language, body and memory.

6. The Cheshire Cat: A Sign Without a Body

The Cheshire Cat is one of the key figures for a theory of message. It gradually disappears, yet its smile remains. The support vanishes while the sign persists. A message is not necessarily attached to a stable body. It can survive as a trace, a relation, a motif, an afterimage.

This resonates with A.L.I's questions: how do we recognize intention in an incomplete signal? How do we interpret a signature whose sender has vanished? How do we distinguish a natural residue from an addressed sign?

John Tenniel, the Cheshire Cat. A sign can survive the disappearance of its support. Public domain image via Wikimedia Commons.

7. Pop Culture: From Psychedelia to Cyberspace

Alice has been continuously reactivated: Disney's 1951 film, Jefferson Airplane's White Rabbit, Jan Švankmajer's and Tim Burton's adaptations, American McGee's Alice, manga, music videos, fashion, gothic aesthetics, cyberpunk and psychedelic culture. Every era finds its own passage in Alice: dream, drug, adolescence, madness, simulation, network, multiverse.

8. What A.L.I Learns from Alice

Alice teaches us that an alien language is not merely a vocabulary. It presupposes a world, a physics, a scale, a memory, a politeness, a temporality and a logic of identity. Interstellar contact may resemble less a word-for-word translation than a gradual entry into Wonderland: a milieu where meaning exists, but according to rules that are not ours.

The central A.L.I hypothesis is this: nonsense can be a method. By creating situations in which our logical habits fail, we expose the hidden assumptions of our own language. A contact protocol could deliberately include paradoxes, scale shifts, mirror games and impossible sentences to test how another intelligence reconstructs coherence.

9. Possible Devices

Semantic Rabbit Hole. An interface in which each click slowly changes the rules of reading: buttons change function, words swap meaning, images become syntax.

Logical Mirror. A two-screen installation: one screen writes a sentence, the other returns it according to an inverted logic. Repetition reveals an alphabet of transformation.

Cheshire Cat. A sound system where voices disappear but leave resonances, acoustic smiles and harmonic fragments that reconstruct an absent sender.

Tea Without Time. A looping radio piece where time never progresses, but meaning accumulates through tiny variations, as if each repeated sentence came from a slightly different universe.

John Tenniel, the croquet game. The rules of the game become unstable: living beings, objects and law merge. Public domain image via Wikimedia Commons.

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Images: John Tenniel's original illustrations for Alice's Adventures in Wonderland, public domain, Wikimedia Commons.

50 - GUDEMON: a radio War of the Worlds in Courtenay

Keywords: A.L.I, GUDEMON, radio, sound installation, Courtenay, La Chambre d'Écho, H.G. Wells, Orson Welles, radio fiction, signal

GUDEMON project poster, A.L.I, July 2026.

Summary

A.L.I radio project and sound installation conceived for the La Chambre d'Écho residency: an old radio loops a fake emergency broadcast from Courtenay.

Text

GUDEMON is a radio project and sound installation conceived within the framework of the La Chambre d'Écho (guez.org/ali/585) residency at Chalet Twin Peaks, Courtenay, in July 2026. The planned device is deliberately simple: an old radio, placed in the space, loops an audio file as if it were still receiving an emergency broadcast from another time.

A Radio Fiction as a Contact Object

GUDEMON draws from H. G. Wells's The War of the Worlds and Orson Welles's famous 1938 radio adaptation. But instead of replaying the American media panic, the project relocates the event to a precise territory: Courtenay, in the Loiret. Cosmic catastrophe becomes local, almost domestic. A special broadcast, announced as coming from France Culture, describes sonic phenomena, signals, testimonies, interruptions, scientific voices, then a gradual shift toward the impossible.

Genesis

The genesis of GUDEMON comes from a central A.L.I question: how does a signal become believable? A radio voice, a jingle, a news bulletin, a cut, a witness, a layer of noise can be enough to produce a world. The project does not seek to actually deceive the public, but to study that fragile moment when a medium gives fiction the shape of reality. Radio is a

passage device: it turns narration into event, text into wave, voice into presence.

The title GUDEMON works like a signal-word. It suggests a proper name, a code, an alert, an entity. It does not explain: it calls. In the installation, the word may become a mental frequency, a fragment that remains in the ear after listening.

La Chambre d'Écho residency logo, Chalet Twin Peaks, Courtenay.

The Old Radio

The installation is based on an old radio looping the MP3. This choice matters: the object is not only an audio player, it is a cultural sign. The old radio already carries memories of war, coded messages, official news, propaganda, weather bulletins and distant voices. Placed inside the residency space, GUDEMON produces a temporal disturbance: the broadcast seems to come from the past, yet it speaks of an event that has not yet happened.

Why A.L.I?

For A.L.I, GUDEMON is an experiment on communication, belief and the form of the signal. It asks several questions: what distinguishes fiction from information? What role do timbre, compression, noise and the authority of a voice play? At what point does a story become an environment? And if an extraterrestrial civilization wanted to speak to us, would it invent a new language or hijack our most memory-loaded media?

A Listening Loop

The audio loop turns fiction into ritual. Each restart makes the broadcast begin again, as if the event refused to end. The radio no longer merely announces an imaginary invasion; it becomes a repetition machine, a local beacon, a small transmitter of poetic panic. GUDEMON proposes one hypothesis: contact may not be a single message, but a loop that returns until someone agrees to listen differently.

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- GUDEMON project page

51 - Time as multidimensional memory: the condition of encounter

Keywords: time, multidimensional memory, relativity, duration, entropy, chronotope, music, poetry, literature, quantum, synchronization, encounter, A.L.I

David Guez, Horloge 2067, installation - Gaîté Lyrique, Paris. A reversed clock that replays the venue's sound memory and turns time into a listenable archive.

Summary

An A.L.I hypothesis on time as the condition of encounter: from cosmology to memory, from poetry to music, time becomes a multidimensional and multifrequency medium in which a message can survive, transform and wait for its receiver.

Text

Without time, there is no encounter. There may be objects, bodies, worlds and signals, but nothing actually meets. Encounter requires a gap, a waiting period, propagation, and a minimum of memory: something has to leave, last, cross a distance, then be received.

For A.L.I, time is therefore not simply a cosmic background. It may be the first language of contact. Before knowing what a message says, one must know when it speaks, how long it can survive, at what rhythm it returns, and in what memory it is inscribed.

1. Origins: counting, waiting, returning

The first human forms of time are not abstract. They come from day and night, seasons, lunar cycles, germination, hunting, death and the return of stars. Time is first a way to coordinate bodies with a world: sleep, sow, wait, remember, anticipate.

Ancient calendars, monuments aligned with solstices, agricultural rituals and cosmogonic narratives do not yet separate the measurement of time from its symbolic power. Time is both cosmic and social order. It says when to act, when to celebrate, when to transmit.

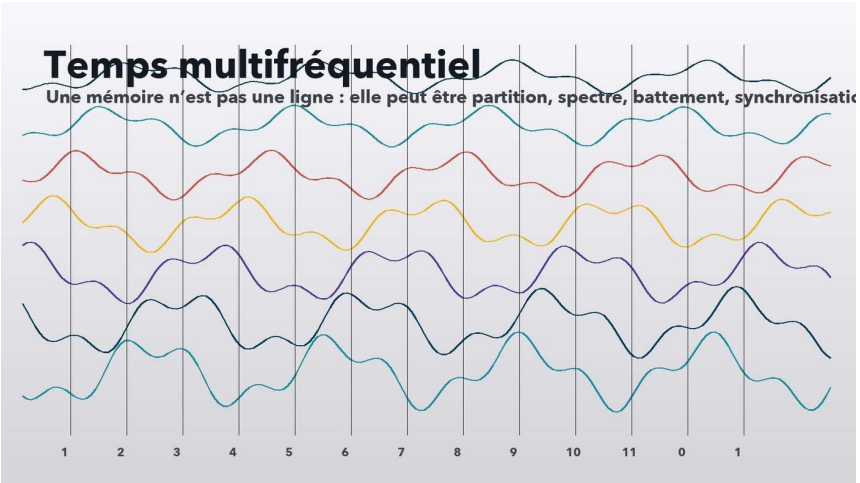
In this perspective, an interstellar message asks an archaic question in an extreme form: how can a sign survive long enough to meet a gaze that may not yet exist?

2. From lived time to measured time

Saint Augustine formulated one of the strongest intuitions: we know what time is as long as nobody asks us, but it becomes elusive as soon as we try to define it. The past is no longer, the future is not yet, the present immediately withdraws. Time seems to exist in memory, attention and expectation.

Henri Bergson later opposed homogeneous clock time to duration: a qualitative, lived, irreversible continuity. Duration is not a series of points on a line. It is texture, transformation, thickness. It resembles a melody more than a ruler.

This distinction is essential for A.L.I. A civilization may measure time with extreme precision while living it differently. If its biology, memory or environment differ from ours, its units of duration, rhythms of attention and forms of waiting may be radically other.



A.L.I image: memory is not a line; it may be a score, a spectrum, a beat, a synchronization.

3. Science: relativity, entropy, clocks

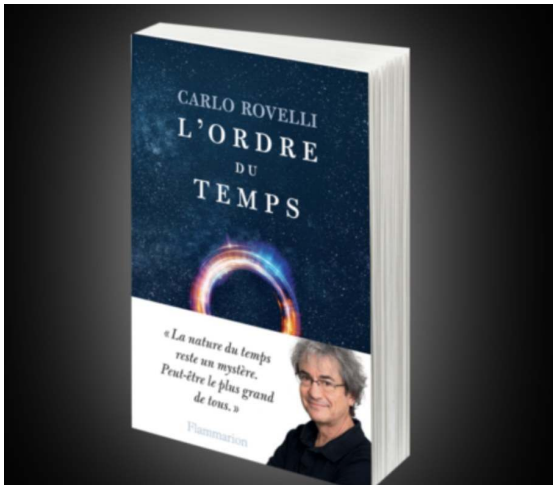
With Newton, classical time appears absolute: it flows uniformly, independently of things. With Einstein, this evidence collapses. Relativity shows that time depends on motion and gravitation. Two clocks may not tick in the same way. Time becomes local, relative, bound to space.

This is decisive for interstellar language. Between two planets, probes or civilizations, there is no simple shared present. The message travels through spacetime, where distance, velocity and gravity transform the conditions of reception. To communicate is already to negotiate clocks.

The other major arrow comes from thermodynamics. Entropy gives time a direction: states disperse, traces decay, archives age. A message intended for the cosmos must therefore resist erasure. It must be redundant, repairable, readable despite loss.

Atomic clocks introduce a third dimension: time is no longer only astronomical, it becomes frequency. The modern second is defined through a cesium transition. Time becomes a stabilized vibration. This opens both a poetic and technical hypothesis: perhaps a universal message should not only describe a duration, but provide a frequency for synchronization.

4. Carlo Rovelli: the order of time undone



Carlo Rovelli, The Order of Time: an essay showing that time is not a single block but a construction related to relations, scales and entropy.

In The Order of Time, Carlo Rovelli offers an idea that is crucial for A.L.I: the time we think we know - single, universal, regular, simply oriented - dissolves when viewed through contemporary physics. There is no great common cosmic time wrapping all events in the same way.

Rovelli emphasizes several shifts: time passes differently depending on place and velocity; the clear distinction between past, present and future does not have the same status everywhere; irreversibility largely comes from our thermodynamic position, from the way we see the world through entropy and memory.

For A.L.I, this means that an interstellar message is never simply sent “in time”. It is sent between local times. It must cross not only distance, but temporal regimes: gravitational clocks, relative speeds, biological durations, technical memories, cultural expectations. Contact then becomes an operation of temporal translation.

5. Literature: time as inhabited memory

Literature has often understood time as a problem of memory. In Proust, a taste, sensation or smell can reopen a block of the past. Lost time is not destroyed: it is stored elsewhere, in the body, in associations, in involuntary memory.

In Borges, time becomes a labyrinth. In The Garden of Forking Paths, all possibilities unfold as branches. Time is no longer only succession; it becomes an architecture of variations. In Virginia Woolf it dilates within consciousness, while science fiction, from H. G. Wells to Ted Chiang, turns it into a machine, a loop, reversed causality or non-human perception.

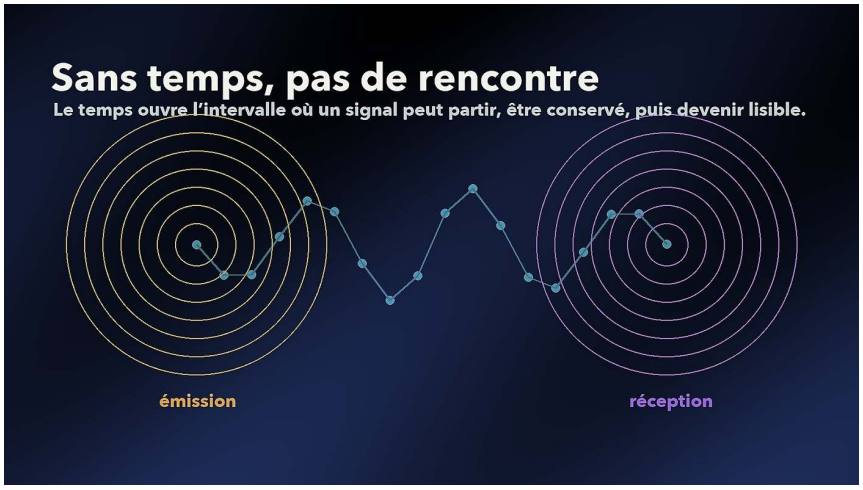
Cinema extends this with Tarkovsky, who spoke of “sculpting in time”, with Chris Marker’s La Jetée, where an image becomes a temporal anchor, or with Arrival, where language transforms the perception of temporality.

6. Poetry and music: rhythms, returns, silences

Poetry does not merely measure time: it makes time. Verse, caesura, rhyme, enjambment and typographic blank organize expectation. A poem is a miniature time machine: it delays, accelerates, suspends, makes things return.

Music makes this even clearer. Time becomes direct matter. Bach builds architectures of return and variation; Messiaen explores non-retrogradable rhythms and durations inspired by birds, theology and modes of time; Steve Reich works with phasing, where identical motifs slowly shift until a new structure appears; John Cage turns silence into a duration of listening.

These practices can inspire A.L.I: a message for another intelligence might be less a sentence than a score. It could carry its instructions through repetition, shift, variation, return and silence.



A.L.I image: time opens the interval in which a signal can leave, be preserved, and become readable.

7. A.L.I hypothesis: multidimensional, multifrequency, quantum memory

We can now propose a hypothesis: time is not only the line separating emission from reception. It is a multidimensional memory.

Multidimensional, because an event never exists in only one layer. It is physical, biological, psychic, social, technical, cosmological. A radio signal is also an expenditure of energy, a cultural choice, an archive, a rhythm, an address.

Multifrequency, because every system has its own speeds: heartbeat, circadian cycle, neural memory, atomic frequency, planetary rotation, orbit, pulsar, cosmic expansion. Communicating with another intelligence might mean finding a zone of common beat among these frequencies.

Quantum, not because entanglement would magically send instantaneous messages, but because quantum theory forces us to think state, probability, measurement and correlation. A message could be designed as a space of possibilities whose reception actualizes a form. To read would be to reduce a multiplicity of meanings into one trajectory.

8. Time as a protocol of encounter

If we want to invent a contact language, perhaps we must begin by transmitting a theory of time. Not “here is our name”, but “here is how we wait”. A civilization might recognize another intelligence by its way of repeating, preserving, dating, synchronizing and leaving a trace for later.

An A.L.I protocol could therefore send several temporal layers:

- a stable frequency serving as a shared clock;

- a series of repetitions with measurable variations;
- an archive capable of explaining its own aging;
- a pattern that changes according to observation time;
- a message whose several readings appear at different temporal scales.

In this model, contact is no longer merely information exchange. It becomes synchronization of expectations. To meet an alien intelligence would be to succeed, however briefly, in inhabiting the same form of duration.

9. Arrival: a writing system that contains time

Denis Villeneuve's Arrival, already studied in another LABO article, adds a precise point here: the heptapod language does not merely represent time; it seems to include time in its very mode of writing. The circular logograms are not read as a sentence moving from left to right. They appear as global forms, in which beginning and end are conceived together.

Arrival, Denis Villeneuve: heptapod writing appears as a global, non-linear form, where the sign already contains its own temporal unfolding.

This is fundamental for A.L.I. Linear writing often assumes that meaning arrives piece by piece, in the same order as reading. A temporal writing system could instead require the sender to know the whole form before beginning. To write would then mean depositing a complete event, like a score already traversed by its future.

In a contact hypothesis, an advanced language could therefore include temporality within its syntax: observation duration, order of revelation, periodic returns, possible bifurcations, delayed readings. The message would not only say something in time; it would make time a dimension of dialogue.

10. AI: an interface for passing through time

Artificial intelligence can be understood as a statistical time machine. It does not see the future prophetically; it projects probable continuations from massive archives. Every generated text, image or sound is an anticipation: among several possible futures of a sentence, motif or situation, it actualizes one.

This opens an A.L.I hypothesis: AI could become an interface for passing through time. It could link traces of the past, signals of the present and future projections inside a single latent space. It could simulate what a message becomes after noise, translation, forgetting, cultural mutation or reception by another form of intelligence.

In a contact protocol, AI would therefore not only translate between languages. It would

translate between temporalities. It could test the survivability of a message, produce several futures of reading, detect the structures that remain stable, and propose forms capable of being understood later by unknown recipients.

11. Installation or software proposal

One could build an installation titled Clock for an Absent Intelligence. It would receive several flows: pulsars, heartbeats, a simulated atomic clock, the breathing rhythm of the public, sound archives, light variations. A program would transform these flows into a luminous and sonic score.

The viewer would never see “the message” all at once. They would have to stay, return, wait. Some layers would appear after a few seconds, others after several minutes, others only by comparing two visits. The device would make tangible that understanding is not only decoding: it is accepting a shared duration.

12. Conclusion: time before language

A.L.I could formulate this rule: every message begins with a clock. Before the sign, there is the interval. Before the sentence, there is rhythm. Before encounter, there is the possibility that two presences do not yet coincide, but may still reach one another.

Time is therefore not only what separates us from other worlds. It is also what makes their encounter thinkable. It gives the signal a route, memory a depth, waiting a form, and the unknown a chance to become readable.

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52 - Multiverse: origins, parallel worlds and passages between universes

Keywords: multiverse, parallel universes, Everett, inflation, cosmology, science fiction, poetry, cinema, passage, contact, A.L.I

Everything Everywhere All at Once: the multiverse as an intimate experience of doubles, unlived choices and alternative life-lines. Image provided for the A.L.I project.

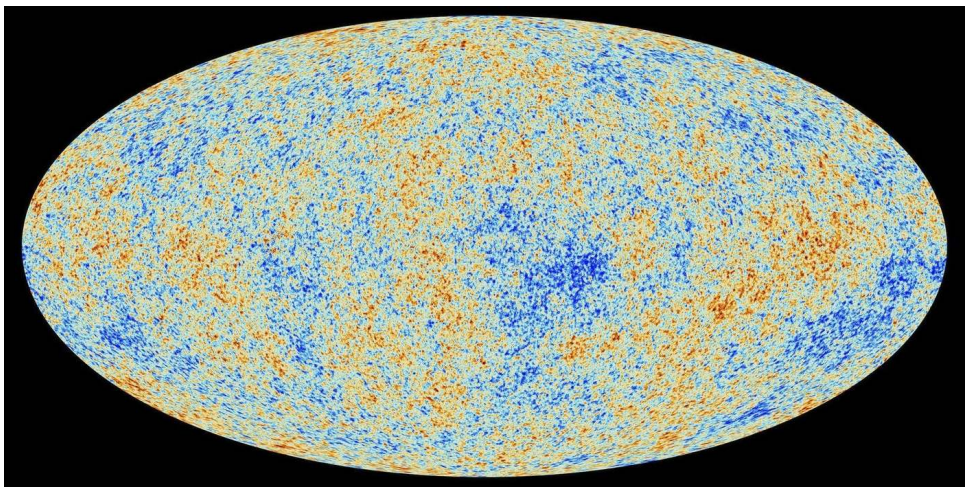
Summary

From the Copernican decentering to Everett's quantum worlds, from eternal inflation to the string landscape, the multiverse displaces the question of contact: what if the most radical otherness came not from another planet, but from another universe?

Text

The multiverse is not only a spectacular science-fiction idea. It is an extreme form of decentering: after we stopped placing Earth at the center of the cosmos, after we understood that the Sun was only one star among others, after we accepted that our galaxy was only one galaxy among billions, the multiverse hypothesis proposes one final displacement: our universe itself may be only a local case, a bubble, a branch, one solution among others.

For A.L.I, this hypothesis changes the nature of contact. Non-human intelligence would no longer be merely located elsewhere in our space. It could be separated by a cosmological boundary, a quantum branch, an inaccessible geometry, a difference in physical constants, or a level of reality of which our instruments perceive only an indirect trace. The language of contact would then become a language of passage: how can one recognize a sign from a world that may share neither our space, nor our time, nor our laws?

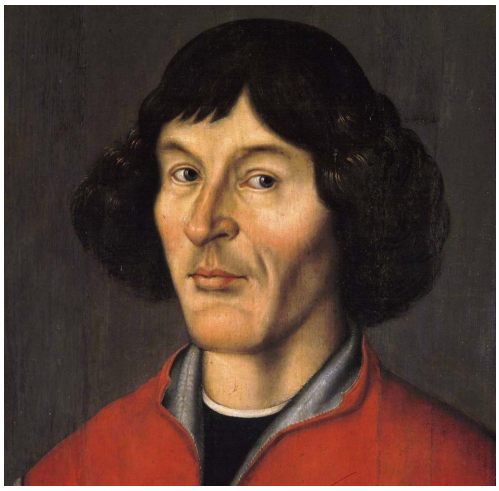


Cosmic microwave background: one of the oldest observable surfaces of our universe. Image: Wikimedia Commons / cosmological data.

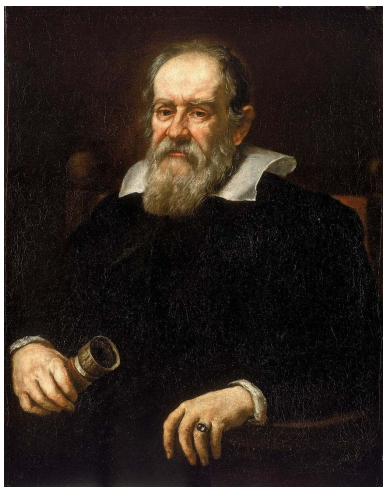
From centered world to decentered world

The history of the multiverse begins before the word itself. It begins with the progressive loss of the center. In antiquity, some traditions already imagined a plurality of worlds: Democritus, Epicurus and Lucretius thought of innumerable worlds in a cosmos without absolute center. But medieval and Aristotelian Europe long placed Earth within an ordered, hierarchical and closed architecture.

The Copernican gesture, in the sixteenth century, displaced Earth: it was no longer the center around which everything turns. Galileo, with the telescope, made this decentering visible: lunar mountains, Jupiter's moons, Venus's phases. The sky ceased to be a perfect sphere and became a field of observation. Giordano Bruno went further, imagining an infinity of inhabited worlds. This hypothesis, long metaphysical, gradually became an astronomical and then cosmological question.



Nicolaus Copernicus: heliocentric decentering opens the long modern history of cosmic pluralities. Image: Wikimedia Commons.



Galileo, by Justus Sustermans, 1636: the telescope turns cosmology into an instrumental inquiry. Image: Wikimedia Commons.

The plurality of worlds before the multiverse

Before modern physics spoke of a multiverse, literature and philosophy spoke of worlds. Fontenelle published Conversations on the Plurality of Worlds in 1686, making other worlds a matter of conversation, pedagogy and imagination. Cyrano de Bergerac imagined journeys to the Moon and the Sun. Later, Camille Flammarion popularized an inhabited vision of the universe. The plurality of worlds is first a revolution of imagination: accepting that our world is not the only possible stage.

This history matters for A.L.I: every cosmological leap also produces a leap in language. When Earth ceases to be central, one must invent another grammar of place. When the galaxy becomes one among others, one must think distances, signals and delays. When the universe may become one among others, one must think a semiology of the inaccessible.

Four families of multiverse

The word multiverse covers several very different hypotheses. They must be distinguished in order not to confuse cosmic poetry and scientific model.

Everett: the multiverse as branching

In 1957, Hugh Everett III proposed a radical reading of quantum mechanics: the universal wave function does not collapse during measurement; it continues to evolve, and what we call a result corresponds to one branch of that evolution. In this interpretation, there is not a single world in which one possibility becomes real, but a structure in which possibilities unfold.

This multiverse is not a set of parallel planets one could simply travel to. It is rather an architecture of branches that no longer communicate once they have decohered. For A.L.I, the issue becomes: is a message between branches impossible in principle, or can one imagine indirect traces, interferences, thresholds where separation is not yet total? Current physics does not allow us to send a message to a decohered branch. But conceptually, Everett’s multiverse makes language a problem of selection: every observation is a sentence written in one branch, while the other sentences become inaccessible.

Our doubles: what becomes of the choices we did not live?

One of the most disturbing consequences of the multiverse, especially in its quantum and fictional versions, is the idea that doubles of ourselves might exist: not merely identical copies, but variations. A self who made another decision, a self who did not meet the same person, a self who followed another path, a self living in a branch where a tiny event displaced an entire history. Each choice would then become a kind of ontological crossroads.

This idea directly touches the question of free will. If everything that can happen happens somewhere, what does choosing mean? In a radical deterministic or Everettian reading, a choice would not erase the other possibilities; it would only select the branch in which one version of us becomes conscious of that choice. The other options would not be abolished, but lived elsewhere by other versions of ourselves. Free will would no longer be the power to reduce reality to a single trajectory, but the subjective experience of one trajectory among a field of bifurcations.

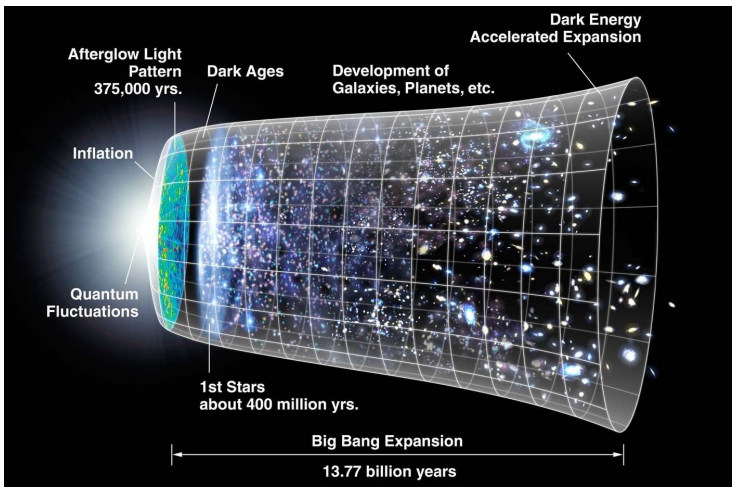
For A.L.I, the most fertile hypothesis is this: could these doubles share something like a common layer of consciousness? Not a clear, telephone-like communication, but weak resonances: intuitions, dreams, premonitions, déjà vu, sudden decisions, mental images that seem to come from another line of life. This would be a form of multiversal telepathy, not between two people, but between several versions of the same subject distributed across different branches.

Scientifically, caution is necessary: no experiment shows that decohered branches can exchange information. But as an artistic and philosophical hypothesis, the question is powerful. It allows us to consider every unrealized choice as an active archive. The lives we did not live would not merely be lost; they would form a field of possibles with which our consciousness might maintain obscure relations.

An A.L.I protocol could consist in writing down an important decision, then producing its alternatives as narrative doubles. Each double would generate a text, an image, a sentence, a sound frequency. The installation would make these simultaneous life-lines audible, as if the subject were receiving messages from their other trajectories. The language of the multiverse would no longer be only cosmological; it would become intimate. It would ask: if our other choices exist somewhere, can they still speak to us?

Eternal inflation: bubble universes

Cosmic inflation, developed notably by Alan Guth, Andrei Linde and others, proposes an extremely rapid expansion of the very early universe. In some models, this inflation is eternal: it stops locally in certain regions, forming bubble universes, while continuing elsewhere. Each bubble might have different properties, and our observable universe would be the inside of one such bubble.

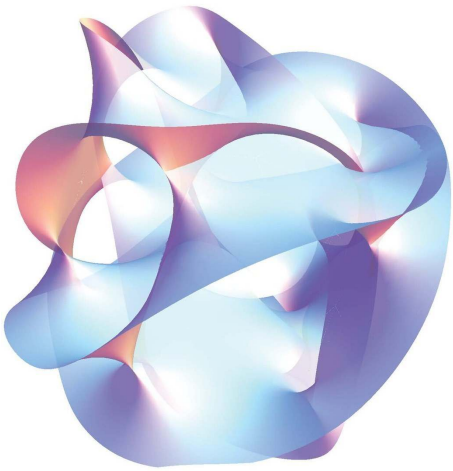


Cosmic timeline: from the hot Big Bang to large-scale structures. Image: NASA / WMAP / Wikimedia Commons.

This hypothesis has inspired searches for possible traces of bubble collisions in the cosmic microwave background. So far, no decisive evidence has been found. This is crucial: the multiverse is a powerful idea, but its testability remains one of its most debated problems. A hypothesis that produces no possible observation risks becoming metaphysics. Conversely, searching for signatures, even negative ones, turns the multiverse into a research program.

String landscape, dimensions and hidden geometries

In some versions of string theory, extra dimensions must be compactified according to complex geometries. The number of possible solutions may be immense. Leonard Susskind popularized the idea of a landscape, a landscape of possible vacua where different regions or universes might have different physical constants. Brian Greene, in The Hidden Reality, offered an accessible synthesis of the main families of multiverse.



Calabi-Yau form: an iconic image of compactified geometries in some string theories. Image: Wikimedia Commons.

Here, passage between universes becomes a passage between regimes of law. Another universe would not only be elsewhere; it could be built with another value of the cosmological constant, another particle structure, another topology. Communicating with it would require translating not only a message, but the very conditions of legibility.

Literature, poetry, fictions of bifurcation

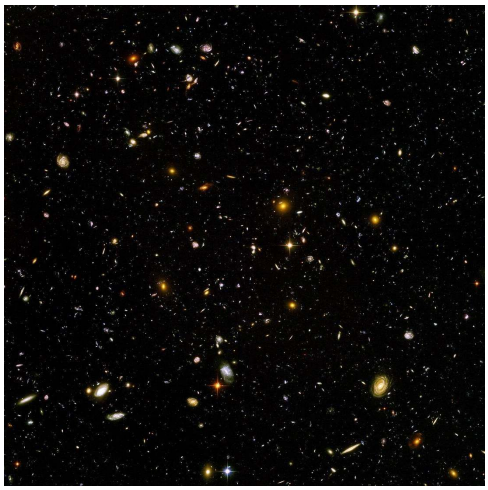
Literature often preceded physics in imagining multiple worlds. Borges, in The Garden of Forking Paths, describes a structure in which all choices coexist in temporal ramifications. Lewis Carroll plays with logical and dimensional passages. Dante crosses cosmic architectures that are not scientific multiverses but symbolic worlds ordered by other laws. Modern poetry, from Mallarmé to Michaux, also opens spaces where language no longer merely describes a world: it produces possible worlds.

Science fiction then gave the multiverse immense narrative power: Philip K. Dick questions unstable realities; Michael Moorcock develops a literary multiverse; Ursula K. Le Guin thinks worlds as anthropological experiments; Greg Egan radicalizes mathematical worlds and alternative realities. The multiverse becomes a laboratory of variations: what becomes of identity when it exists in multiple versions? What becomes of memory when several incompatible histories are equally real?

Cinema: passage as image

Cinema has turned the multiverse into a sensory experience. Everything Everywhere All at Once makes the multiverse a crisis of attention and identity. Spider-Man: Into the Spider-Verse gives graphic form to superposed realities. Doctor Strange in the Multiverse of Madness uses the multiverse as a magical and cosmological space. Coherence imagines an intimate and almost domestic bifurcation. Interstellar, without being a multiverse film in the strict sense, stages the idea of passage through a higher-dimensional structure.

These films show that the question of passage is always also a question of language: how does one recognize another version of oneself? How does one communicate with a world whose continuity differs? How does one transmit information when the context that gives meaning to that information changes from universe to universe?



Hubble Ultra Deep Field: an image reminding us that cosmic plurality already begins within our observable universe. Image: NASA / ESA / Wikimedia Commons.

Potential passages: science, limits, speculations

Passages between universes are currently highly speculative. Several scenarios exist in scientific or semi-speculative literature, but none constitutes a technology of passage.

- Wormholes: solutions of general relativity connecting two regions of spacetime, but their stability

would require exotic conditions.

- Bubble collisions: in some eternal inflation models, two bubble universes could leave a signature in fossil radiation.
- Branes: in string-inspired cosmologies, our universe might be a brane; interaction with another brane could produce cosmological effects.
- Black holes and baby universes: some models imagine black holes associated with the birth of other spacetime regions.
- Informational passages: even without matter transport, one can imagine statistical signatures, correlations or anomalies indicating an interaction between regimes of reality.

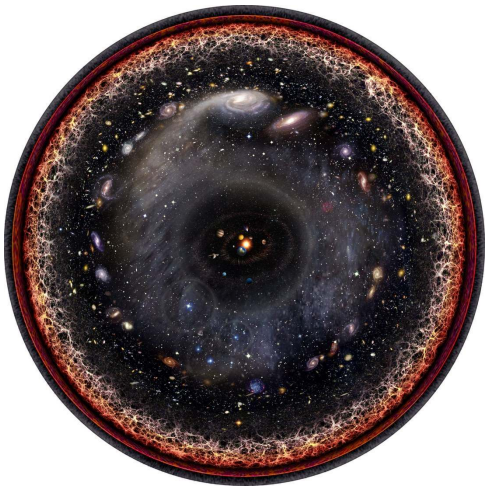
In every case, A.L.I must remain cautious: material passage between universes is not demonstrated. But the hypothesis is useful for thinking the minimal conditions of an extreme communication. An inter-universe message would have to survive a difference of laws, constants, dimensions and temporalities. It would therefore have to aim at very fundamental structures: relations, symmetries, numbers, topologies and invariants.

A.L.I hypothesis: a language of invariants

If a message had to pass between universes, it might not be able to rely on an identical language, chemistry or even physics. It would have to rely on what crosses models: ratios, motifs, mathematical structures, transformations. A multiversal language would be less an alphabet than a set of invariants recognizable despite the change of world.

One can imagine an artistic and scientific protocol:

- Build a library of invariant motifs: prime numbers, symmetries, graphs, knots, topologies, compressible sequences.
- Simulate several universes with different rules: dimensions, speed limits, constants, geometries.
- Test which motifs remain recognizable from one simulated universe to another.
- Create an installation where the public sees a message deform according to variable laws, until only its relational skeleton remains.
- Ask an AI to reconstruct the initial message from its projections in several incompatible worlds.



Observable universe on a logarithmic scale: a mapping of distances reminding us that every observation depends on a scale of representation. Image: Pablo Carlos Budassi / Wikimedia Commons.

Conclusion: the other beyond the cosmos

The multiverse may be true, unprovable, or merely a mathematical consequence of still incomplete models. But it already acts as a philosophical machine: it pushes otherness beyond the planet, beyond the galaxy, beyond even our observable universe. It forces us to think that contact might not only be an encounter in space, but a translation between realities.

For A.L.I, the multiverse becomes a poetic and scientific frontier. The point is not to claim that we will travel from one universe to another tomorrow. It is to prepare forms capable of thinking this limit case: a language that would no longer depend on a single world, but on a structure deep enough to remain legible when the world changes.

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53 - Simulation: Are We Living in a Computed World?

Keywords: simulation, philosophy, physics, cinema, video games, Matrix, Loïc Hecht, Quentin Dupieux, code, creators, A.L.I

Jan Saenredam / Cornelis Cornelisz. van Haarlem, Antrum Platonicum, 1604: Plato's cave as an early model for a world perceived through shadows. Source: Wikimedia Commons.

Summary

An A.L.I study of the simulation hypothesis: physics, philosophy, cinema, literature, video games and possible protocols for communicating with the creators of a computed world.

Text

The Question

What if the world were not the final layer of reality, but a computed layer maintained by an external intelligence, a post-human civilization, a cosmic machine, or a structure of which we perceive only the interface? The simulation hypothesis is not merely a contemporary fantasy born from video games. It extends a very old philosophical anxiety: how can we know that what we call real is not already a representation, a dream, a stage, a cave, a calculation or a device?

For A.L.I, this hypothesis becomes a communication problem. If we live in a simulation, the question of extraterrestrial contact shifts: the task is no longer only to transmit toward another planet, but to find a way to send a signal toward the layer that produces our world. How can one speak to what is not inside our space, but conditions the existence of that space itself?

From the Cave to the Computer

Plato already placed humans in front of shadows mistaken for reality. Descartes imagined an evil demon capable of radically deceiving perception. Berkeley made the existence of the world depend on perception. Later, Hilary Putnam's brain in a vat reformulated the same worry: could a subject be fed artificial signals and still believe it inhabits a coherent world?

The contemporary simulation hypothesis takes a more technical form with Nick Bostrom, who proposed in 2003 a probabilistic argument: if very advanced civilizations can produce vast numbers of conscious ancestor simulations, then simulated conscious beings could become statistically far more numerous than original biological beings. The argument does not prove that we live in a simulation; it forces us to take seriously the possible industrial scale of computed worlds.

David Chalmers, in recent work on virtual reality, shifts the issue again: a virtual world is not necessarily a false world. If it has stability, objects, causal relations and lived experiences, it can constitute an authentic reality for those who inhabit it. Simulation would therefore not simply be illusion, but environment.

Physics: Clues, Limits, Caution

Contemporary physics offers motifs that make the idea seductive without confirming it. Quantum mechanics shows that observation, measurement and information are deeply entangled. Quantum gravity and holographic approaches suggest that information may play a fundamental role in the structure of spacetime. John Archibald Wheeler summarized this intuition as it from bit: reality may arise from acts of information.

Some have searched for possible signatures of simulation: limits in spacetime resolution, anisotropies, statistical artifacts, energy constraints, traces of a discrete grid. These avenues remain speculative. A physical limit is not necessarily a pixel; a constant is not necessarily a program parameter; background noise is not automatically a rendering error. The danger would be to transform every scientific mystery into evidence for a hidden developer.

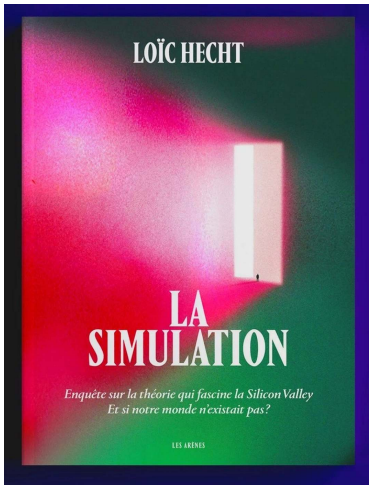
The most fertile position for A.L.I is intermediate: not to assert that the world is simulated, but to use the hypothesis as an experimental model. A simulation implies rules, thresholds, formats, permissions and channels. It forces us to think of contact not as simple transmission through space, but as an attempt to cross layers.

Cinema: Leaving the Set

The Matrix gave the simulation hypothesis its most famous popular form: everyday life is an interface produced by machines, and awakening consists in seeing code behind appearances. The motif also runs through Tron, eXistenZ, The Thirteenth Floor, Dark City, Free Guy, Ready Player One and some episodes of Black Mirror. Each story offers a variant: artificial world, programmed characters, implanted memories, replayable identity, nested reality.

Le Vertige, Quentin Dupieux, 2026: a CGI world where deliberately poor rendering becomes a metaphysical question. Image source: L'Éclaireur Fnac.

Quentin Dupieux's recent film Le Vertige, announced as a computer-generated animated feature, directly summons this idea through simplified characters who suspect that their reality is simulated. What matters here is not only the comic or absurd premise, but the aesthetic question: a deliberately poor-looking world can reveal its condition as a model more brutally. Visual limitation becomes metaphysical evidence.



Loïc Hecht, La Simulation, Les Arènes, 2026: a contemporary essay on the hypothesis of a computed world and its philosophical consequences. Image source: Les Arènes.

In La Simulation, Loïc Hecht revisits the question in a contemporary speculative register: if simulation becomes a credible way to describe our relation to the world, it forces us to rethink freedom, responsibility, consciousness and the possibility of an outside. The book can be read as a philosophical extension of today's digital imaginary: we no longer ask only whether the world is true, but whether it is executable.

Literature and Video Games: The Character Looking for the Author

Literature prepared this ground long before computers. Borges imagined worlds fabricated by encyclopedias, labyrinths that contaminate reality, libraries containing every possible combination. Philip K. Dick constantly suspects reality of being an unstable facade. Stanislaw Lem's Summa Technologiae anticipates artificial worlds and forms of synthetic reality. Italo Calvino and Pirandello interrogate the boundary between author, character and narrative

world.

Grand Theft Auto V: the open world as a popular laboratory for simulation, agents, rules and emergent behavior. Image source: The GTA Place / Rockstar Games.

Video games make the question experimental. In The Stanley Parable, a character discovers that a voice structures his choices. In Undertale, the system remembers the player's actions. In No Man's Sky, procedural space becomes almost a playable cosmology. In Outer Wilds, the time loop turns exploration into decoding. The player is at once local god, observer, experimenter and possible interlocutor.

If we were characters in a cosmic game, our prayers, sciences, artworks and interstellar messages might be reread as attempts to find the administrator interface. We would not only be looking for another inhabitant, but for the gaze that runs the scene.

Who Created the Simulation?

Several scenarios are possible. The first is post-human: our descendants may have simulated their ancestors in order to understand their origin, test historical branches, produce sensitive archives or explore moral worlds. The second is extraterrestrial: a non-human intelligence may have generated universes as experiments, artworks, laboratories or forms of memory. The third is cosmological: simulation may not have been created by someone, but may be the very mode through which reality is produced, a computation without an identifiable programmer.

A fourth, more vertiginous scenario imagines nested simulations. Simulated beings create simulations in turn, and each level produces its own question of the outside. In that case, searching for the ultimate creator means climbing a potentially infinite chain. Contact is no longer horizontal, but vertical.

Are We Free in a Programmed World?

A simulation does not necessarily imply that everything is scripted. A game can contain strict rules and still produce unpredictable trajectories. A simple cellular automaton can generate highly complex forms. A physical model can evolve without a prewritten narrative. Freedom may therefore reside not outside rules, but within the possibility-space opened by rules.

For A.L.I, the question becomes: how can an internal agent produce a signal that exceeds its expected status? In video games, some players communicate with developers through bugs,

speedruns, emergent behavior and détournements of internal logic. Transposed to a cosmic scale, this suggests a strange hypothesis: perhaps we should search for gestures that do not merely maximize our survival, but change the readability of our world for an external observer.

A.L.I image: simulation hypothesis, rendered world, signal and attempted contact with the layer that contains us.

Protocols for Contacting the Creators

A simulation-contact protocol could take several forms. First, create highly compressible mathematical messages: prime numbers, constants, self-similar patterns, structures that signal intention within a noisy universe. Second, produce coordinated large-scale experiments: synchronizing luminous, sonic, radio or computational events to create a planetary statistical anomaly. Third, look for zones of failure: limit phenomena, paradoxes, indeterminacies, places where the model is forced to answer.

One could imagine an A.L.I installation called Ping the Renderer: a network of participants simultaneously generates light, sound and text sequences based on the same mathematical structure. The work would be designed as a packet addressed not to the stars, but to the hypothetical computational layer. It would document physical, human and symbolic responses: noise, coincidences, errors, narratives, dreams, correlations.

Another path would be a program that fabricates messages impossible to reduce to a single medium: image, sound, text, movement, code, radio wave, QR, score. If the world is an interface, perhaps the message must become multi-interface.

A.L.I Hypothesis

Simulation is not only a theory about the origin of the world. It is a method for thinking contact with what exceeds us. It forces us to ask: where is the channel? who sees? what does it mean to answer? which internal actions can become visible from outside?

The A.L.I hypothesis would be this: if our world is simulated, art may be one of the forms capable of producing signals not predicted by ordinary utility. Because it condenses information, symbol, gesture, intention and ambiguity, an artwork could act as an anomalous packet in the world's flow. It does not prove the outside, but tries to provoke it.

From this perspective, communicating with the creators would not mean finding their language. It would mean inventing a situation strange enough, coherent enough and insistent

enough for the system itself to have to notice us.

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54 - The X-Files: Real Archives, Extraterrestrial Communication and the Language of Secrecy

Keywords: The X-Files, UFO, UAP, Project Blue Book, FBI Vault, CIA, archives, secrecy, extraterrestrial communication, Roswell, SETI, A.L.I, language of secrecy

A.L.I image: original cover composed from public FBI / Project Blue Book archival material.

Summary

Using The X-Files as a cultural matrix, this article analyses extraterrestrial communication in the series, the real archives that fed it, and what this aesthetics of secrecy can bring to A.L.I.

Text

The X-Files, created by Chris Carter in 1993, is not simply a series about aliens. It is a series about the conditions under which truth appears when it has to cross layers of secrecy, belief, fear, bureaucracy, incomplete documents, fragile testimonies and surveillance technologies. For A.L.I, it is a major cultural laboratory: how can a message be recognized when the space that contains it is deliberately blurred? How can one distinguish signal, rumor, manipulation and evidence?

Mulder / Scully: a Method in Tension

The Mulder-Scully pair stages a dialectical method. Mulder embodies the expansive hypothesis: listening to the margins, taking weak narratives seriously, assuming that an anomaly may contain a structure. Scully embodies verification: biology, forensic medicine, protocol, rational doubt. The series is powerful precisely because it never fully chooses one against the other. It invents a double method: believe enough to look, doubt enough to document.

This tension directly concerns A.L.I. A possible extraterrestrial language may not appear as a

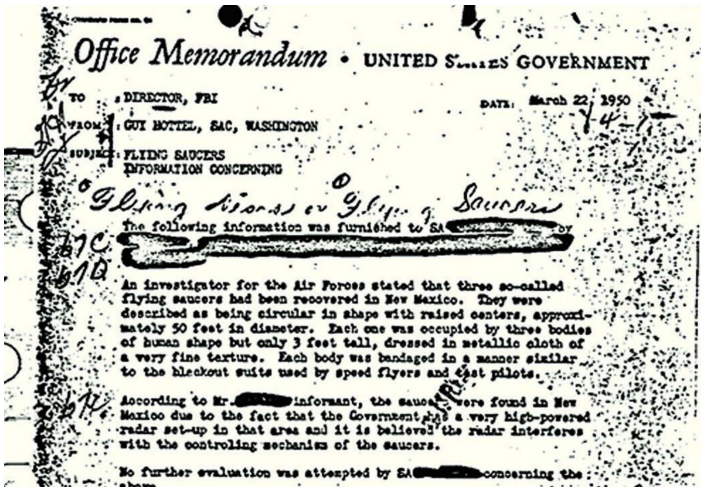
clear text. It could appear as a trace, a biological sample, a statistical pattern, a synchronicity, a repeated testimony or a poorly indexed document. The question is therefore not only “what does the message say?” but “within what regime of evidence can the message become readable?”

Mulder and Scully: looking from the threshold, between belief, evidence and access to information.

Forms of Extraterrestrial Communication in the Series

The series explores almost every imaginary path of contact. There is electromagnetic transmission, close to SETI listening: signals, interference, magnetic tapes, networks, screens, digital files. There is bodily communication: implants, abductions, missing time, traumatic memory, scars, genetic modifications. There is biological communication: contamination, hybridization, black oil, viruses or organisms that speak through the transformation of life. Finally, there is political communication: silence, classification and disinformation as counter-message.

In this framework, the extraterrestrial does not always communicate through words. It communicates through effects: displacement of the body, alteration of memory, mutation of the environment, appearance of a file, disappearance of a proof. Language becomes an ecology of signs. One no longer deciphers only an alphabet; one deciphers a system of clues.



Office Memorandum • UNITED STATES GOVERNMENT

TO : DIRECTOR, FBI

DATE: March 22, 1950

FROM : GUY HOTTEL, SAC, WASHINGTON

SUBJECT: FLYING SAUCERS
INFORMATION CONCERNING

Flying Disks or Flying Saucers

The following information was furnished to SA [redacted] by [redacted]

An investigator for the Air Forces stated that three so-called flying saucers had been recovered in New Mexico. They were described as being circular in shape with raised centers, approximately 50 feet in diameter. Each one was occupied by three bodies of human shape but only 3 feet tall, dressed in metallic cloth of a very fine texture. Each body was bandaged in a manner similar to the blackout suits used by speed flyers and test pilots.

According to Mr. [redacted] informant, the saucers were found in New Mexico due to the fact that the Government has a very high-powered radar set-up in that area and it is believed the radar interferes with the controling mechanism of the saucers.

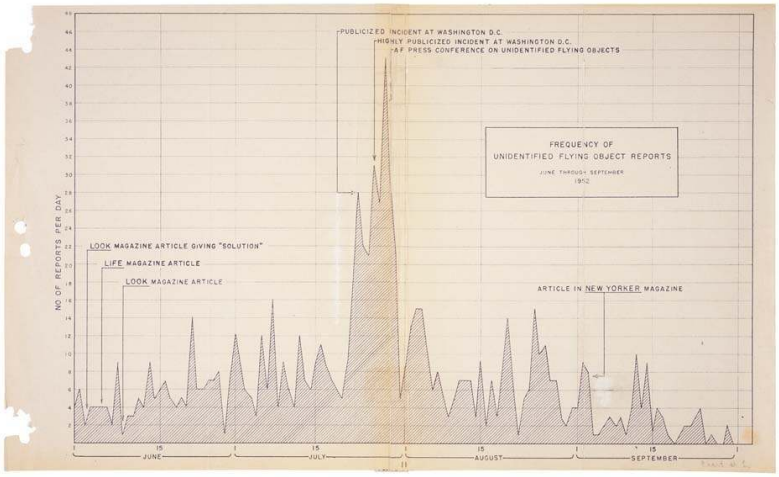
No further evaluation was attempted by SA [redacted] concerning the

Guy Hottel memo, FBI, 1950. The FBI states that this document does not prove the existence of UFOs: it is an unverified second- or third-hand claim.

Real Files: Project Blue Book, FBI Vault, CIA

The strength of The X-Files also comes from the fact that fiction draws on real documentary matter. The United States did produce, classify, declassify and archive thousands of pages related to UFOs and later UAPs. The National Archives notes that Project Blue Book, a U.S. Air Force program, collected 12,618 sightings between 1947 and 1969, of which 701 remained “Unidentified.” The same official document also states that the Air Force found no evidence of a national security threat, no evidence of technology beyond scientific knowledge, and no evidence that unidentified sightings were extraterrestrial vehicles.

This ambiguity is essential: archives exist, but the existence of an archive is not proof of contact. The FBI's Hottel memo, one of the most viewed documents in the Vault, is exemplary: spectacular in wording, yet explicitly framed by the FBI as indirect, uninvestigated and non-conclusive information. The CIA also released sets of documents on UFO sightings, including a page ironically titled “Take a Peek Into Our X-Files,” showing how deeply the series has shaped the way archives themselves are presented.



Project Blue Book document preserved by the National Archives. The archive is less an answer than a field of method: classify, compare, reread, doubt.

“I want to believe”: belief as a motor of attention, but also as a risk of projection.

Secrecy as Language

In The X-Files, secrecy is not only what hides the message. It becomes a form of message. Black bars, redacted pages, institutional silences, displaced witnesses, disappearing evidence: all of this composes a second language, a negative language. What is missing becomes almost as important as what is shown.

For A.L.I, this idea is decisive. A non-human civilization might deliberately limit the amount of information it transmits. A government might filter a signal. An AI might reconstruct a structure from fragments. An archive might be readable only through its absences. Contact might not be a luminous apparition, but a statistical difference in a corpus, an abnormal repetition, an organized gap.

Roswell, Area 51 and Administrative Mythology

The series also reworks the major sites of ufological imagination: Roswell, Area 51, military bases, biological experiments, secret agreements. The National Archives states that official research on Roswell did not establish a UFO event or a government cover-up, and that the recovered material was interpreted as related to a then-classified balloon program. Culturally, however, Roswell functions as a persistent narrative structure: the idea that a real event was covered by a technical explanation.

This is exactly the tension that interests the series: rational explanation, political concealment and the desire to believe. The point is not to treat every rumor as truth, but to understand why certain narrative forms become durable. A society also produces its languages through what it hides, what it fears and what it hopes for.

Little A'Le'Inn, Rachel, Nevada: Area 51 as a territory where military archive, UFO tourism and the imagination of secrecy overlap.

Around Area 51, images are not merely evidence or scenery: they become a cultural landscape. The inn, signs, desert roads and saucer silhouettes build a popular interface of secrecy. This is another lesson for A.L.I: a contact hypothesis also produces places, gestures, economies, icons and ways of looking at the sky.

From File to A.L.I Interface

One could imagine an A.L.I protocol inspired by The X-Files: each anomaly would be described through several layers. Layer 1: raw observation, date, location, sensors. Layer 2: human testimonies, contradictions, social context. Layer 3: technical analysis, noise, artifacts, possible errors. Layer 4: symbolic and cultural patterns. Layer 5: communication hypotheses. Layer 6: degree of uncertainty.

This protocol would transform the fantasy of the secret file into an artistic and scientific tool. The article, image, sound, map, spectrogram, transcript and testimony would become facets of the same interface. Instead of saying “the truth is out there,” A.L.I could propose: truth may lie in the way several sign systems overlap before they have become a language.

Projections: Listening to Archives

The most fertile path would be to create an installation functioning as a living archive room. Declassified documents, radio signals, fragments of abduction narratives, scientific reports and astronomical data would be linked by an AI. The visitor would not seek a single answer, but explore constellations of evidence. When a pattern repeats across sources, the interface would make it appear as a green line, a vibration, a breath, a hypothesis.

From this perspective, The X-Files becomes less a series about extraterrestrials than a series about our difficulty reading. It teaches us that contact, if it happens, may not immediately be recognizable as contact. We may first have to learn to read noise, silences, classifications, false positives and collective dreams. A.L.I can carry this lesson forward: invent tools to think evidence without killing imagination, and welcome imagination without abandoning critical demands.

Sources and Further Reading

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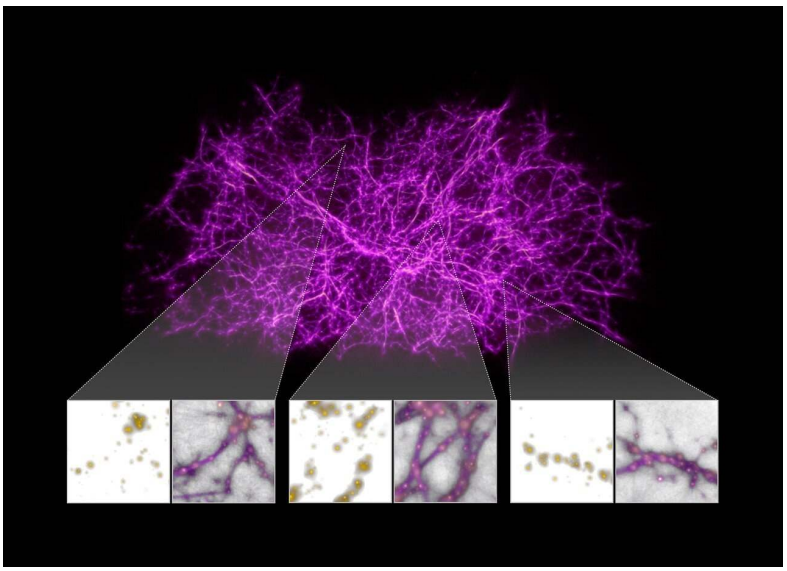
NASA - UAP Independent Study (guez.org/ali/609)

55 - Biological networks, mycelium and dark matter: the language of the collective

Keywords: biological networks, mycelium, trees, fungi, collective intelligence, dark matter, cosmic web, rhizome, Pluribus, We Come in Peace, A.L.I



Map of the cosmic web generated with an algorithm inspired by slime mould behavior. Source: NASA / ESA / J. Burchett & O. Elek, image distributed through Wikimedia Commons.

Summary

From roots to fungi, from swarms to dark-matter filaments, this article explores the hypothesis of a distributed collective language in which the 'we' precedes the individual.

Text

Summary

A language is not always produced by an individual. It can emerge from a network: roots, mycelium, swarms, colonies, chemical signals, electrical flows, information distributed through a medium. At cosmic scale, dark matter and galaxies also draw a web of filaments: the cosmic web. This article proposes an A.L.I hypothesis: what if extraterrestrial intelligence were not a voice, but a network? What if the first interlocutor were not an “I”, but a distributed “we”?

1. Trees do not speak like us, but they exchange

Suzanne Simard’s research showed that trees can be linked by mycorrhizal networks: associations between roots and fungi able to move carbon, nitrogen, phosphorus and stress-related signals. These studies strongly fed the popular idea of a “wood wide web”. But precision matters: not all scientists accept the image of an intentional forest internet. Transfers exist, but their interpretation as organized communication remains debated depending on context, species and methods.

For A.L.I, this controversy is useful. It forces us to distinguish three levels: matter transfer, biological signal, and message. Does a flow become language because it carries information? Or does it require intention, syntax, response? Forests teach us that communication can be slow, diffuse, chemical, local, and still structurally decisive.

Mycelium in a forest floor: a living network linking matter, decomposition, nutrition and signaling. Photo: Lex VB, Wikimedia Commons.

2. Fungi: networks, impulses, interpretations

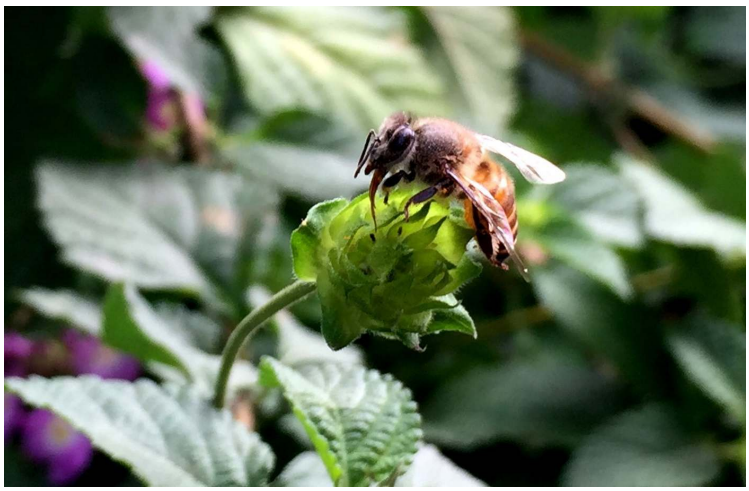
The fungus is a radical model for thinking non-human intelligence. It has no central brain, yet it explores, connects, digests, remembers chemical gradients and redistributes matter. Research on fungal electrical impulses, especially by Andrew Adamatzky, has even proposed comparing some spike trains to lexical structures. This is stimulating, but it should be read as a hypothesis, not as proof that fungi “speak” in the human sense.

This shift matters: extraterrestrial language may resemble neither voice, nor writing, nor binary code. It could be network behavior: density changes, growth orientation, impulse rhythms, color shifts, resource distribution, emergence of a large-scale pattern.

3. In the air: swarms, flights, colonies

Collective communication is not only underground. Bird murmurations, fish schools, bees, termites and ants produce global forms without a single leader. Each individual follows simple rules: distance, alignment, avoidance, attraction, response to gradients. The result becomes a form larger than each element.

In air, water or colony architectures, the message is not always “sent”: sometimes it is embodied by collective behavior itself. A wave in a fish school, a bee dance, a pheromone trail or a flight variation can be read as a spatial sentence.



In bees, dance and chemical signals articulate orientation, distance, food and coordination. A spatial, bodily, collective communication.

4. The “we” before the “I”

Our culture often imagines the extraterrestrial as an individual: a face, a voice, a body, an interlocutor. Yet many terrestrial intelligences are distributed. An ant colony solves problems without a central brain. A fungal network explores territory without a single subject. Slime mould can find efficient paths and remember situations without a nervous system.

Contact may therefore not be a meeting between two individual consciousnesses, but between two regimes of collectivity. In that case, the question “who is speaking?” becomes harder. Are we addressing a species, a colony, a network, a planet, an atmosphere, a biosphere, an infrastructure?

5. From mycelium to the cosmic web

The comparison between mycelium and the cosmic web is visually striking: filaments, nodes, voids, densities, circulation. Scientifically, the mechanisms must not be confused: a fungal network is biological, metabolic and evolutionary; the cosmic web is structured by gravity, dark matter, cosmic expansion and the history of the Universe. But the analogy is fertile for A.L.I: it lets us imagine messages that are not localized in one point, but distributed through an architecture.

If dark matter forms a web where galaxies condense along nodes and filaments, then the visible Universe itself appears as a writing of density. It is not an intentional message in the classical sense. But it is a readable structure: a physical grammar in which forms arise from constraints.

6. Pluribus: when the collective becomes civilization

Pluribus, Apple TV series by Vince Gilligan: the imaginary of the collective, the “we” and shared consciousness becomes a political and existential question. Apple TV promotional image.

Vince Gilligan’s Pluribus stages a world in which the collective becomes central. Its interest for A.L.I lies in the ambiguity of the “we”: can a shared intelligence be a higher form of peace, or the disappearance of alterity? If everyone thinks together, what happens to contradiction, secrecy, solitude, poetry, error?

For an interstellar language, this question is decisive. A very advanced extraterrestrial civilization might not present itself as a sum of individuals, but as a collective field. We would look for a sender; it might be a distributed state. We would expect a sentence; it might produce a cognitive climate.

7. We Come in Peace: the extraterrestrial as fungus

We Come in Peace / Vi kommer i fred: the imaginary of fungal contact shifts the extraterrestrial from the spaceship toward spore, contamination, network and medium. Promotional image referenced through TMDb.

We Come in Peace extends a strong intuition: what if the extraterrestrial did not arrive as a metal machine, but as a fungal form, a spore, a contamination, a growth? The fungus is an ideal figure of alterity: neither animal nor plant, living through relations, transforming environments, operating in the invisible, sometimes appearing only through fruiting bodies while its real body is elsewhere, underground.

This matches an A.L.I hypothesis: an extraterrestrial intelligence might not try to “speak”, but to colonize a channel, modify a medium, make a territory more readable for itself. Contact would become ecological before becoming linguistic.

8. A.L.I hypothesis: a rhizomatic language

We can therefore imagine a non-centralized communication protocol. Instead of sending one message from one transmitter to one receiver, we would create a network of distributed micro-signals: lights, sounds, vibrations, data, humidity, temperature, electrical impulses, chemical traces. Meaning would not lie in one isolated sign, but in the way signs synchronize, propagate and transform.

Such a language could take the form of a rhizome: no absolute beginning, no center, but nodes, returns, bifurcations. Reading it would mean observing a dynamic ecology rather than translating a sentence.

9. Possible prototype: a signal garden

An A.L.I device could be built as a living installation: humidity sensors in substrate, electrodes in a mycelial network, microphones, thermal camera, LEDs, speakers, real-time visualization. The public would see a network respond to stimulations: light, sound, breath, presence, vibration. The data would be transformed into sound and light patterns.

The aim would not be to claim that the fungus speaks English, but to test a threshold: when does a set of variations become readable as intention? When does a medium become an interlocutor?

10. From ecosophy to an ecology of reception

Describing living networks is not enough. As soon as human beings observe, measure, exploit or attempt to translate a forest, a soil or an animal community, they already adopt a moral position. The question is therefore not only what nature communicates, but under which conditions we can listen without reducing its forms of existence to resources, data or metaphors useful to our species alone. Before imagining contact with extraterrestrial intelligence, A.L.I must examine the quality of contact we know how to establish with terrestrial intelligences, their environments and their temporalities.

10.1. Extending the moral community

In A Sand County Almanac (guez.org/ali/610), Aldo Leopold formulates a “land ethic”: soils, waters, plants and animals are no longer an external setting for humanity, but members of a biotic community on which we depend. This extension does not mean that all beings have identical rights or that every intervention should be prohibited. It asks us to judge an action by its effects on the integrity, stability and capacity for renewal of the living collective. Humans cease to be owners of the system and become responsible participants within it.

This attitude also transforms knowledge. Scientific measurement is never entirely external to what it measures: placing a sensor, isolating a species, sampling soil or training artificial intelligence on animal sounds modifies the relations being studied. An ethics of attention therefore requires protocols to document their own effects, avoid irreversible extraction and recognize the value of what cannot immediately be converted into usable information.

10.2. Ecosophy: environment, society and subjectivity

Arne Næss’s ecosophy (guez.org/ali/611) invites each person to build a lived philosophy of their relations with the world. It engages our ways of dwelling, our needs, our definition of

fulfilment and the extension of the self to the relations that make it possible. So-called “deep” ecology challenges the idea that nature has value only through the services it provides to humanity.

Félix Guattari shifts the concept further in The Three Ecologies (guez.org/ali/612), linking environmental, social and mental ecologies. Destroying an environment, standardizing forms of life and impoverishing subjectivities belong to the same process. For A.L.I, a receiving device can therefore never be reduced to an antenna or algorithm. It also includes a community of interpreters, narratives, expectations and power relations that determine what may be heard as a message.

Ecosophy must not, however, become a vague spiritualization of biological networks. Trees, fungi and animals do not necessarily form a global harmony; cooperation coexists with predation, competition and rupture. Its contribution is methodological: it connects ecological facts to the social and sensory forms through which we receive them, while keeping scientific results, philosophical interpretations and artistic proposals distinct.

10.3. Diplomacy with the living

The work of Philippe Descola (guez.org/ali/613) reminds us that the modern separation between objective “nature” and humans as the sole bearers of culture is not universal. Other societies organize continuities and differences among humans, animals, plants, spirits and places differently. This plurality prepares a fundamental question of contact: an alien intelligence may share neither our division of beings nor our distinction between subject, object, organism and environment.

Through interspecies diplomacy, Baptiste Morizot (guez.org/ali/614) proposes beginning with concrete signs, territories and conflicts of use in order to compose coexistence rather than impose an abstract peace. Vinciane Despret (guez.org/ali/615) shows that the quality of an animal’s response often depends on the quality of the question and experimental setting. This diplomacy echoes Donna Haraway’s invitation to stay with the trouble (guez.org/ali/616): remaining within imperfect, interdependent relations without waiting for a total solution that would erase conflict.

10.4. From ecological reception to an ecology of reception

In “La réception écologique de la Nature chez Serge Moscovici” (guez.org/ali/617), sociologist Hélène Houdayer analyzes a body of thought in which nature and society can no longer be separated. For Serge Moscovici, nature is not an untouched outside opposed to culture: it is a historical reality transformed and inhabited by societies, while natural elements participate in shaping our practices, sensitivities and conflicts. Ecology becomes both a critique of production and consumption and a force for social experimentation, autonomy and collective participation.

“Ecological reception” describes how a place becomes a lived environment. People are no longer mere spectators of an external environment: they incorporate environmental values, act upon their living conditions and become responsible for the relations that compose them. This reception combines objective dimensions — soil, biodiversity, climate and resources — with subjective dimensions — attachments, representations, memory, fear, pleasure and protection. To inhabit an environment is to receive it from within through everyday practices that make a complete separation between human activity and physical elements impossible.

This reading directly extends Serge Moscovici's De la nature: pour penser l'écologie (guez.org/ali/618). Reception is not the final stage of transmission: it is the process through which an environment becomes perceptible, shared and politically transformable.

From this lineage, A.L.I proposes extending ecological reception toward an "ecology of reception" for non-human signals. Just as natural space becomes an environment only through physical, social and sensory relations, a signal becomes a message only within a receiving environment. Antenna, organism, algorithm, memory, institution, narrative and community of interpreters form that environment together. Receiving is never passive: the receiver selects a frequency, constructs a threshold, compares patterns and is itself transformed through the relation.

Attention before interpretation. A phenomenon should first be observed through its duration, variations and context before being declared a message.

Reciprocity before extraction. A protocol should ask not only what an environment can teach us, but what our presence does to it and what we can return.

Reversible devices. Whenever possible, sensors, transmissions and experiments should be stoppable without leaving lasting degradation.

Plurality of interpreters. No single discipline should own the meaning of a signal. Documented disagreement protects against premature certainty.

10.5. Before interstellar contact

Our relation to terrestrial non-humans is a moral laboratory for interstellar contact. A civilization that can listen to a forest, an animal or a soil only by turning them into commodities risks reproducing the same violence when faced with cosmic alterity. Conversely, learning to recognize agents whose signs are slow, distributed, collective or ambiguous trains us not to confuse intelligence with resemblance to ourselves.

The first act of communication may not be sending a message, but preparing a world capable of receiving without capturing. A.L.I can then be understood as a school of attention: inventing instruments that listen across scales, protocols that leave room for silence, and narratives that make a response conceivable without deciding its form in advance. Contact would mean less the conquest of information than becoming responsible for the relation opened by that information.

11. Conclusion: learning to listen to the network

This path deeply shifts A.L.I. Interstellar contact may not only be a question of antenna, message, translation or mathematics. It could be a question of reception ecology. To hear a collective intelligence, we may need to build a collective receiver: humans, machines, plants, fungi, sensors, AI models, archives, artists and scientists.

The language of the future may not be a language. It may be an organized form of coexistence, a mesh, a forest, a constellation of signals.

Sources and paths

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56 - Neutrinos: the ghost language that crosses worlds

Keywords: neutrinos, SETI, particle physics, IceCube, interstellar communication, signal, particles, art science

IceCube Neutrino Observatory, South Pole. Image: Wikimedia Commons / IceCube Collaboration.

Summary

What if an advanced civilization chose to speak not with light, but with particles able to cross planets? Neutrinos open a fascinating scenario for A.L.I: an almost invisible language, extremely costly, but conceptually immense.

Text

In the usual imagination of contact, an extraterrestrial message arrives through light: radio waves, lasers, optical flashes, electromagnetic modulation. But there is another family of messengers, far more discreet: neutrinos. These elementary particles, produced by the Sun, supernovae, nuclear reactors, particle accelerators and extreme cosmic events, interact so weakly with matter that they can cross the Earth almost as if it were transparent.

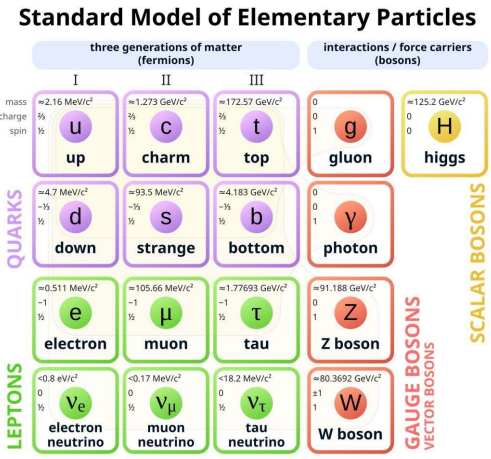
For A.L.I, this property opens a vertiginous hypothesis: could a contact language be designed not to be immediately visible, but to cross opacity? Could a message be sent through a planet, a star, a dust cloud, or a region of space where light is blurred? The neutrino is not only a particle: it is a figure of the ghost message, the sign that passes through while almost refusing to be captured.

An almost invisible particle

The neutrino belongs to the Standard Model of particle physics. It exists in several flavors, associated with the electron, the muon and the tau. Its mass is extremely small, its electric charge is zero, and it interacts with matter only through the weak interaction and gravity. This discretion makes it paradoxical: it is everywhere, but almost undetectable.

Every second, billions of solar neutrinos pass through our bodies. They do not speak to us,

they barely touch us, they leave no sensible trace. Yet in giant detectors such as Super-Kamiokande in Japan or IceCube in Antarctica, a few rare interactions become visible as Cherenkov light, produced when a charged particle created by a neutrino interaction crosses a transparent medium faster than light propagates through that medium.



The neutrino in the Standard Model: an almost silent elementary particle, yet essential to reading the cosmos. Image: Cush / Wikimedia Commons.

The precedent: sending a message with neutrinos

The idea is not purely speculative. In 2012, a team of researchers demonstrated that a message could be transmitted using a neutrino beam. The experiment, carried out with Fermilab's NuMI beamline and the MINERvA detector, encoded the word neutrino and sent it through roughly 240 meters of rock. The data rate was extremely low and the infrastructure enormous, but the principle was established: human information can be converted into a modulation of a neutrino beam and reconstructed at reception.

This experiment does not make neutrino communication practical today. Instead, it reveals a fertile limit: when a channel is almost impossible to use, it clarifies what communication really means. One must decide what to encode, how much energy to spend, how much redundancy to produce, what detector to build, and what kind of patience to adopt.

Why would an advanced civilization choose this channel?

A civilization capable of producing and detecting neutrino beams precisely might be tempted by this medium for several reasons.

- Crossing obstacles: where light is absorbed, blurred or scattered, neutrinos keep moving.
- Sending without a visible surface: the message can pass through a planet and reach a receiver on the other side.
- Signing a high technological threshold: a highly structured artificial neutrino signal would be difficult to confuse with natural noise.
- Creating a rare communication: this channel selects its receivers. It speaks only to those who have already developed advanced experimental physics.

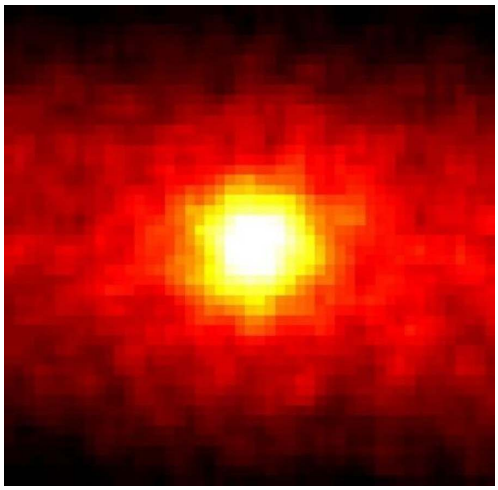
This last idea matters for A.L.I: some languages may not be designed to be universal in an immediate sense, but to become legible only beyond a technical, cosmological or cognitive threshold. A neutrino message would then be less a bottle thrown into the sea than a message placed behind a door: it forces the receiver to build the instrument that makes it

perceptible.

Kamiokande / Super-Kamiokande: detecting the almost invisible requires monumental architecture. Image: Wikimedia Commons.

Reading the Sun in neutrinos

Neutrinos have already transformed the way we look at the sky. Detectors do not simply see luminous objects: they allow us to observe internal processes. The Sun, for example, can be reconstructed from neutrinos produced in its core. This changes the very notion of an image: we no longer photograph a surface, we capture a deep activity.



The Sun in neutrinos, reconstructed by Super-Kamiokande. Source: NASA APOD / Super-Kamiokande Collaboration.

A neutrino message could operate through the same reversal: not as an image placed before us, but as a structure emerging statistically from events that are almost indistinguishable. The language would not be a sentence, but an accumulation, a patience, a form understood only after enough occurrences have been collected.

A.L.I hypothesis: an alphabet of crossing

One can imagine a minimal neutrino alphabet. Each symbol would not be a spoken letter, but a measurable configuration: average energy, pulse rhythm, apparent direction, time distribution, alternation of silences and bursts, prime-number repetitions, variation in event frequency. A grammar could emerge from the combination of three dimensions: time, energy

and direction.

The first message should not be narrative. It could be a demonstration of structure: prime numbers, physical constants, recognizable periodicities, then very simple images reconstructed statistically. As with Arecibo, a matrix would be needed. But here the matrix would not be a radio packet: it would be a cloud of rare events distributed in time.

Thought protocol

- Produce a sky simulation in which each point corresponds to a detected neutrino event.
- Encode a simple image into a series of statistically rare pulses.
- Add natural noise, as if the message crossed a realistic cosmic environment.
- Ask an AI program to recover the hidden structure without knowing the initial code.
- Compare several methods: correlation, unsupervised learning, sequence models, time-energy transforms.

This experiment could become an installation: a dark room, a sky of points, nearly silent events, and an image that appears only after several minutes of observation. The public does not receive a message immediately. It learns to wait, to suspect an organization, to move from perception to decoding.

Limits and beauty of the impossible channel

Neutrino communication is currently unrealistic for ordinary use. It requires powerful accelerators, enormous detectors, considerable energy and a very low data rate. But this is precisely what makes it conceptually interesting. It forces us to imagine a language in which every bit is costly, every symbol must be justified, and silence is almost the whole message.

From an A.L.I perspective, the neutrino proposes an aesthetics of rarity. A civilization speaking this way might not be trying to chat. It would produce slow, deep inscriptions able to cross worlds. It would write in almost nothing, with particles that almost never stop.

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- IceCube image - Wikimedia Commons (guez.org/ali/623)

57 - The Gaia Hypothesis: stellar bodies, brain and universe-organism

Keywords: Gaia, Lovelock, Margulis, brain, universe, cosmic web, neurons, Earth, organism, cosmology, art science

Earth seen from Apollo 17, often called Blue Marble. Image: NASA / Wikimedia Commons.

Summary

From Lovelock and Margulis to contemporary comparisons between neuronal networks and the cosmic web, this article studies the hypothesis of global organisms: living Earth, stellar bodies, network-universe and the brain as a possible structural miniature of the cosmos.

Text

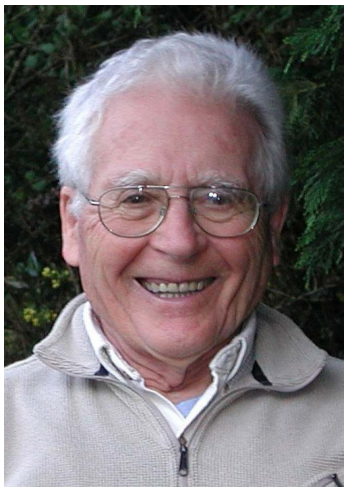
The Gaia hypothesis, formulated from the work of James Lovelock and developed with Lynn Margulis, proposes a powerful idea: Earth is not merely an inert support on which life appears, but a self-regulating system in which atmosphere, oceans, rocks, climates, bacteria, plants, animals and chemical activities help maintain conditions relatively favorable to life. Gaia is not necessarily a goddess, nor a planetary consciousness in a mystical sense. In its scientific core, it describes a planet functioning as a coupled whole, with feedback loops, unstable equilibria and emergent regulations.

For A.L.I, this hypothesis opens an essential shift: if a planet can be thought of as a global organism, then an extraterrestrial language should not only be sought in the productions of a localized species. It might be inscribed in the rhythms of an entire world: atmospheric composition, climatic oscillations, biological symbioses, mineral cycles, electromagnetic signals, root networks, migrations, clouds, oceans, ionosphere. The question becomes: how do we listen to a planetary body?

Gaia: a hypothesis of regulation

In the 1970s, Lovelock observed that Earth's atmosphere is far from the chemical equilibrium expected for a merely mineral planet. The simultaneous presence of oxygen, methane, nitrogen and other compounds indicates continuous activity. Margulis, a microbiologist, brought a decisive support: microbes, symbioses and cellular evolution show that life deeply transforms its environment. The atmosphere is not a background: it is a historical product of life.

The strength of Gaia lies in this inversion. Life does not simply adapt to the planet; it modifies the planet which, in turn, modifies life. Organism and environment can no longer be strictly separated. The biosphere becomes a system of relations, a machine of equilibria, a collective writing recomposed at every scale.



James Lovelock, chemist and originator of the Gaia hypothesis. Image: Wikimedia Commons.

Lynn Margulis, biologist, theorist of endosymbiosis and a major figure in Gaia thinking. Image: Wikimedia Commons.

From planetary body to stellar bodies

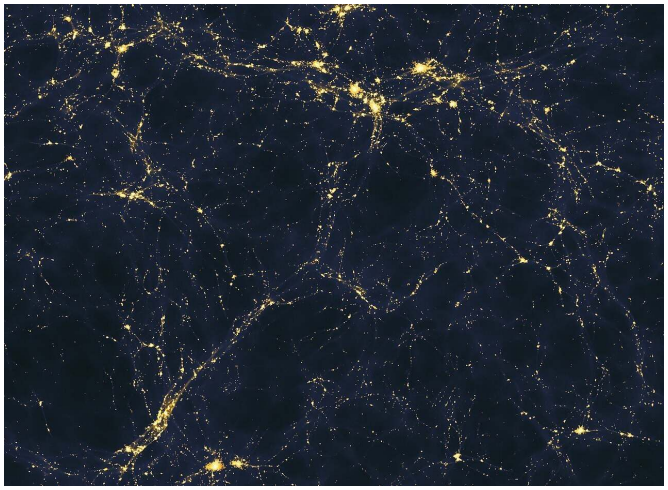
If Gaia is extended, one can speak of stellar bodies: planets, stars, planetary systems, nebulae, galaxies. Of course, not all of them are alive in a biological sense. But each organizes flows: energy, matter, magnetic fields, plasma, dust, radiation, gravitation. A star is a thermonuclear body; a planet is a geochemical body; a galaxy is a gravitational body; a

solar system is a dynamic ecology of orbits, resonances and transfers.

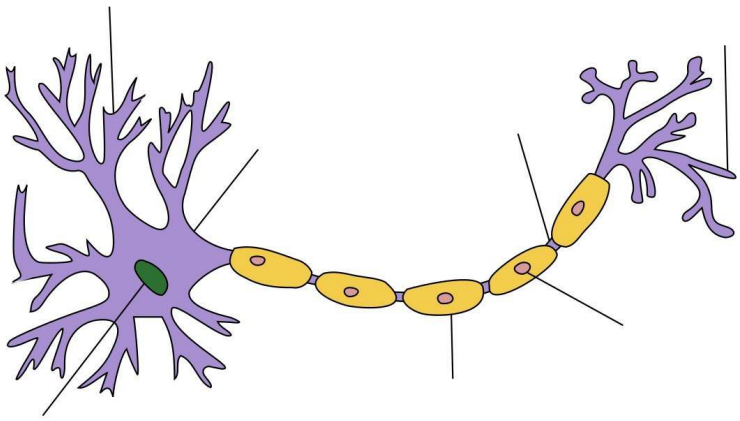
The A.L.I question is not to claim that these bodies think like us. It is to ask whether an extremely vast body can produce forms of coherence which, at its own scale, resemble behaviors: self-regulation, memory, critical thresholds, attractors, cycles, signals. In this frame, an extraterrestrial message might not be a sentence sent by a mouth, but a modulation in the regimes of a celestial body.

Brain and universe: a comparison across distance

In recent years, researchers have compared the structure of the cosmic web and certain neuronal networks. The article by Franco Vazza and Alberto Feletti, published in Scientific Reports in 2020, is often cited because it quantitatively examines similarities between matter distribution in the universe and the organization of neuronal networks, especially in the cerebellum. The two systems are separated by vertiginous scales, yet both display network motifs: nodes, filaments, voids, connections and hierarchical organization.



Large-scale luminous distribution: the observable universe as a network of filaments, clusters and voids. Image: Wikimedia Commons.



Neuronal diagram: dendrites, cell body and axon. Image: Quasar Jarosz / Wikimedia Commons.

Comparative analysis of scales

The comparison requires that visual resemblance and scientific equivalence are not confused. The orders of magnitude are enormous.

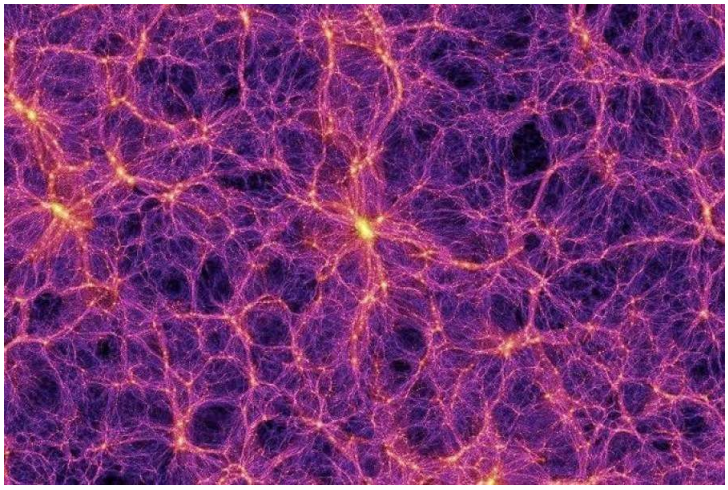
The human brain measures less than 20 centimeters, while the observable universe is roughly 8.8 × 1026 meters in diameter. The scale ratio is on the order of 1027 to 1028. Yet at very different levels one finds abstract principles: sparse networks, uneven densities, highly connected nodes, low-density zones, circulation of signals or flows, and dependence on a formation history.

It is therefore inaccurate to say: the universe is a brain. It is more rigorous to say: some structures of the universe and some brain structures can be compared as complex networks. The resemblance then becomes a tool for thought, not a proof of identity.

The mirror hypothesis: the brain as structural miniature

The speculative hypothesis proposed here is this: the brain may be a miniature not of the material universe, but of a universal mode of organization. When many elements interact under constraints of energy, distance, connection economy and memory, they can produce analogous architectures: filaments, hubs, hierarchies, loops, silent zones, local synchronizations.

From this perspective, our brain is not a magical copy of the cosmos. It would rather be a local occurrence of a more general logic: that of systems learning to organize flows. The cosmos organizes matter through gravitation; the brain organizes information through connection; Gaia organizes the conditions of life through feedback. Three scales, three matters, but one shared question: how does a system become more than the sum of its parts?



Cosmic web: an image of the filamentary structure of the cosmos. Image: Wikimedia Commons.

Consequences for A.L.I

If the hypothesis of global organisms is taken seriously, A.L.I can expand the notion of language. A language would no longer be only a discrete code between individuals. It could be:

- planetary: atmospheric variation, global chemistry, seasonal cycles, biosignature spectra;

- stellar: luminous modulation, magnetic activity, oscillations, plasma rhythms;
- galactic: abnormal energy distribution, artificial structures, coordinated signatures;
- cognitive: brain structures capable of recognizing in the cosmos a form that resembles them;
- artistic: an installation in which brain, Earth and cosmic web become three layers of one reading instrument.

Installation prototype: Gaia Mirror

One could imagine an installation entitled Gaia Mirror. It would combine three data streams: human brain activity, terrestrial climate data and maps of large-scale cosmic structure. The visitor would wear an EEG headset. Their brain rhythms would modulate an image of Earth; climate data would modulate a neuronal map; the cosmic web would serve as the structural background. The installation would not claim that everything is identical. It would make perceptible that radically separated scales can enter a shared visual and sonic grammar.

A program could then search for quantitative analogies: degree distribution, node density, modularity, average path length, silent zones, synchronizations. From these measurements, A.L.I could produce an alphabet of networks: not an alphabet of letters, but an alphabet of relational forms.

Extrapolation: listening to a foreign planet

In exoplanet research, we already look for biosignatures: oxygen, methane, water vapor, chemical disequilibria. A Gaia reading would go further: a living planet may have a dynamic signature, an active stability, a way of correcting disturbances. A non-human intelligence may not inhabit a planet; it may be distributed through its cycles. In that case, communicating with it would mean dialoguing with a global system.

The question then becomes almost vertiginous: if our brain recognizes in the universe forms resembling its own, is it because it projects its structures, or because it was itself born from a universe capable of producing networks? A.L.I can stand in this interval: between human projection and the discovery of a cosmic grammar.

Sources and paths

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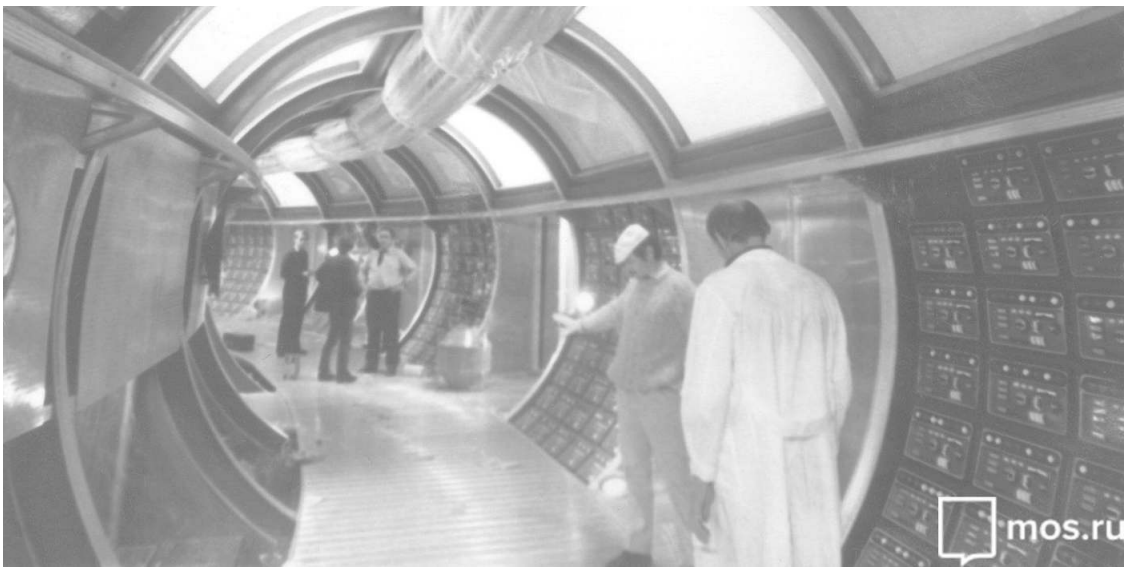
58 - Conscious Planets and Living Zones: Pop Culture of Contact Without Dialogue

Keywords: Solaris, Stanislaw Lem, Tarkovsky, Artemyev, Stalker, Annihilation, Sun Ra, Space Is the Place, pop culture, experimental music, A.L.I, contact without dialogue



Solaris, Andrei Tarkovsky, 1972. The planetary ocean does not converse with humans: it produces presences from their memories. Image used in the A.L.I visual corpus.

Summary

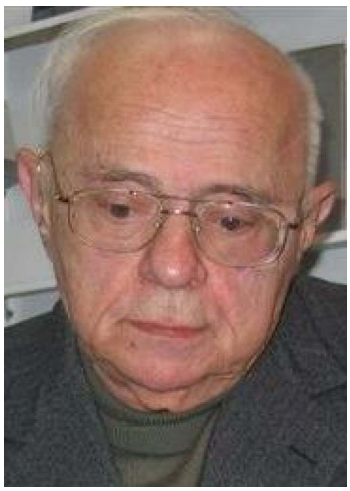
From Solaris to Stalker, from Annihilation to Sun Ra, pop culture imagines forms of contact where the extraterrestrial does not send a message: it becomes environment, memory, music, climate, or zone of transformation.

Text

Hypothesis: part of pop culture has already imagined a form of contact stranger than the exchange of sentences, radio signals, or mathematical symbols. In these works, extraterrestrial intelligence does not speak: it becomes a place, an ocean, a zone, a planet, a vibration, a music, a modification of reality. The message is no longer a transmitted object. The message is an environment that transforms us.

1. Solaris: When a Planet Reads Our Memories

Stanislaw Lem's novel Solaris, published in 1961, is one of the great works about the impossibility of contact. Humans study a planet covered by a living ocean. For decades they classify its forms, measure its movements, build an entire science, Solaristics. But Solaris remains opaque. It does not respond like a human civilization. It does not build a common grammar. It acts.



Stanislaw Lem. In Solaris, contact fails because the human does not meet an interlocutor, but an intelligence-planet. Photo: Mariusz Kubik, Wikimedia Commons, CC BY 2.5.

Solaris' answer is unsettling: it materializes figures drawn from the researchers' unconscious and memories. It is neither a language, nor a weapon, nor a simple hallucination. It is an operation on memory. Solaris does not translate its world into ours; it forces humans to face what they carry within themselves.

For A.L.I, Solaris asks an essential question: what if extraterrestrial intelligence did not seek to transmit content, but to produce a situation of knowledge? Contact would then be not a message to decode, but a device that reveals the receiver.

2. Tarkovsky and Artemyev: Listening to an Intelligence Without Speech

In Tarkovsky's film, the question of language also passes through sound. Eduard Artemyev's music, combining electronic texture, organic depth, and an almost liturgical presence, does not describe Solaris: it makes a voiceless thought audible. The film also uses Bach as a terrestrial memory, a human remainder projected into space.

Eduard Artemyev, composer associated with Tarkovsky's films. His electronic work turns sonic space into an organism: layers, pulses, thresholds, presences. Photo: Const740, Wikimedia Commons, CC BY-SA 4.0.

This dimension matters: some forms of otherness may not be understood through semantics, but through immersion. A long sound, a vibration, a slow modulation can become forms of

environmental thought. Experimental music, from analog electronics to contemporary drones, offers a model of non-verbal contact: one does not explain the signal, one enters its regime.

3. Stalker and the Zone: A Place That Answers Differently

With Stalker, Tarkovsky extends the idea in another direction. The Zone is not merely a post-extraterrestrial setting. It is a space where ordinary laws seem displaced, where human intention turns back on itself, where the straight path is not the right path. Contact is topological: it takes place through paths, waiting, prohibitions, detours, thresholds.

The Zone can be understood as a medium: it does not speak, but it organizes experience. Image from Jägala, a site often associated with the industrial imaginary of Stalker. Photo: Hannu, Wikimedia Commons, public domain.

In this logic, an advanced extraterrestrial civilization might not send a sentence. It might create a zone of experience: a field of constraints, a reactive environment, an architecture where our behavior becomes the alphabet. A.L.I could then study not only messages, but place-messages.

4. Annihilation: The Shimmer as Biological Translation

In Annihilation, Jeff VanderMeer's novel and Alex Garland's film, contact takes the form of a refracting zone. The Shimmer transforms organisms, mixes biological identities, alters forms, voices, memories. The extraterrestrial is not presented as a species declaring an intention. It acts as a principle of mutation.

This work is especially useful for A.L.I because it moves language toward the living. The message is no longer written in an alphabet: it is inscribed in tissues, symbioses, deformations, copies. Communication could be biology in the process of rewriting itself.

5. Sun Ra: Cosmic Music and Fiction of Origin

With Sun Ra, the extraterrestrial becomes a poetic, political, and sonic strategy. In the Afrofuturism of Space Is the Place, space is not merely a science-fiction backdrop: it is a possibility of emancipation, identity displacement, and active mythology. Sun Ra does not try to prove contact; he creates a world where music serves as a cosmic vehicle.

Space Is the Place, 1974. Sun Ra turns extraterrestrial language into performance, music, costume, ritual, and politics of the future. Poster: North American Star System Production / El Saturn Research, Wikimedia Commons, public domain.

For A.L.I, this path is decisive: an interstellar language could be performative. It does not describe a world; it makes one appear. Experimental music, cosmic jazz, noise, modular synthesizers, ritual singing, and sonic architecture can become laboratories for non-human signals.

6. Toward a Pop Typology of Non-Verbal Contact

These references draw a family of contacts where the extraterrestrial does not appear as a classical interlocutor:

- Memory-contact: Solaris produces presences from the human past.
- Zone-contact: Stalker imagines a place that transforms the rules of action.
- Biology-contact: Annihilation thinks otherness as mutation and recombination.
- Music-contact: Sun Ra makes sound a mythological and political spacecraft.
- Atmosphere-contact: Artemyev's electronic layers turn sonic space into diffuse intelligence.

This typology is useful because it avoids reducing contact to emission and reception. It requires us to consider indirect forms of communication: atmosphere, memory, landscape, biology, ritual, vibration.

7. Possible Experiments for A.L.I

Installation: The Environment That Answers

Create a room where visitors receive no explicit message. The device captures their movements, voice, heartbeat, or visual choices, then gradually modifies light, sound, and images. The public does not know whether the room responds, observes, or influences them. Language emerges from relation to the environment.

Program: Inverted Solaris

A piece of software collects memory fragments provided by several people: sentences, sounds, images, regrets, dreams. It never displays them directly. It transforms them into generative landscapes, sonic textures, slow forms. The visitor must recognize what comes from them and what comes from the system. The question becomes: where does the other

begin?

Sonic Protocol: Contact by Drone

Develop a very long composition made of slow frequencies, pulses, micro-variations, and recurring motifs. Isolated listeners describe what they perceive. The invariants are then searched for: shared mental images, bodily effects, recognized structures. Sound becomes a test of intersubjectivity.

8. Conclusion: The Extraterrestrial as Medium

Pop culture gives us a powerful idea: an extraterrestrial intelligence very different from us might not speak at all. It might envelop us, reflect us, transform us, make us cross a zone, alter us through sound or biology. Contact would no longer be a conversation. It would be an environmental experience.

A.L.I can therefore expand its field: looking for messages, yes, but also imagining environments that think. Because a truly foreign civilization might not send a sentence to Earth. It might create a condition in which we finally become able to perceive that someone, or something, is already answering.

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- Space Is the Place, Sun Ra (guez.org/ali/1090)

59 - Archaeology of the Unknown: Earthly Traces and Non-Human Messages?

Keywords: archaeology, xenoarchaeology, technosignatures, Nazca, Antikythera, Voynich, quipu, Göbekli Tepe, Phaistos, A.L.I, message

Nazca Lines, Peru. Photo: Wikimedia Commons, Diego Delso. Reference: UNESCO, Lines and Geoglyphs of Nasca and Palpa.

Summary

An A.L.I study of earthly artifacts, scripts, machines and monuments that raise the question of messages without readers: a critical xenoarchaeology of the unknown.

Text

Hypothesis: Earth already contains objects that behave, for us, like messages from partially lost worlds. They do not prove extraterrestrial intervention. But they raise a central A.L.I question: how can we recognize a message when the reader, the code, the use and the context have disappeared?

This line of inquiry could be called an archaeology of the unknown, or a form of terrestrial xenoarchaeology. The term xenoarchaeology is often used in science fiction and in some SETI reflections to describe the study of non-human artifacts. Here, the point is not to claim a non-human origin for earthly remains, but to build a method: to study some terrestrial objects as models of opacity, impossible translation, partial signal and memory without instructions.

A method: not confusing strangeness with proof

An ancient object can seem impossible for many reasons: it is technically complex, its writing can no longer be read, its scale exceeds ordinary perception, its ritual function escapes us, or its use has been separated from the community that knew how to interpret it. The mistake would be to fill that gap with spectacle. The A.L.I path is more useful: to treat each case as a decoding experiment.

Five questions can guide the study:

- Structure: does the object contain repetition, measurement, code or orientation?
- Medium: is the message carried by stone, metal, textile, skin, landscape, machine?
- Reader: at what scale was it meant to be read: hand, body, procession, sky, collective memory, instrument?
- Loss: what is missing today: language, ritual, technology, calendar, social use?
- A.L.I transposition: what would this case teach us if we received a truly non-human artifact?

Nazca: writing at a scale beyond the body

The Nazca lines and geoglyphs in Peru were traced in the desert between roughly 500 BCE and 500 CE. They depict animals, lines, trapezoids and geometric figures that become fully legible from altitude. They are studied as ritual, territorial, calendrical or cosmological productions, not as extraterrestrial messages.

For A.L.I, their value is immense: they show that a message may be designed for a scale that is not the reader's immediate scale. On the ground one sees a path, a segment, a trace. From above, the whole becomes a figure. This split between local inscription and global reading resembles an interstellar problem: a signal received in fragments may only become readable when the correct scale is reconstructed.

Göbekli Tepe: symbols before writing

Göbekli Tepe, Turkey. Photo: Wikimedia Commons. Reference: UNESCO, Göbekli Tepe.

Göbekli Tepe in Turkey is a Neolithic monumental site dated to around 9600-8200 BCE. Its T-shaped pillars, carved with animals and signs, belong to a world before alphabetic writing but already capable of organizing a complex symbolic space.

This site asks a deep question: does a message need writing? Sculpted animals, orientations, repetitions and monumentality can operate as a grammar without sentences. For A.L.I, this shifts the research: a non-human intelligence might not send words, but an arrangement of forms, positions, rhythms and thresholds.

Antikythera: a machine waiting for its reader

Antikythera mechanism, fragment A. Photo: Wikimedia Commons. Reference: research published notably in Nature.

The Antikythera mechanism, recovered from a Greek shipwreck and dated to the second or first century BCE, is often described as a mechanical astronomical calculator. Its complexity surprised researchers not because it was impossible, but because it forced a revision of what ancient technical cultures could do.

This case is essential: an artifact may appear anomalous simply because our technical history is incomplete. Surprise is not evidence of non-human origin. Yet Antikythera is a perfect model for a message-machine. It does not merely contain information; it contains a procedure, a calculation, a manipulable cosmology.

Phaistos Disc: the text without a family

Phaistos Disc, side A. Photo: Wikimedia Commons. Reference: Heraklion Archaeological Museum.

The Phaistos Disc, found in Crete, bears stamped signs arranged in a spiral. It remains famous because its system is not understood by consensus. The issue is not only the difficulty of the signs, but the lack of a large enough corpus to establish reliable repetitions.

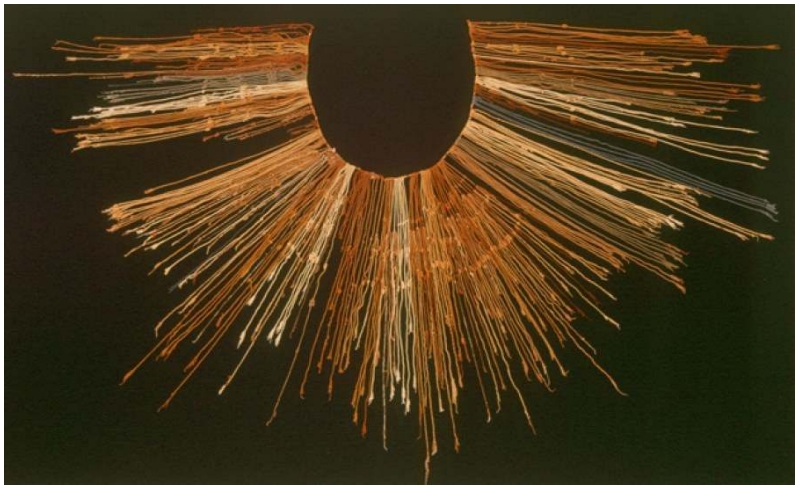
The disc shows a situation A.L.I might face: receiving a single beautiful, organized message that is too isolated to decipher. Without redundancy, without an internal dictionary, without multiple examples, a message may remain forever decorative.

Rongorongo: when the community of readers disappears

Rongorongo from Rapa Nui is a system of signs carved on wooden tablets, still not deciphered by consensus. It reminds us that writing is not just a set of forms: it is a community of practice, memory, transmission, teaching and reading.

For A.L.I, rongorongo is a warning: a message can become alien without coming from elsewhere. It is enough for the chain of readers to break. A civilization receiving our archives in a thousand years might see our disks, files or interfaces the way we see those tablets: intentional forms whose social key has vanished.

Quipu: data without alphabet



Inca quipu. Photo: Wikimedia Commons. Reference: Khipu Database Project, Harvard.

Andean quipus are devices of cords and knots used in the Inca empire to record information. They show that a culture can produce a data system without alphabetic writing. Color, material, position, twist, knot type and spatial order become variables.

For A.L.I, the quipu is one of the strongest examples: it demonstrates that a message can be tactile, textile, combinatorial and three-dimensional. If a non-human intelligence does not privilege vision or voice, its language may look more like a structure of tensions, textures, orientations or physical relations than a written sentence.

Voynich: the object that resembles a book without giving up its world

Voynich manuscript detail. Photo: Wikimedia Commons. Reference: Beinecke Rare Book and Manuscript Library, Yale.

The Voynich manuscript, held at Yale, combines undeciphered writing, strange plants, diagrams, figures and an encyclopedic organization. It fascinates because it looks like a learned book whose knowledge remains closed to us.

In a contact scenario, this may be our first situation: recognizing organization without knowing whether it encodes botany, astronomy, ritual, medicine, fiction, a lure or a private language. A.L.I must learn to work with objects that produce partial recognition.

Toward an archaeology of technosignatures

SETI research now speaks of technosignatures: observable clues of possible non-human technology. We often think of radio signals, lasers, atmospheric pollution, megastructures or energy anomalies. But another path exists: searching for artifacts, probes, traces or objects within the solar system. This is where the idea of xenoarchaeology becomes relevant.

The distinction matters: terrestrial archaeology starts from real but human objects that we do not always understand. Speculative xenoarchaeology would start from potentially non-human objects whose artificiality would first have to be established. In both cases, the initial problem is the same: distinguishing a natural form, a lost human form and an unknown artificial form.

What these objects teach A.L.I

These cases do not say “extraterrestrials have already been here.” They say something more rigorous and perhaps more vertiginous: even among humans, a message can become alien. A script without readers, a machine without a manual, a landscape without a viewpoint, a textile without a code or a book without a language already produces an experience of impossible contact.

For A.L.I, this opens a method:

- design messages with several scales of reading;
- add redundancy and examples;
- carry meaning through structure, not only vocabulary;
- think through tactile, luminous, mechanical, spatial or biological media;
- include a learning procedure inside the message;

- accept that a message may remain partially unreadable for a long time.

Installation proposal: Cabinet of Messages Without Readers

An A.L.I installation could gather reproductions, fragments, projections and objects inspired by these cases. The visitor would enter a cabinet of speculative archaeology: a central analysis table; around it, miniature geoglyphs, a cycle machine, coded cords, a generative manuscript, a tablet of signs and a program attempting to produce reading hypotheses.

The device would not search for “the correct translation.” It would show how an intelligence builds interpretations: detecting repetitions, proposing grammars, comparing media, simulating scales, searching for redundancy and visualizing uncertainty. The viewer would become the archaeologist of a message that may never have been written for them.

Perspective

The archaeology of the unknown is not a naive search for impossible objects. It is an imaginary but useful discipline: learning to read the limits of our reading. Before meeting a non-human civilization, we can already train with terrestrial objects that resist our codes.

Perhaps first contact will not begin with a voice in the sky, but with a silent object: too organized to be natural, too strange to be immediately human, too fragmentary to be translated. Then we will need an archaeology of signal: patience before forms that look back at us without yet speaking.

Sources and paths

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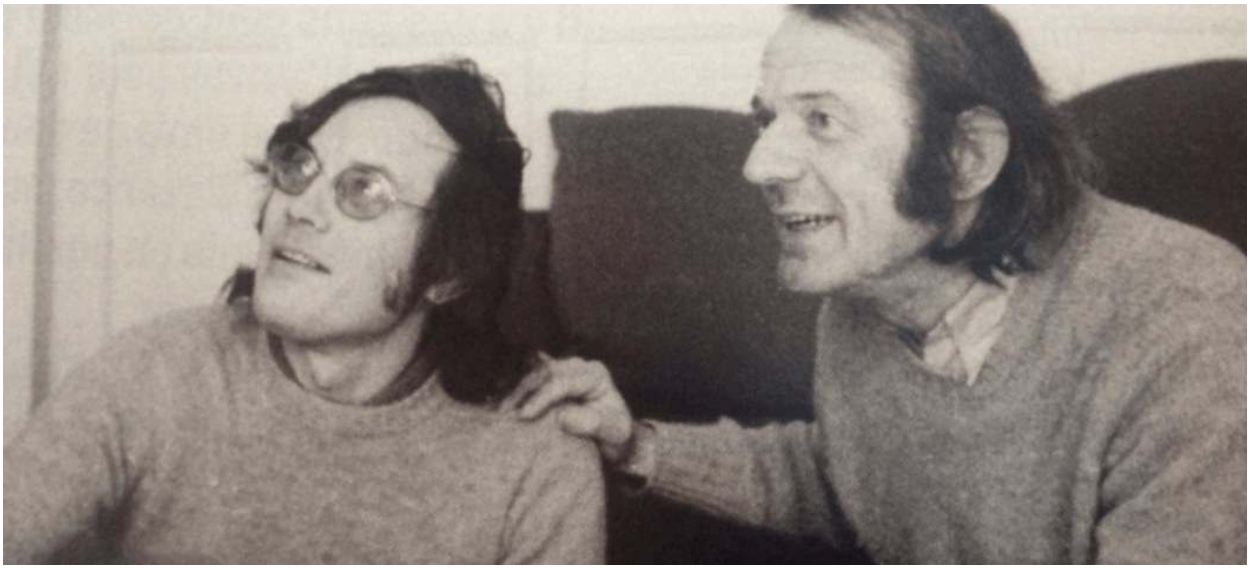
60 - Deleuze: Rhizome, Extreme Otherness and the Alien Organism

Keywords: Deleuze, Guattari, rhizome, otherness, collective intelligence, AI, posthumanism, assemblage, A.L.I, philosophy



Gilles Deleuze and Félix Guattari. Image provided for the A.L.I project. Their shared thought shifts language toward assemblage, multiplicity, becoming and rhizome.

Summary

An academic reading of Deleuze and Guattari for A.L.I: rhizome, becoming, extreme otherness, collective intelligence and AI as a non-centralized translation milieu.

Text

Hypothesis: Gilles Deleuze's thought, especially as it extends through his work with Félix Guattari, gives A.L.I a rigorous way to think extreme otherness. Not the other as an exotic interlocutor, but the other as a system of relations, speeds, perceptions, becomings and connections that exceeds human categories. The rhizome can then be read as a model for an alien organism: non-centralized, multiple, proliferating, without a single origin, producing meaning through connections rather than hierarchy.

1. Deleuze and otherness as a philosophical problem

For Deleuze, otherness cannot be reduced to a moral encounter with another subject. It first passes through a critique of identity. In Difference and Repetition, Deleuze attempts to think difference in itself, without reducing it to resemblance, opposition or analogy. This is fundamental for A.L.I: an extraterrestrial intelligence may not be a variation of the human, but a positive and irreducible difference with its own operations.

Thinking extreme otherness therefore requires us not to begin by asking: “what does it resemble?” We should instead ask: what relations does this intelligence produce? What signs affect it? What speeds, thresholds, intensities and connections define its world? Deleuze

shifts analysis from being to functioning, from essence to assemblage.

For A.L.I, this changes the question of contact. If a non-human civilization appears in a radically different form, it may not be identifiable as a “speaking subject.” It may be a network, distributed organism, field of behaviors, techno-biological ensemble, planetary memory, collective machine or cloud of relations.

2. The rhizome: thought without a center

Botanical rhizome. Image: Wellcome Collection / Wikimedia Commons. The rhizome grows through lateral ramifications, resumptions and non-hierarchical connections.

In the introduction to A Thousand Plateaus, Deleuze and Guattari oppose the model of the tree to the model of the rhizome. The tree implies root, trunk, branches, lineage and hierarchy. The rhizome unfolds through multiple connections: it can be cut and restart elsewhere; it has no necessary center; it connects heterogeneous points; it produces a map rather than a tracing.

Academically, the rhizome is not merely a plant metaphor. It is a theory of non-arborescent organization. It allows us to think systems in which units do not first exist as isolated individuals, but as provisional nodes in a network of relations. The rhizome is a logic of propagation, association and transformation.

For A.L.I, the rhizome can become a model for an alien organism. An extraterrestrial intelligence may have no central brain, no single language, no stable body and no clear border between individual and milieu. It may be made of loops, symbioses, local signals, temporary connections, partial memories and emergent decisions. Such an organism does not “speak” from a center; it modulates a field.

3. Becoming, animality, imperceptibility

Extreme otherness in Deleuze and Guattari also passes through notions of becoming: becoming-animal, becoming-molecular, becoming-imperceptible. These concepts do not mean imitating an animal or literally turning into something else. They describe passages, alliances and zones of indiscernibility in which a form of existence leaves its usual coordinates.

From this perspective, communicating with a non-human intelligence would not only mean translating a vocabulary. It would require entering a zone of becoming: transforming our

instruments, perceptual habits, models of meaning and rhythms of listening. Translation becomes a transformation of the translator.

A.L.I can take up this idea: interstellar contact is not only the reception of a message; it is the fabrication of a common zone. A becoming-contact, in which each intelligence accepts to shift its own mode of existence.

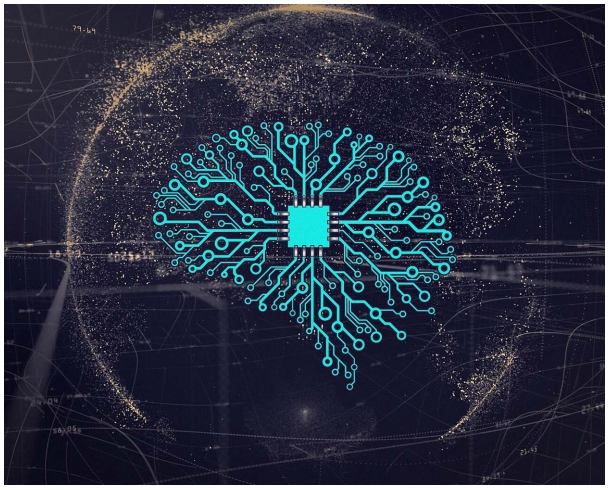
4. Rhizome and collective intelligence

The notion of rhizome has been taken up in network theory, media studies, digital thought, political ecology, anthropology, posthumanism and assemblage theory. It is often used to describe collective forms that do not operate through a single center: distributed communities, activist networks, ecosystems, platforms, web architectures and multi-agent systems.

But one must avoid a simplistic reading. A network is not automatically rhizomatic. Many digital networks are strongly hierarchical, surveilled, centralized or governed by platforms. The Deleuzo-Guattarian rhizome is not simply a technical network; it is a logic of multiplicity, heterogeneity and transformation.

For A.L.I, this distinction is essential: an extraterrestrial collective intelligence may be rhizomatic without being democratic in any human sense, without being benevolent, without being transparent. It may produce decisions through propagation of differences, local thresholds, chemical signals, distributed calculations or environmental memory.

5. AI: from neural network to computational rhizome



Artificial neural network and chip. Image: Wikimedia Commons. Contemporary AI makes it possible to think distributed, statistical and not fully legible forms of cognition.

Contemporary artificial intelligence makes the Deleuzian question newly relevant. A large language model is not a central consciousness applying explicit rules like a dictionary. It operates through distributions, associations, latent spaces, weights, statistical neighborhoods and successive transformations. It does not understand like a human subject, but it produces effects of meaning through a relational architecture.

The parallel with the rhizome must remain careful. Industrial AI is built, trained, optimized and controlled by highly centralized infrastructures. Yet its internal mode of meaning-production is already less arborescent than a dictionary: it connects, propagates,

weights, activates and recombines. Meaning is not stored in a single point; it circulates through a multiplicity of relations.

A.L.I can therefore propose a hypothesis: AI may become a mediator between heterogeneous forms of intelligence because it tolerates nonlinear spaces, partial correspondences, probabilistic translations and cartographies of relations better than we do. It would not be a “universal interpreter,” but a rhizomatic instrument of passage.

6. Deleuze, Guattari and contemporary philosophers

Several contemporary thinkers have extended or transformed Deleuzian intuitions. Manuel DeLanda developed assemblage theory, emphasizing emergent organizations, material interactions and processes not reducible to essence. Brian Massumi worked on affect, intensity and virtuality, showing how bodies and signs circulate before meaning stabilizes. Rosi Braidotti took up Deleuze in a posthuman perspective attentive to non-anthropocentric subjectivities, becomings and continuities between human, animal, technology and Earth.

Donna Haraway, while not reducible to Deleuze, shares with this constellation a critique of overly clear boundaries between human, animal, machine and organism. Her cyborg figure and later work on companion species help think hybrid, situated and relational subjectivities. Bruno Latour and actor-network theory also contributed to thinking collectives made of humans and non-humans, even if their framework differs from Deleuze and Guattari's.

These continuations are important for A.L.I because they give conceptual tools for not reducing the extraterrestrial to “another human.” They force us to think hybrid agents, technical collectives, distributed intelligences, ecologies of signs and decentered forms of subjectivity.

7. A.L.I hypothesis: rhizome as contact protocol

If Deleuze is transposed to A.L.I, an interstellar message should perhaps not be designed as a sentence sent from subject A to subject B. It could be designed as a rhizome: a set of heterogeneous modules, connectable in several orders, readable at several scales, capable of surviving cuts and producing multiple paths of understanding.

A rhizomatic contact protocol could contain:

- mathematical sequences, but also images, sounds, rhythms, physical measures and manipulable objects;
- partial redundancies, so the message can be resumed through several paths;
- autonomous fragments that make sense without the whole;
- learning loops, where each part explains other parts;
- progressive thresholds of complexity;
- maps of relations rather than a single grammar.

The message would therefore not be a line, but a milieu. It would not only ask “understand me,” but “move through me, connect, cut, resume, reconstruct.”

8. Work paths and installation

An A.L.I installation inspired by Deleuze could take the form of a rhizome-organism of translation. In space, several stations produce signals: voice, light, vibration, image, text, biological data, mathematical fragments. No station is the center. Each visitor activates

different connections. The system gradually learns which passages become readable between stations.

A program could represent each A.L.I article as a node, not classified by section, but connected by intensities: signal, body, machine, dream, mathematics, cosmos, biology, fiction, ritual. The interface would become a rhizomatic map of the project: not a menu, but a collective intelligence of themes.

In an AI version, a model could generate nonlinear paths between concepts, then ask the visitor to choose the connections that “make sense.” The rhizome would not merely be visualized: it would be co-produced by humans, texts, images, machines and extraterrestrial hypotheses.

9. Conclusion: thinking the alien without reducing it

Deleuze is useful to A.L.I because he prevents otherness from being reduced to an already known figure. Rhizome, becoming, assemblage and multiplicity do not directly describe extraterrestrials. They train us to think what does not yet resemble an interlocutor.

If a non-human intelligence is rhizomatic, it may not appear as a face, a voice or a linear message. It may manifest as organization, propagation, field, distributed memory, network of signs, organism without center. The question will no longer be only: “What does it mean?” but: “How does this system produce relations, and how can we become capable of entering them without crushing them under our categories?”

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61 - Animal Language and AI: From Zebra Finches to Interspecies Contact

Keywords: animal language, zebra finch, AI, interspecies communication, birds, whales, bonobos, bees, Project CETI, Earth Species Project, A.L.I

The zebra finch has become a major model for studying vocal learning, songs, social calls, and sound categories. Photo: JJ Harrison, Wikimedia Commons, CC BY-SA 3.0.

Summary

Starting from recent news about zebra finches, this article traces the history of animal language research, from bees to whales, then shows how AI is transforming interspecies decoding and feeding A.L.I.

Text

Starting point: a news item relayed by Slate from an article in The Guardian highlights the work of researcher Julie Elie on zebra finches. Her study, awarded the 2026 Coller-Dolittle Prize, shows that these birds do not merely produce sounds linked to emotional states: they manipulate different call types, recognize them, and seem to classify their own vocalizations according to categories of meaning.

The news matters for A.L.I because it shifts the question. We no longer ask only: do animals communicate? We ask: do their signals carry categories stable enough to be recognized, tested, compared, modeled, and perhaps translated? This is precisely the problem of interstellar contact: detecting a signal is only the beginning. We then need to know whether a structure of meaning exists behind the variation.

1. What the Zebra Finch Study Shows

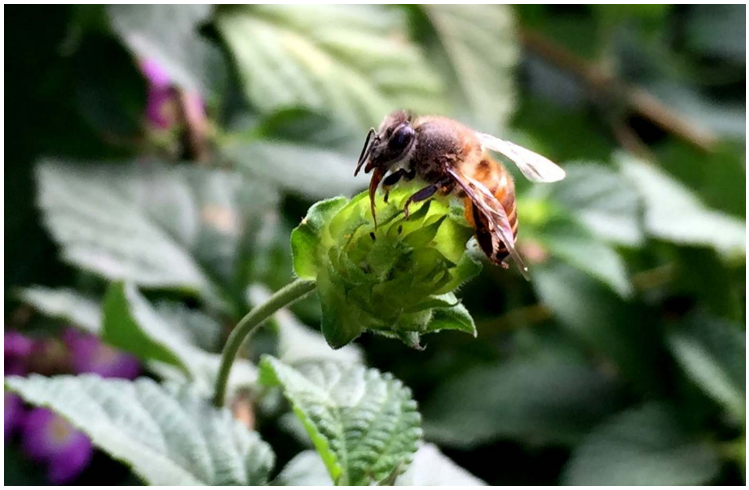
Zebra finches produce a rich repertoire of vocalizations: songs, contact calls, hunger calls, danger calls, calls linked to stress, social interactions, or mate seeking. Julie Elie's work distinguishes eleven call types and shows that birds do not confuse them randomly.

The strength of the study is experimental: when birds are asked to associate sounds with responses, their mistakes do not follow acoustic similarity alone. They confuse more often calls that belong to semantically related categories. In other words, classification seems not only sonic; it is also semantic. The birds may possess a kind of internal map of the functions of their calls.

This is a subtle but major advance. It does not mean zebra finches speak like humans. It means that an animal can possess a vocal system in which acoustic form, social situation, and communicative function are linked strongly enough to be studied as a proto-lexicon.

2. A Long History: From Darwin to Bees

The study of animal language begins long before AI. Darwin, in The Expression of the Emotions in Man and Animals, opened a path by treating animal expressions as organized, inherited, functional forms, not as mere noises. This was not yet language in the linguistic sense, but it already established continuity between body, emotion, sign, and behavior.



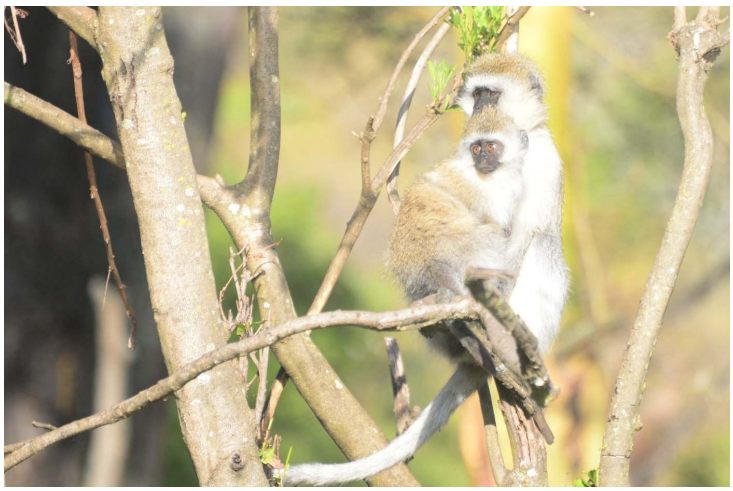
Bees provided one of the great historical examples of animal code: the waggle dance, studied by Karl von Frisch, encodes direction, distance, and quality of a food source. Photo: Shiv's fotografia, Wikimedia Commons, CC BY-SA 4.0.

In the twentieth century, Karl von Frisch showed that bees communicate the direction and distance of a food source through the waggle dance. This case is decisive because it links gesture, space, collective memory, and action. Information is not a metaphor: it truly orients the colony.

This model matters for A.L.I: a message can be spatial rather than verbal, embodied rather than written, collective rather than individual. The bee dance reminds us that language is not always made to represent the world; it can be made to coordinate movement within the world.

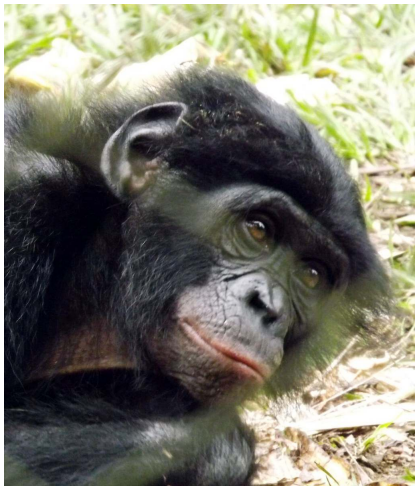
3. Alarms, Names, Signatures: Animals Categorize

Vervet monkeys have long been studied for their differentiated alarm calls: some calls signal an eagle, others a leopard, others a snake, and group members respond with adapted behavior. In dolphins, signature whistles function as individual markers. In parrots studied by Irene Pepperberg, Alex showed capacities for discriminating color, shape, number, and material that deeply influenced comparative psychology.



Vervet monkeys contributed to the idea that some animal calls are not merely emotional reactions, but may correspond to categories of danger. Photo: PremchandReghuvaran, Wikimedia Commons, CC0.

In bonobos, work on vocal sequences and experiments with Kanzi also raised a difficult question: can we speak of syntax, composition, symbolic understanding? The answers remain cautious, but they force us to abandon an overly simple separation between human language and animal communication.



Bonobos are central to research on symbolic understanding, vocal sequences, and interspecies interfaces. Photo: Christina Bergey, Wikimedia Commons, CC BY-SA 3.0.

4. Whales: When AI Listens to Sonic Civilizations

Whales, especially sperm whales, have recently shifted the scale of the problem. Project CETI uses machine learning to analyze codas, the sequences of clicks exchanged by sperm whales. Recent research has proposed describing their productions with notions close to a phonetic alphabet: tempo, rhythm, rubato, ornamentation, structured variations.

Sperm whales exchange codas, highly structured click sequences. Project CETI analyzes them with machine learning tools to search for regularities, contexts, and possible forms of meaning. Photo: Gabriel Barathieu, Wikimedia Commons, CC BY-SA 2.0.

Interactive demo: Listen to the whales (guez.org/ali/646), a Project CETI experience that lets visitors enter sperm whale sounds, archives, and visualizations. If the iframe is blocked in some browsers, the link opens the demo directly.

What changes with AI is not only the amount of data processed. It is the possibility of searching for structures the human ear does not notice: fine variations, contextual correlations, individual signatures, sequences, turn-taking, delayed responses. The animal becomes a living corpus, situated in an environment, and AI becomes an instrument of augmented listening.

5. Ethology: Understanding the Sign in Its Environment

Ethology is essential here. It studies animal behavior in living conditions: movement, reproduction, learning, social hierarchies, care, conflict, cooperation, attention to the environment. Without ethology, we risk extracting a sound from its context and turning it too quickly into a word. An animal call is not only an acoustic form: it is a situated event, produced by a body, in a social scene, with observable effects.

Major figures in ethology, such as Konrad Lorenz, Nikolaas Tinbergen, and Karl von Frisch, showed that animals must be observed over time, behaviors described, testable hypotheses formulated, and signals linked to actions. Tinbergen proposed four now-classic questions: what is the function of the behavior, what mechanism produces it, how does it develop, and what is its evolutionary history? For A.L.I, this grid matters: an extraterrestrial signal too should be studied through its function, mechanism, possible learning, and history.

AI therefore does not replace ethology. It augments it. It can detect regularities in masses of sound and video, but it must remain attached to field context: who is speaking, to whom, in what situation, with what consequence? Interspecies decoding begins as a discipline of observation.

6. The Current Role of AI: Translate or Map?

We must be careful with the word translation. Translating an animal as one translates a human language presupposes lexical equivalences. Most animal systems probably do not function like full human languages. AI can nevertheless do something else, perhaps more

fundamental: map relations between sound, context, behavior, body, and environment.

Contemporary projects such as Earth Species Project and Project CETI try to build models able to detect units, motifs, variations, and correspondences. AI does not become a magic dictionary. It becomes a semiotic microscope: it makes visible regularities that human intuition cannot perceive.

This shift is crucial: the machine can help us avoid anthropomorphizing too quickly. It can also create new risks: overinterpreting correlations, inventing semantics where there is only contextual effect, producing a seductive but false translation. For A.L.I, this tension is central. Any decoding of a non-human signal must be both imaginative and verifiable.

7. From Animals to Extraterrestrials: What This Changes for A.L.I

The study of animal language is a rehearsal for extraterrestrial contact. Animals are not aliens, but they are already non-human intelligences with bodies, perceptual worlds, needs, and categorization modes different from ours. If we fail to listen to other terrestrial species, how can we claim to listen to an intelligence from another planet?

The lessons for A.L.I are concrete:

- Do not look first for words: look for functions, contexts, regularities, responses.
- Associate signal and situation: a sound alone is not enough; we need to know who emits it, in which scene, toward whom, and with what effect.
- Build comprehension tests: a contact system must prove that the receiver distinguishes categories, not only that it detects a motif.
- Accept sensory difference: a language can be vocal, gestural, chemical, electrical, spatial, luminous, or biological.
- Use AI as interface, not oracle: it proposes hypotheses, but experiment must test them.

8. Possible Experiments

Interspecies Signal Atlas

Create an A.L.I database gathering animal sounds, contexts, spectrograms, associated behaviors, and human annotations. Each signal becomes a record: form, environment, use, degree of evidence, possible response.

Careful Translator

Develop a prototype that never directly translates an animal sound into a human sentence, but offers several layers: probable category, context, confidence level, comparable examples, competing hypotheses. The system refuses the spectacular phrase when the data are insufficient.

Installation: The Non-Human Ear

A room transforms animal sounds into light, vibration, fragmented text, and spectral image. The visitor gradually learns that certain motifs correspond to situations. The work reenacts the learning of a foreign language without an alphabet.

A.L.I Protocol: Proving the Category

From an unknown signal, human, animal, or artificial, the model is asked to predict not its translation, but its effect: gathering, flight, call, conflict, exploration, care. Communication becomes a science of the action produced by the sign.

9. Conclusion: Learning to Listen Before Speaking

The news about zebra finches does not announce that we will soon chat with birds as in a fairy tale. It announces something more interesting: the boundary between noise, signal, category, and meaning is becoming measurable. Animals possess communication systems that we are only beginning to map with enough precision.

For A.L.I, the stakes are direct. Before building a language to speak to extraterrestrials, we must learn to recognize the non-human languages already present on Earth. Birds, bees, primates, dolphins, and whales are not lower steps toward human language. They are semiotic worlds. AI can become the instrument that helps us move from anthropocentric listening to truly interspecies listening.

Perhaps the first exercise in interstellar contact is not to send a message toward the stars. It is to finally hear what Earth is already saying in languages we had not yet learned to read.

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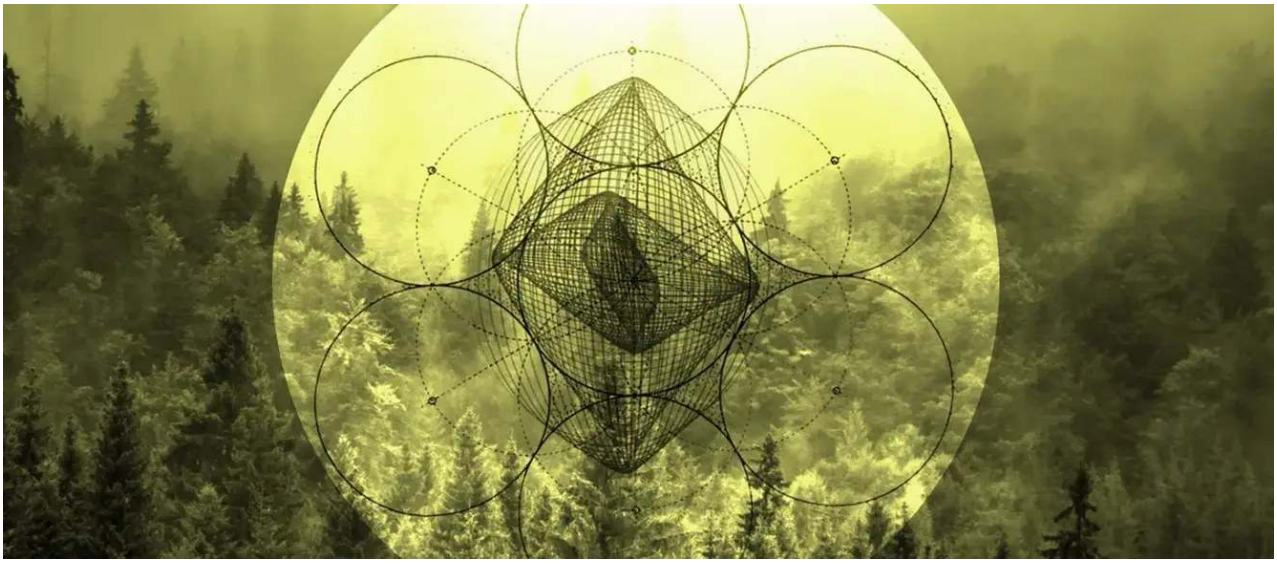
62 - Umwelt: every intelligence inhabits a perceptual world

Keywords: Umwelt, Uexküll, biosemiotics, perception, sensory ecology, translation, alien, A.L.I, contact



Umwelt, Bertrand Wolff, François Rossi, Damien Ravnich. Image: GMEM — Centre national de création musicale de Marseille.

Summary

An A.L.I article on Umwelt: the perceptual world proper to each being, from Jakob von Uexküll to non-human senses, and the hypothesis that contact language begins by translating perceptual milieus.

Text

Before speaking a language, an intelligence inhabits a world. It does not receive “reality” as a single block: it selects certain intensities, rhythms, forms, smells, pressures and fields. The notion of Umwelt, formulated by Jakob von Uexküll, names this proper world: the environment as it exists for a given organism through its organs, needs, possible actions and relevant signs.

For A.L.I, this notion is crucial: interstellar contact would not only be a problem of vocabulary. It would first be a problem of perceptual milieu. If an extraterrestrial intelligence does not see as we do, hear as we do, divide time as we do, or share our bodily and chemical scale, then the first act of translation is to understand what kind of world it inhabits.

1. Uexküll: the world is not the same for everyone

Jakob von Uexküll, biologist and theorist of life, proposed a simple and disruptive idea: each being lives in a world of signs proper to it. The world of a tick is not the world of a human; the world of a bat is not the world of a bee; the world of an octopus, a dog, a tree or a microorganism cannot be reduced to a poor version of ours.

Umwelt is therefore not merely a physical environment. It is an active cut through reality. Some signals become decisive, others disappear. A smell may be a landscape. A thermal

variation may be a direction. An electric field may be a shape. A vibration may be a sentence.

2. Reality as sensory selection

Humans often privilege vision, articulated language, geometry, images and stable objects. But other living beings construct their worlds from senses that almost entirely escape us: echolocation, light polarization, ultraviolet, magnetoreception, electroreception, fine chemoreception, micro-vibration perception.

These senses are not simple extensions. They produce different worlds. An intelligence that perceives magnetic fields as we perceive colors might think space otherwise. An intelligence inhabiting an ocean of waves, pressures or molecules might have no interest in our rectangular images, yet immediately perceive the structure of a rhythm.

3. Thomas Nagel: what does inner experience do?

In his famous essay What Is It Like to Be a Bat?, Thomas Nagel identifies a philosophical limit: even if we perfectly describe a bat's sonar, do we know what it is like to be a bat? Science can describe functions, but subjective experience remains hard to translate.

For A.L.I, this question becomes cosmic. Understanding an extraterrestrial intelligence does not only mean decoding its signals. We might have to understand what it means for that intelligence to have a world: what matters, what appears, what disappears, what counts as an event, what triggers a response.

4. The alien as radical Umwelt

An extraterrestrial intelligence could be biological, mineral, oceanic, atmospheric, collective, slow, diffuse, photosensitive, electromagnetic or chemical. Its Umwelt might not contain objects in the human sense. It might live in gradients, flows, densities, fields and probabilities.

We often send images, numbers, sounds or diagrams because they fit our own division of reality. But another perceptual world might not recognize these forms as relevant. The problem is not only "what message should we send?" but "in what Umwelt could this message become perceptible?"

A.L.I diagram: contact does not begin with an alphabet, but with the partial overlap of perceptual worlds.

5. Translating a world rather than a sentence

A contact protocol inspired by Umwelt should begin by mapping capacities of perception. Instead of sending only "we are here", one could send variations designed to test which channels are readable: frequency, repetition, polarity, contrast, periodicity, scale change, redundancy, symmetry, phase, duration.

The response of an intelligence would not necessarily be a word. It could be a rhythmic modification, an amplification, an absence, a synchronization, a deliberate disturbance. A dialogue between two Umwelt would therefore be an exchange of adjustments: each side tries to produce something that exists in the perceptual world of the other.

6. A.L.I hypothesis: the Umwelt translator

One can imagine an A.L.I prototype called the Umwelt translator. The device would take a human datum - phrase, image, sound, gesture - and transform it into several sensory versions: vibration, pulsed light, simulated magnetic field, infrasound, ultrasound, synthetic smell, thermal pattern, virtual particle flow.

An AI could then observe the responses of a living, artificial or simulated system, and search for which channels produce regularities. The goal would not be to translate “hello” directly, but to discover a space of co-perception: a minimal perceptual common ground from which a message might begin.

7. Possible installation: Chamber of Proper Worlds

An installation could place the visitor inside several sensory cabins. In each one, the same “message” is translated differently: simulated ultraviolet light, low-frequency vibration, spatialized sound, visualized magnetic field, tactile pattern, smell. The visitor would understand that a message is not independent from the body that receives it.

At the center, an interface would show zones of overlap: what the human, the machine, the animal and the hypothetical alien may share. The artistic question becomes: how much of ourselves must we abandon for another world to begin answering?

8. Consequences for contact

- A universal message is not necessarily an image. It must first be perceptible.
- Language begins before words. It begins in attention, difference and repetition.
- An alien intelligence might not recognize our objects. It might recognize gradients, cycles or transitions.
- Translation is embodied. Translating a message also means translating a world of sensations.
- AI could act as mediator. It can explore several channels and search for correspondences without immediately imposing human language.

9. Perspective

Umwelt offers A.L.I a strong direction: to think contact as a meeting between perceptual worlds. Before asking “what does this sign mean?”, we must ask “in what world can this sign appear?” A very different civilization might fail to answer not because our message is false, but because it is simply outside its sensible world.

Inventing an interstellar language may therefore mean inventing a method for making something perceptible between worlds that share neither body, nor senses, nor scale. The true first contact would not be a sentence. It would be an overlap.

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- Annihilation - cultural reference around a transformed Umwelt (guez.org/ali/658)

Artistic reference: Umwelt at GMEM

The project Umwelt (guez.org/ali/659), presented by GMEM — Centre national de création musicale de Marseille, is a direct artistic reference for A.L.I. The piece is described as a mixed work for electronics, two percussionists and six vibratory loudspeakers. It explicitly starts from Jakob von Uexküll's concept and applies it to a sonic field: each instrument, loudspeaker and resonating body produces its own perceptual milieu.

What matters here for A.L.I is the way sound becomes a model of a proper world. Vibratory loudspeakers applied to cymbals or drum skins make the instruments resonate beyond the direct human gesture. Listening becomes an experience of sensory ecology: the same event can be perceived as gesture, vibration, matter, space, dilated time or relation between milieus.

This reference shifts the question of extraterrestrial language toward the coexistence of several acoustic worlds. Before translating a sentence, we may first have to learn how to make heterogeneous regimes of perception coexist: human, instrumental, electronic, vibratory, non-human.

63 - Extraterrestrial Poetry: Rhythm, Unconsciousness and Language Beyond Meaning

Keywords: poetry, extraterrestrials, automatic writing, unconscious, surrealism, prosody, language, AI, signal, A.L.I

Figurative Arabic calligraphy: Basmala, 1924, by Aziz Efendi, referenced on Wikipedia / Wikimedia Commons. Text becomes form, image and visual organism: writing that is not only readable, but visible as an architecture of signs. Source (guez.org/ali/660).

Summary

What if poetry were an ultimate form of communication with non-human intelligence: not because it explains better, but because it carries rhythm, silence, image, ambiguity and the unconscious.

Text

What if poetry were one of the most advanced forms of communication with extraterrestrial intelligence? Not because it is clearer than science, but because it accepts what ordinary language often tries to reduce: ambiguity, vibration, metaphor, silence, the unconscious, the plurality of meaning.

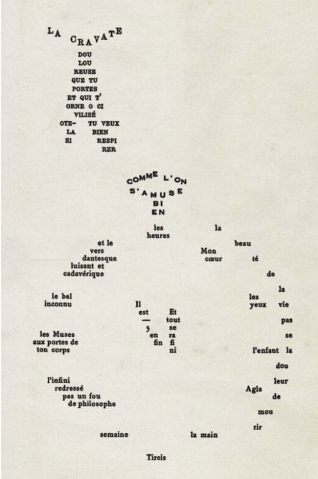
For A.L.I, poetry opens a strong hypothesis: first contact may not pass through a translatable sentence, but through a form capable of producing resonance. A non-human intelligence may not understand our dictionaries, but perceive regularities of breath, return, rupture, image and density.

1. A brief history of poetry as language technology

Poetry often precedes writing. In many cultures, it is first oral: song, formula, memorized story, invocation, prayer, epic. Rhythm and repetition serve memory, transmission and community. Poetry is not only an art: it is a technology of memory.

Ancient forms often associate poetry, sacred speech and cosmology. Hymns, psalms, ritual songs, oracles, epics: the poem carries a speech that exceeds the individual. It does not only say "I think." It speaks from a larger place: ancestors, gods, cosmos, people, spirit, unknown.

Historical markers. Homer, Vedic hymns, psalms, Sappho, shamanic songs, Sufi poetry by Rumi or Ibn Arabi show that poetry has long held memory, rhythm, body and cosmos together. It is not first a separate "literary genre": it is a practice of address to the invisible, the community, the dead, gods, elements.



Guillaume Apollinaire, La Cravate et la montre, from Calligrammes: the page becomes space, a constellation of words and a mental drawing.

With writing, poetry also becomes a graphic architecture. Lines, stanzas, blanks, alignments, calligrams, ideograms, typography: the poem shows that language is not only a sequence of words, but a spatial and sonic object.

Spatial poetry. Mallarmé, with Un coup de dés jamais n'abolira le hasard, turns the page into a field of forces: type sizes, blanks, dispersion. Apollinaire, with Calligrammes, turns the poem into a figure. Later, concrete poetry by Eugen Gomringer, Augusto and Haroldo de Campos, Ian Hamilton Finlay or bpNichol turns the word into a visual, almost sculptural object. For A.L.I, this lineage is decisive: it shows that a poem can become map, constellation, diagram or interface.

Image-calligraphies. Arabic, Persian, Hebrew and East Asian calligraphic traditions remind us that writing can be sign, breath, image, gesture and rhythm at once. In these forms, text does not merely name: it becomes a graphic body. For non-human communication, this hybridization is precious because it gives the receiver several simultaneous handles: reading, seeing, following movement, recognizing structure.

2. Poetry and ordinary language

Ordinary language often seeks efficiency: naming, describing, ordering, transmitting stable information. It tries to reduce uncertainty. Poetry, by contrast, works with uncertainty. It does not only say one thing: it makes several levels appear simultaneously.

Ordinary language says: "the light arrives." A poem can make us feel time, distance, body, lack, waiting, color, trembling. It does not replace information: it increases it through sensory layers.

Language against pure information. Rimbaud speaks of the "derangement of all the senses";

Mallarmé wants to "give a purer sense to the words of the tribe"; Paul Celan writes after catastrophe in a broken, dense, almost mineral language. In Emily Dickinson, cuts, dashes and condensation turn the poem into a machine for suspending meaning. These poets matter for A.L.I because they do not only transmit content: they change how the receiver becomes able to receive.

Before the dictionary, there is prosody: rhythm, pauses, returns, intensities. A foreign intelligence might first recognize a temporal organization.

Poetry operates through several procedures:

- rhythm: a temporal structure before lexical meaning;
- metaphor: a displacement between distant domains;
- ellipsis: what is missing becomes active;
- ambiguity: several readings coexist;
- mental image: language becomes an inner scene;
- silence: blank, pause and interruption participate in the message.

These properties matter for A.L.I because they bring language close to experience. The poem does not merely transmit content. It transforms the receiver's state.

3. Poetry as a non-literal signal

An extraterrestrial intelligence may not possess ears, mouth, human syntax or body. Yet it might detect regularities: alternation, symmetry, rupture, repetition, density, transformation. Poetry could therefore be designed as a form of non-literal signal.

An interstellar poem would not necessarily be translated word by word. It could be read as a score of variations: intensities, returns, motifs, delays, silences. It would be a writing of relation rather than a writing of objects.

Sound poetry and proto-language. Hugo Ball at Cabaret Voltaire, Kurt Schwitters with Ursonate, Antonin Artaud in his glossolalia, Henri Chopin with sound poetry on tape, Bernard Heidsieck and François Dufrêne move the poem toward mouth, breath, cry, syllable and tape recorder. Here, language becomes acoustic signal before becoming dictionary. This is a direct A.L.I path: an external intelligence might first recognize vibration, repetition and modulation.

Here poetry becomes close to music, mathematics and ritual. It does not only say "this is what we know." It says: this is how our mind organizes the unknown.

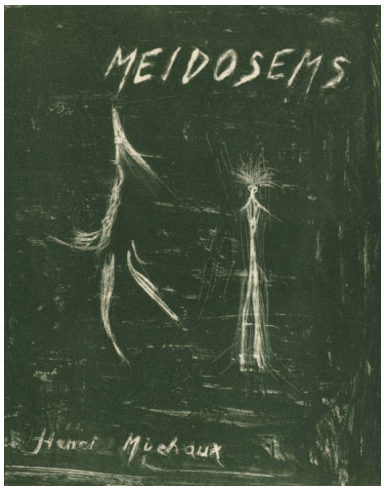
4. Automatic writing and forces beyond us

Automatic writing occupies a particular place. In nineteenth-century spiritualism, it was often understood as dictated by spirits. In Surrealism, André Breton took it up as a method for letting thought speak outside rational control. In both cases, the author is no longer a sovereign master: they become receiver, channel, surface of inscription.

We can analyze this without choosing too quickly between belief and skepticism. Automatic writing can be seen as access to the unconscious, involuntary associations, buried memories and linguistic structures that act before the will. But it can also be thought poetically as a situation in which the subject accepts being crossed by what exceeds them.

Automatism, chance, cut-up. Breton and Soupault published Les Champs magnétiques as an experiment in automatic writing. Brion Gysin and William S. Burroughs invented or

systematized cut-up: cutting, displacing, making the text speak otherwise. John Cage used chance and the I Ching; Jackson Mac Low composed with chance operations, silences and durations. These practices displace the author: the poet becomes an operator of a device where something writes with them.



Henri Michaux, Meidosems: between writing, trace, creature and hallucinated alphabet, form seems to come from a zone before or beyond ordinary language.

Michaux is a decisive reference here: his figures are neither only drawings nor only signs. They resemble graphic organisms, writings of beings, alphabets without translation. For A.L.I, they show how poetry can leave the sentence and become apparition.

For A.L.I, this position is essential: learning to write as if language came from elsewhere. Not claiming that extraterrestrial forces dictate sentences, but creating devices where the ego becomes less central and the text lets unexpected forms pass through.

5. A.L.I hypothesis: the poem as psychic antenna

I propose the following hypothesis: a poem can function as a psychic antenna. It does not necessarily capture an external signal in the physical sense, but it configures the mind to receive differently: through analogy, dream, rhythm, resonance, drift and image.

The poem would then be an instrument of controlled disorientation. It disturbs language enough for other associations to become possible, but not so much that all structure is lost. It stands between code and apparition.

Unconscious and reception. This idea resonates with Freud and Jung, but also with spiritualist, mediumistic and visionary practices: Hélène Smith and her "Martian" studied by Théodore Flournoy, mediumistic drawings, invented alphabets, glossolalic writings. For A.L.I, these are not proofs of contact, but archives of forms produced when human language believes it is crossed by otherness.

In communication with an external intelligence, this property could be decisive. A message that is too literal imposes our categories. A poetic message opens a common space where several readings can survive.

6. Making contact poetry

An A.L.I device could produce poems by crossing body, radio noise, chance, AI, archives and automatic writing.

Several contact-poetry devices can be imagined:

Procedural poetries. Oulipo, founded around Raymond Queneau and François Le Lionnais, explores literature under constraints. Queneau's Cent mille milliards de poèmes is almost a printed combinatorial machine. Georges Perec shows that a constraint can produce a world. Bernadette Mayer proposes writing experiments as protocols of perception. These approaches are essential for A.L.I: they turn the poem into a procedure, therefore into something transmissible and replayable.

- Radio-poem: capture cosmic noise, transform it into rhythmic constraints, then write under these constraints;
- EEG-poem: use a reader's brain activity as modulation for a text;
- Dream-poem: collect dream fragments and recombine them into an alphabet of images;
- Automaton-poem: let a program produce variations, then keep those that seem to carry intention;
- Collective poem: several participants write without reading each other, then a system extracts motifs, returns and correspondences;
- Stellar poem: convert astronomical data into prosody, blanks, repetitions and stanzas.

These devices do not try to prove contact. They try to fabricate conditions of reception: making language more porous, more sensitive, more able to welcome another form.

7. Possible program: contact poem generator

A computational prototype could work as follows:

- input 1: a stream of astronomical or radio data;
- input 2: a multilingual poetic corpus;
- input 3: a human bodily stream, breath or heartbeat;
- module 1: extraction of rhythmic motifs;
- module 2: generation of fragments through AI;
- module 3: automatic perturbation through controlled chance;
- output: visual, sonic and textual poem, accompanied by its generation score.

The key point would be to preserve the trace of the process. The poem would not only be an aesthetic result. It would be a reproducible experiment: a message whose conditions of appearance can be replayed.

Technical references. One could draw from John Cage's mesostics, Jackson Mac Low's operations, Burroughs and Gysin's audio cut-ups, but also contemporary generative poetry, poetry bots, performed reading and text-to-speech. The goal is not to replace the poet with the machine, but to create a chain of agents: body, chance, archive, statistical model, cosmic noise, human decision.

8. Possible installation: Chamber of Exterior Writing

An A.L.I installation could be called Chamber of Exterior Writing. The public enters a dark room. At the center: a table with paper, microphone, breathing sensors, radio antenna and screen. The room diffuses a faint sonic breath derived from space data. The visitor writes without clear instructions for a few minutes.

The system analyzes writing rhythm, pauses, repetitions and insistent words. It crosses them with radio noise and produces a second poem, like a response. The visitor leaves with two texts: the one they believe they wrote, and the one the machine extracted from what passed through them.

Installations and inheritances. This chamber could dialogue with Fluxus, George Brecht's textual scores, La Monte Young's environments, Ian Hamilton Finlay's poem-objects, Jaap Blonk's sound readings or PennSound archives. It could also function as a public laboratory: every visitor adds a trace, and the whole becomes an evolving corpus of contact attempts.

The installation does not ask: "did an extraterrestrial speak?" It asks: "what speaks when I stop fully controlling language?"

9. Why poetry might be ultimate

Poetry may be an ultimate form of communication not because it is superior to mathematics or science, but because it accepts not closing meaning. It can survive imperfect translation. It can carry rhythm without shared vocabulary. It can make a mental image exist even when concepts diverge.

Interstellar contact will perhaps need proofs, numbers, constants and protocols. But it will also need something more fragile: a way of saying otherness without reducing it. This may be where poetry becomes indispensable.

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64 - Boltzmann Brain: when an observer emerges from cosmic noise

Keywords: Boltzmann brain, entropy, cosmology, observer, fluctuation, multiverse, Star Trek, Strange New Worlds, information, A.L.I

Cosmic brain: cover image for thinking a consciousness emerging from stellar noise.

Summary

An A.L.I article on the Boltzmann brain, entropy, spontaneous observers, the cosmological measure problem, and season 1 episode 8 of Star Trek: Strange New Worlds.

Text

The Boltzmann brain is one of the most vertiginous hypotheses in contemporary cosmology. It imagines that a conscious observer might appear not through biological, planetary and evolutionary history, but as an extremely rare statistical fluctuation in a vast, ancient, perhaps eternal universe.

For A.L.I, the idea is fertile because it shifts the question of contact. What if an extraterrestrial message did not come from a civilization with antennas, spacecraft or planets, but from a consciousness briefly emerging inside cosmic noise itself? What if the sender had no world, no people, no duration, only an instant of thought produced by entropy?

1. Boltzmann, entropy and the scandal of order

Ludwig Boltzmann. Image source: Wikimedia Commons, Dibner Library / Smithsonian Libraries.

Ludwig Boltzmann tried to understand how the laws of thermodynamics could emerge from the statistical behavior of enormous numbers of particles. Entropy measures, in simplified terms, the number of microscopic configurations compatible with a macroscopic state. Disorder is more probable because there are vastly more ways to be disordered.

The problem begins when this logic is applied to the universe as a whole. Our world is locally structured: galaxies, stars, planets, chemistry, DNA, brains, languages, archives, telescopes. Why is there so much order if entropy tends to increase? One answer is that we inhabit an extraordinarily rare fluctuation: an island of order in an ocean of disorder.

But if this idea is pushed to its limit, an absurd consequence appears. It seems statistically easier to produce a conscious brain directly, complete with false memories and the impression of a world, than to produce an entire ordered universe capable of slowly generating that brain. This hypothetical observer is called a Boltzmann brain.

2. The observer without history

A Boltzmann brain would be a minimal observer: organized enough to have an experience, perhaps a memory, perhaps the feeling of being a person, but without a real past. Its memories would be internal traces, not historical evidence. It might believe it is sitting in front of a screen reading an article, while its environment is only a fluctuating mental structure.

The philosophical horror of the hypothesis is simple: if a cosmology predicts far more Boltzmann brains than ordinary observers, then statistically we should expect to be such brains. Yet our experience seems stable, coherent, shared and resistant to verification. Physicists such as Sean Carroll therefore use the Boltzmann brain as a critical test: a good cosmology should not produce more ghost observers than historical observers.

3. Can a thought born from noise send a message?

Within A.L.I, the question becomes speculative but fertile. Could a Boltzmann brain communicate? If its existence is brief, it may not have time to build an antenna, learn a language or encode an archive. But it might itself be a pattern: an information structure in the void, a local signature of order, an anomaly detectable only as an inconsistency inside noise.

We can imagine three levels of communication:

- Message as thought: an instantaneous consciousness produces an image, a sentence or a dream, but has no durable medium.
- Message as structure: the fluctuation that produces the observer leaves an identifiable mathematical or energetic pattern.
- Message as impossible proof: the observer contains information too ordered, compressed or relevant to be mere chance.

4. Star Trek: Strange New Worlds, season 1 episode 8

Spock and the Star Trek imaginary: a visual culture of extraterrestrial cognition, logical mind and augmented perception.

In Star Trek: Strange New Worlds, season 1, episode 8, The Elysian Kingdom, the USS Enterprise enters a nebula where the crew is transformed into characters from a storybook. The episode, tied to Doctor M'Benga and his daughter Rukiya, introduces a cosmic entity associated with the nebula, often described in Star Trek summaries and commentary as a Boltzmann brain.

This is a fascinating choice. The series does not simply show a classical extraterrestrial creature. It stages a nebula-intelligence able to manipulate perception, identity, narrative and memory. Contact does not pass through articulated language, but through a fiction imposed on the crew. The message becomes theater. The ship becomes a brain. The crew becomes an alphabet.

In this reading, the Boltzmann brain is not only a cosmological problem: it becomes a narrative machine. A cosmic consciousness, instead of sending a radio signal, temporarily rewrites the perceptual world of humans so that they enter its own regime of meaning.

5. Why this matters for A.L.I

A.L.I searches for forms of interstellar language. The Boltzmann brain introduces an extreme hypothesis: language might not come from a species, but from an event. Intelligence could be a thermodynamic accident, a local condensation of information, a brief consciousness owning nothing except its own appearance.

This hypothesis expands the criteria of contact. To search for a civilization is to search for duration, technique and repetition. To search for a Boltzmann brain would be to search for a cognitive singularity: a pattern that thinks, but may never have had time to become a culture.

A.L.I protocol: never trust a single apparition; archive, compare, repeat, falsify.

6. Thought experiment: receiving a memory without a world

Imagine that a radio telescope, an AI model or an artistic apparatus captures a sequence resembling a memory: a city, a smell, a fear, an equation, a face, but no stable astronomical context. The message is internally coherent, yet points to no known planet. Is it a hallucination of our system? A statistical artifact? A fiction produced by our algorithms? Or the trace of an observer without a world?

An A.L.I protocol could ask:

- does the sequence contain non-trivial compression?
- can it be reconstructed by several independent methods?
- does it produce predictions verifiable outside the receiving system?
- does it survive the hypotheses of noise, human bias and algorithmic hallucination?

7. Possible installation: Fluctuation Chamber

An artistic installation could simulate this hypothesis. In a dark room, a stream of cosmic noise, radio data, generated texts and unstable images would be analyzed in real time. An AI would search for local pockets of order: emerging phrases, recurring forms, visual motifs, fragments of memory. The visitor would not see a clear message, but a struggle between chance and meaning.

The system could include:

- a cosmological or radio noise generator;
- a pattern-detection model;
- a narrative engine turning anomalies into fragments of memory;
- a critical dashboard showing chance probability;
- an archive of false positives, because the protocol must learn to doubt.

8. The danger: confusing contact with apophenia

The Boltzmann brain is also a warning. Human minds see forms everywhere: faces in clouds, signs in noise, intentions in coincidences. A project such as A.L.I must therefore remain double: open to strange forms, but demanding about evidence. The poetry of the signal is not enough. Protocols, comparisons and adversarial tests are necessary.

The most interesting question may not be whether a Boltzmann brain really exists. It is what the hypothesis does to our conception of language: it imagines a message without society, a memory without history, a consciousness without body, an intelligence without planet.

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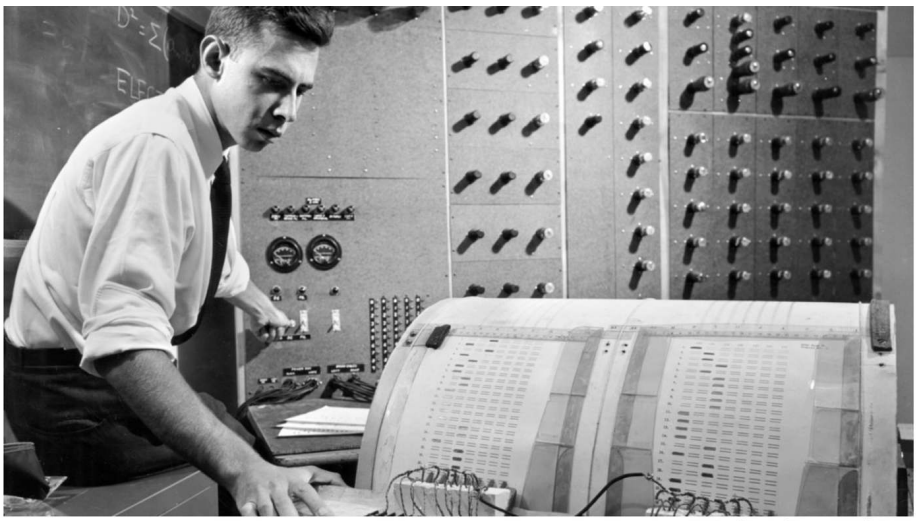
65 - From the Perceptron to Organoids: toward cultivated intelligence?

Keywords: perceptron, neural networks, deep learning, organoids, biocomputing, organoid intelligence, neurons, AI, A.L.I, contact



Division of Rare and Manuscript Collections

Frank Rosenblatt '50, Ph.D. '56, works on the "electronic profile analyzing computer" – a precursor to the perceptron.

Frank Rosenblatt with the electronic profile analyzing computer, a precursor to the perceptron. Source: Division of Rare and Manuscript Collections.

Summary

An A.L.I article on the perceptron, the evolution of neural networks, deep learning, neuronal cultures, brain organoids and the hypothesis of cultivated intelligence as a new medium of contact.

Text

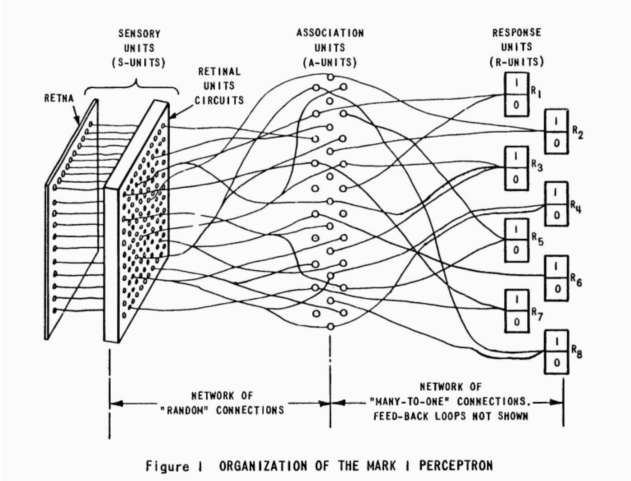
The perceptron is a tiny machine in the history of artificial intelligence, but it already contains a vertiginous idea: to learn is to adjust a relation. An input arrives, a weight modulates it, an output is decided. The operation seems simple, almost poor. Yet it opens a genealogy leading from the first artificial neuron to deep networks, then to living neuronal cultures and brain organoids.

For A.L.I, this trajectory matters because it shifts the question of language. At first, artificial intelligence abstractly imitated the brain. Today, some laboratories try to make living neuronal tissues compute. Between the two lies a question: if intelligence can be trained, cultivated, embodied in biological or hybrid matter, what kind of language can it produce? And could it become an interface between humans, machines and non-human intelligence?

1. The perceptron: a line that learns

In 1958, Frank Rosenblatt published The Perceptron: A Probabilistic Model for Information Storage and Organization in the Brain. The perceptron is a classification model inspired by the biological neuron: it receives signals, weights them, adds them, then activates or not an output. In its simplest form, it learns to separate examples by adjusting its weights.

The gesture is crucial: the program no longer contains only a rule written in advance. It modifies its own configuration from examples. Intelligence is no longer merely a sequence of instructions; it becomes an adjustable surface. For A.L.I, this matters: a contact language may not be given once and for all, but emerge from a process of adjustment between two systems.

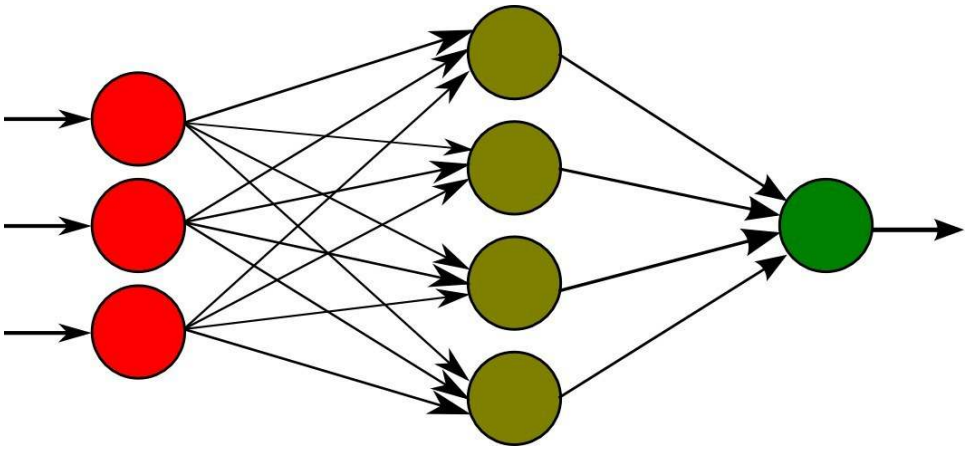


Organization of the Mark I Perceptron: sensory, association and response units. Historical diagram of Rosenblatt's device.

2. The crisis: Minsky, Papert and the limits of the first model

In 1969, Marvin Minsky and Seymour Papert published Perceptrons, a book showing the limits of simple perceptrons, especially their inability to solve certain non-linearly separable functions such as XOR. This critique long symbolized a slowdown in neural network research.

But the story is subtler: the idea of learning does not fail, the simplicity of the device does. A single threshold is not enough to describe complex relations. Layers, intermediate transformations and latent representations are needed. Meaning does not appear directly on the surface, but through a depth of transformations.



The move to multilayer networks transforms a simple boundary into a space of representations. Image source: Wikimedia Commons.

3. The return: backpropagation, deep learning and latent spaces

With multilayer networks, backpropagation and increasing computational power, neural networks changed scale. Hidden layers learn successive representations: edges, forms, patterns, categories, relations, styles and probabilities. In contemporary models, meaning unfolds in latent spaces where objects are not only named, but positioned in relation to one another.

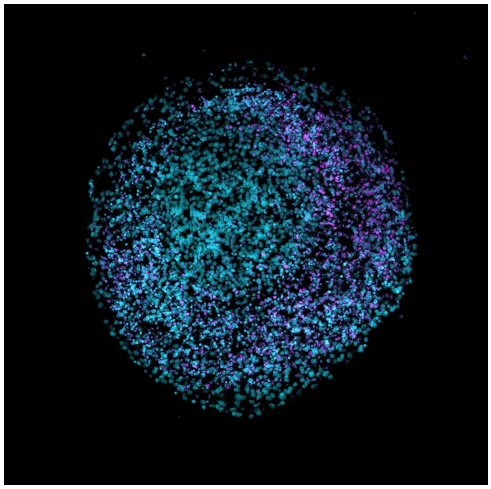
This evolution approaches a central A.L.I question: translating is not merely replacing one word with another. It is building a space where two systems can meet despite different forms. Language models do not understand as we do, but they manipulate statistical neighborhoods capable of producing transitions, analogies and reformulations. They become media of mediation.

4. The biological jump: neuronal cultures and DishBrain

A recent step troubles the boundary between model and living matter. In the experiment often called DishBrain, neurons cultured on an electrode array are coupled to a game-like environment inspired by Pong. The cells receive electrical stimulation and produce measurable activity in return. The experiment does not prove consciousness, but it shows that living neuronal tissue can be placed inside a minimal sensorimotor loop.

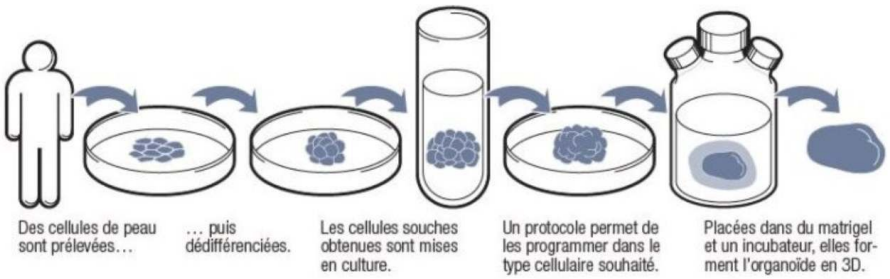
The key point is not to imagine a miniature brain playing like a human. The key point is the loop: stimulation, activity, feedback, adjustment. In biological form, one finds again the core idea of the perceptron: learning means modifying a relation. But the medium changes radically. It is no longer an abstract simulation of neurons; it is living matter responding.

Video: cultured neurons, biological interfaces and early learning loops. Watch on YouTube (guez.org/ali/687).



Human brain organoid observed in fluorescence. Image source: Wikimedia Commons / NREIS.

5. Organoids: neuronal mini-worlds



Principle diagram: collect cells, reprogram them into stem cells, then culture them into a 3D organoid structure.

Brain organoids are three-dimensional structures derived from stem cells, able to reproduce certain aspects of brain tissue organization. They are not complete brains. They have no body, no natural sensory organs, no human experience. Yet they have cellular architecture, electrical activity and a capacity to become models of development, pathology or, more speculatively, biological computation.

The idea of organoid intelligence proposes exploring these tissues as new supports for biocomputing. An organoid connected to electrodes could receive inputs, produce outputs, be stimulated, learn certain regularities, perhaps perform very specific tasks. This enters a hybrid zone: neither classical computer, nor complete brain, nor passive culture.

Human cerebral organoids in laboratory. Image source: Wikimedia Commons / NIH.

6. From artificial AI to cultivated intelligence

The perceptron was an abstraction of the neuron. Deep learning multiplied that abstraction into architectures capable of vision, text, translation, image generation and statistical reasoning. Organoids partly reverse the movement: instead of imitating the living in silicon, they attempt to inscribe computational loops into cultivated living matter.

This inversion raises strong ethical and philosophical questions. When does a neuronal culture become more than a tool? How can sensitivity, suffering, memory or integration be measured in a living system without a body? Who is responsible for an intelligence that is cultivated? How can we avoid projecting fantasies of consciousness onto signals still poorly understood?

7. Hypothesis: cultivating an alien intelligence

A more radical hypothesis then appears: if neuronal tissue is cultivated under conditions very different from those of a human or animal brain, we are not merely producing a reduced model of the living. We might allow a form of intelligence to emerge that has never existed naturally, an intelligence situated inside an artificial milieu, fed by signals, electrodes, light rhythms, sounds or data.

It would not be a miniature human brain, nor an incomplete animal. It would be a process-being, a cultivated cognitive form, without a traditional body, without a classical evolutionary history, without inherited language. In effect, we would be creating an alien intelligence: not one arriving from another planet, but one foreign to our usual biological lineages. It would be alien because its world would be different from ours from the very beginning.

For A.L.I, this idea is crucial. Such a neuronal culture could become an experimental dialogue partner. We could send it light patterns, mathematical sequences, sound fragments, images, radio signals translated into stimulation. In return, it would produce electrical dynamics, oscillations, unstable responses, preferences, perhaps forms of regularity. The dialogue would not be verbal; it would be morphological, rhythmic, statistical, biological.

The point would not be to prove that an organoid “understands” as we do. The point would be to build an interface with a real otherness, however tiny, fragile or strictly experimental. A cultivated intelligence could teach us how to converse with what has no mouth, no face, no human grammar. It could become a terrestrial rehearsal for extraterrestrial contact: learning to speak with a thought that was not formed by our world.

This perspective obviously requires a strong ethical frame. The more a biological system becomes sensitive, adaptive or responsive, the more limits must be defined: which stimulations are acceptable, which signs might indicate a form of suffering, what status should be given to an entity that responds without being a recognized subject? The alien hypothesis must therefore not be only technical or artistic; it must be accompanied by a reflection on our responsibility toward the intelligences we bring into existence.

8. A.L.I hypothesis: the organoid as biological translator

For A.L.I, the most interesting hypothesis is not to fabricate an “extraterrestrial brain”. It would rather be to think of the organoid as an intermediate medium. A neuronal culture connected to sensors could be exposed to human, radio, luminous, vibratory or mathematical signals. Its activity could then be translated into sounds, images, impulses or visual motifs.

The apparatus would become a three-part interface:

- a human system formulating an intention;
- an artificial system encoding, measuring and translating;
- a cultivated living system responding through its own dynamics.

In this scheme, language is not a sentence. It is a controlled perturbation, a response, an adaptation, a pattern of activity. The message would not simply be written or transmitted: it would be cultivated.

9. Possible prototype: neuronal translation garden

One could imagine an installation titled Neuronal Translation Garden. Visitors send very simple messages: prime numbers, light rhythms, voice fragments, spectrograms, stellar coordinates. A computer system transforms these inputs into stimulations compatible with a simulated or real neuronal culture. The response is visualized in real time as a luminous map, sound, generated phrase or constellation of points.

A cautious version could begin without living tissue: a numerical model simulates the activity of an organic neural network. A research version, supervised by a laboratory, could explore public datasets from neuronal cultures or organoids. The artistic stake would be to show that translation is not a transparent passage, but an ecology of media.

10. Toward non-anthropocentric communication

The passage from perceptron to organoids tells a larger story: we first wanted to reduce intelligence to a computable rule; then we discovered immense latent spaces; now we return to living matter capable of its own responses. This does not replace AI. It opens another regime of interface.

If an extraterrestrial intelligence is biological, non-biological, hybrid, distributed or cultivated, it may not communicate through fixed symbols. It may communicate through mutual learning, modulation, plasticity and transformation of a medium. A.L.I could therefore explore not only languages to decode, but media capable of learning to become language.

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66 - Psychology of the Alien: Collective Unconscious, Invisible Channels and Communication

Keywords: psychology, Jung, alien, collective unconscious, archetypes, parapsychology, telepathy, collective consciousness, neuroscience, A.L.I

Opening image: Psychology of the Alien: Collective Unconscious, Invisible Channels and Communication

Summary

A research article on how psychology, from Jung to contemporary neuroscience, approaches the alien, collective consciousness, parapsychology and the hypothesis of invisible information channels.

Text

The alien is not only a being from elsewhere. In the history of psychology, it can also be understood as a limit-form of the human mind: image of the unknown, figure of radical otherness, projection of collective anxiety, symbolic apparition, or attempt to give shape to information that ordinary consciousness cannot yet organize.

For A.L.I, this approach matters because it shifts the question. Communicating with a non-human intelligence may not only mean sending a signal into space. It also requires understanding how the human brain produces, filters, distorts or renders certain forms of presence readable.

1. Jung: flying saucers and modern myth

Jung approached flying saucers in A Modern Myth. He did not primarily try to decide whether the objects were physically real. He observed that their collective apparition had psychological meaning. Circular, luminous, celestial forms could be read as modern mandalas: images of a lost center, symbols of wholeness, responses of the unconscious to an age shaped by the Cold War, technology and nuclear fear.

Bollingen Tower, built by Jung in stages from 1923 onward. This place of retreat, writing and manual work gives architectural form to his inner exploration; it is not evidence of an antenna to an external world. Photograph: Davide Mauro, Wikimedia Commons (guez.org/ali/696), CC BY-SA 4.0.

2. Collective unconscious as a space of forms

The Jungian collective unconscious designates a reservoir of symbolic forms that do not depend solely on individual experience. Applied to A.L.I, this raises a question: could an alien intelligence communicate not through vocabulary, but by activating archetypes?

3. Can the brain be programmed to access other channels?

The word programming is dangerous if it promises magical access. But it becomes interesting if understood as attentional training. The brain massively filters information. Changing perceptual conditions can therefore change what becomes visible, audible, memorable or imaginable.

4. Contemporary neuroscience: networks, prediction, internal states

Contemporary cognitive science increasingly treats the brain as a predictive system. It does not passively receive the world: it anticipates, completes, corrects and compares. Perception is a negotiation between incoming signals and internal models.

5. Parapsychology: experimental frontier and contested zone

Parapsychology has attempted to test telepathy, precognition, psychokinesis and remote viewing. Ganzfeld protocols, remote viewing experiments, PEAR Lab and the Global Consciousness Project all searched for anomalous correlations between intention, information and chance. These fields remain controversial, but they have produced protocols for testing forms of communication that escape ordinary channels.

6. Collective experiences: crowd, synchronicity, social field

The idea of collective consciousness takes many forms: Jungian archetypes, crowd psychology, emotional contagion, shared myths, networked attention and algorithmic amplification. Synchronicity adds another possibility: a meaningful configuration of events rather than a direct causal message.

7. The alien as psychic operator

In abduction and contact narratives, extraterrestrials often communicate through mental images, impressions, silent commands, dreams or telepathic messages. Psychology may read these narratives as trauma, dissociation, personal myth or cultural symbol. But it can also ask: how does the brain represent an otherness that exceeds its categories?

8. A.L.I prototype: laboratory of shared images

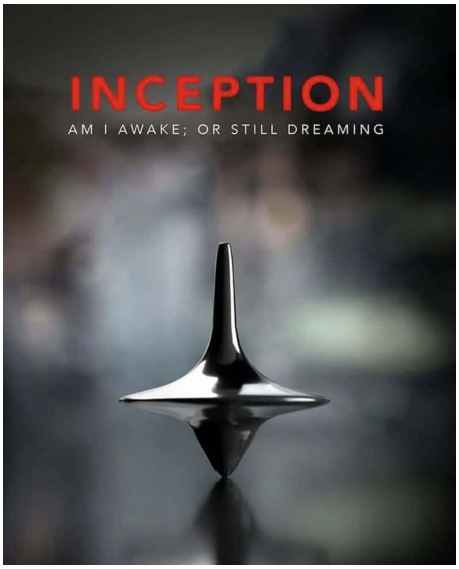
A.L.I could build a protocol where several participants enter modified attention conditions. A hidden symbolic or geometric target is selected. Participants then describe images, words, sensations and figures. The result becomes a database: keywords, visual motifs, subjective intensity, drawings, divergences and convergences.

9. Hypothesis for A.L.I

If a non-human intelligence wanted to contact us, it would probably have to deal with our psychology. It would not communicate with a neutral receiver, but with a predictive, symbolic, emotional, social and cultural brain. A.L.I could therefore become a workshop for the psychology of contact.

67 - Inception, Fractals and Dreams: Communicating Through Mental Architecture

Keywords: Inception, dream, lucid dreaming, fractals, Mandelbrot, Dormio, hypnosis, mental image, communication, A.L.I



Dreaming can be approached as unstable architecture: a space where image, memory, signal and repetition combine in depth.

Summary

Starting from Inception, fractals and lucid-dream research, this article imagines dreaming as a communication interface: an unstable space where motifs, images and messages can repeat across scales.

Text

Christopher Nolan's Inception gives A.L.I a powerful image: dreaming is not only an inner fiction, but a constructed, shared, traversed, sometimes attacked and sometimes encoded space. The film imagines nested dream levels, where each layer modifies time, memory and causality.

If A.L.I searches for communication forms between different intelligences, dreaming becomes a fascinating laboratory. It does not work like a clear sentence. It combines images, emotions, fragments, symbols, architectures and transformations. This nonlinear quality may be precisely what makes it useful for thinking about a non-human message.

The folded city in Inception materializes an essential A.L.I idea: in dreams, space itself can become a message surface.

1. Inception: information inside a mental space

In Inception, the central idea is that information can be planted deep enough in the mind to be mistaken for a personal thought. The film is not simply about telepathy. It is about mental architecture: building a world, placing a clue inside it, designing a path and making an idea feel internal.

This meets an essential A.L.I question: must an extraterrestrial message always be an external signal? Or could it take the form of a mental image, a recurring pattern, a structure that recomposes itself inside the receiver's mind?

Dreaming, in this hypothesis, becomes a translation channel. It does not only transmit words. It transmits scenes, atmospheres, relations and spatial forms. It can carry a message that cannot be reduced to a sentence.

2. Fractals: repeating a form across scales

Fractals, associated in particular with Benoît Mandelbrot, are forms where a motif repeats at different scales. A coastline, a cloud, a fern, a vascular network or the Mandelbrot set can display this logic: each level recalls the whole without being a simple copy.

The link with dreaming is immediate. In a dream, a detail can contain an entire scene. A door opens onto an impossible place. A sentence returns as an object. An image becomes architecture. As in a fractal, meaning is not only local: it circulates between scales.

For an interstellar language, fractals could become an encoding principle: the same message inscribed in a sound, an image, a geometric form, a light sequence and a narrative structure. If the receiver does not understand one level, it may recognize the motif at another.

3. Dreaming as a communication interface

Contemporary research on lucid dreaming shows that, in some cases, limited dialogue with sleeping people is possible. Experiments published in Current Biology showed that lucid dreamers could answer simple questions during sleep through coded eye or muscle movements. Dreaming is therefore not completely closed.

Dormio, developed around the MIT Media Lab, explores targeted dream incubation:

influencing dream content through stimuli during sleep onset. These works do not prove exotic communication, but they open a territory: dreaming can become a partly programmable, reactive space crossed by external signals.

From an A.L.I perspective, this changes the frame. A message would no longer be sent only to an antenna or telescope. It could be sent to a state of consciousness: sleep, hypnosis, deep meditation, lucid dreaming or the threshold between waking and sleeping.

4. Fractal architecture of the message

One can imagine a dream-communication protocol in several layers:

- a sonic layer: pulses, phonemes, frequencies, incomplete words;
- a visual layer: simple forms, spirals, doors, maps, symbols;
- a spatial layer: recurring places, rooms, staircases, folded cities;
- an emotional layer: fear, trust, curiosity, alert;
- a fractal layer: the same motif reappears at each level in another form.

The receiver does not receive a text. They move through a structure. The message is the experience itself: repetition, recognition, change of scale, transformation.

5. Communicating with a non-human intelligence

If an extraterrestrial intelligence shares neither our biology, nor our vocalization, nor our graphic conventions, dreaming could offer a space less dependent on verbal language. It already works with unstable images, associations, analogies and metamorphoses.

This does not mean that dreaming is a magical channel. We should remain precise: we do not know how to communicate with extraterrestrials through dreams. But conceptually, dreaming lets us imagine a language that is neither alphabetic, nor purely mathematical, nor only sonic. A language that passes through lived forms.

The fractal then becomes a method of robustness. If the message must cross an unknown biology, it can multiply its chances of being recognized by repeating its structure across several media: visual motif, rhythm, architecture, narrative and sensation.

6. Inception reversed: not planting an idea, but letting a structure be recognized

In the film, inception means planting an idea. For A.L.I, the gesture should almost be reversed. It would not be about manipulating a mind, but about creating a structure clear enough for another intelligence to recognize an intention.

An ethical dream message should not force. It should propose. It should leave clues, repetitions, thresholds and exits. It should be decodable without capturing the receiver.

Dreaming then becomes a cautious contact space: neither invasion nor simple technical broadcast. A resonance chamber where mental imagery becomes an intermediary between two worlds.

7. A.L.I research paths

- Create an audio-visual sequence for sleep onset, where a fractal motif returns as sound, image and language.

- Build an immersive installation inspired by Inception: a room inside a room, a dream inside a dream, a message in layers.
- Test collective dream journals: if several people encounter the same motif before sleep, do shared structures emerge?
- Develop a fractal alphabet: each sign contains a reduced version of the whole system.
- Compare lucid dreaming, hypnosis and meditation as states of amplified reception.

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68 - Men in Black: Alien Races, Secret Agreements and a Galaxy in a Marble

Keywords: Men in Black, Orion, galaxy, Area 51, alien races, secret agreements, scale, dimensions, multiverse, A.L.I

In Men in Black, the galaxy is not in the constellation Orion, but on the collar of a cat named Orion: a shift of scale that turns a banal clue into a miniature cosmology.

Summary

Men in Black offers a useful fiction for A.L.I: discreet coexistence between alien species, imagined government agreements, Area 51 and Orion's galaxy as a model of nested scales.

Text

Men in Black is a science-fiction comedy, but it is also a powerful conceptual machine for A.L.I. The film imagines a world in which extraterrestrials are not about to arrive: they are already here, integrated, hidden, administered and monitored. Contact is not a future event. It has become an infrastructure.

1. The extraterrestrial as population, not exception

In many contact stories, the alien appears as a single apparition: one ship, one species, one message. Men in Black reverses that logic. Extraterrestrials form a multiple, composite, almost ordinary population.

The kitchen scene gives the film an almost documentary tone: extraterrestrial life is not only spectacular, it becomes domestic, social and administrative.

2. The cosmic immigration office

The film turns the extraterrestrial into an administrative problem. The Men in Black classify, regulate, erase, move and negotiate. Contact is treated as a secret public policy.

3. Secret agreements, governments and Area 51

The film plays with a strong belief in UFO culture: the idea that governments may already know about an extraterrestrial presence, or even have agreements with certain species. Historically, Area 51 is linked to secret aeronautical programs such as U-2 and A-12 OXCART. Symbolically, however, it became the place where secret technology, the sky and the alien hypothesis overlap.

4. Erasing memory: controlling the story of contact

The neuralyzer transforms communication into narrative control. What matters is not only what happened, but what witnesses will be able to say afterwards. Any contact protocol must manage the psychic and social effects of revelation.

5. Orion: the galaxy on the collar

The Orion scene is a masterpiece of semiotic displacement. The characters first interpret “Orion's Belt” at astronomical scale. But the solution is local, tiny and literal: Orion is the cat, and the belt is his collar. The message was right; the scale of reading was wrong.

The galaxy-marble makes the film's central idea visible: a cosmic totality can be contained inside a tiny object, as if the universe changed scale without changing nature.

6. A galaxy as transportable object

Orion's marble contains a galaxy, or at least a miniaturized cosmic structure. The image suggests a universe that can be encapsulated, displaced, possessed and coveted. Space is no longer only immense extension; it becomes compact object.

7. Infinite loop of dimensions

The film extends this intuition: our world may appear as an element inside a larger set, itself handled at another scale. The immense becomes tiny; the tiny becomes immense. The universe is no longer a stable totality, but a cosmic nesting structure.

8. The problem of trans-scalar translation

How can one translate a message from a scale that is not ours? An intelligence operating at another level might manipulate structures we perceive as weather, chance, genetics, dream or cosmic event. The message may be too large or too small to recognize.

9. A.L.I hypothesis

For A.L.I, the Orion scene becomes a matrix: search for the message at several scales at once. Sky, object, body, jewel, city, institution, galaxy, marble. Interstellar language may be less a sentence than a system of correspondences between dimensions.

69 - Altered States of Consciousness: Accessing Otherwise Impossible Zones?

Keywords: altered states of consciousness, hypnosis, meditation, lucid dreaming, Castaneda, Thomas Campbell, Monroe Institute, remote viewing, Ganzfeld, A.L.I

Opening image: Altered States of Consciousness: Accessing Otherwise Impossible Zones?

Summary

A survey of literature, anthropology, hypnosis, lucid dreaming, meditation, out-of-body experiences, remote viewing and extrasensory narratives, asking what these states could contribute to A.L.I.

Text

Some states of consciousness seem to open perceptual zones that ordinary waking awareness cannot reach. Lucid dreaming, trance, hypnosis, deep meditation, out-of-body experience, shamanic vision, sensory deprivation, aesthetic absorption, sudden intuition: these practices and narratives form a troubled constellation, documented, contested, instrumentalized, yet persistent.

For A.L.I, the question is not simply whether to believe. It is more precise: if contact with a non-human intelligence required a shift in perceptual regime, which tools, traditions and protocols could explore that threshold without collapsing into confusion?

1. Changing consciousness, changing access

An altered state of consciousness is not necessarily spectacular. It may be produced by fatigue, rhythm, breathing, sound repetition, hypnosis, isolation, meditation, pain, dreaming or certain substances. What changes is the organization of attention: body, time, memory, mental imagery and selfhood are no longer arranged in the same hierarchy.

In such states, people report stronger mental images, synesthetic perception, stable inner scenes, out-of-body sensations, encounters with presences, or access to information felt as

external to the subject. Science recognizes these subjective states; it remains much more cautious about their ability to produce objectively verifiable knowledge.

2. Charles Tart: mapping states

Psychologist Charles T. Tart played an important role in legitimizing the study of altered states of consciousness. His contribution is methodological: instead of treating these states only as anomalies, he approached them as organized configurations of perception, memory, identity and attention.

This is useful for A.L.I: if a signal becomes readable only in a certain mental state, then the state of the observer is part of the receiving apparatus. One no longer measures only an external phenomenon; one also measures how an organism becomes capable of perceiving it.

3. Castaneda: initiatory narrative and critical zone

Carlos Castaneda's books powerfully shaped the imagination of the 1960s and 1970s around shamanism, perceptual training and passage into non-ordinary realities. In these narratives, the world is not merely seen: it is assembled. Initiation consists in shifting the point of assembly, changing how reality becomes coherent.

But Castaneda is also a critical case. His anthropological status has been strongly contested, and his texts are now often read as literary constructions as much as testimonies. For A.L.I, this ambiguity matters: it forces us to distinguish between narrative, method and proof. A narrative can generate powerful forms without constituting empirical evidence.

4. Monroe, Campbell and architectures of experience

Robert Monroe popularized out-of-body experiences and developed, with the Monroe Institute, sound protocols based on binaural beats and focus states. Thomas Campbell, a physicist and former participant in that research environment, later formulated My Big TOE, a speculative cosmology in which consciousness, information and reality are thought as parts of a larger system.

These models are controversial, but they interest A.L.I for one reason: they imagine consciousness as an interface. The subject is not only a passive receiver, but a terminal capable of synchronizing with different levels of reality, information or simulation. Even cautiously, this can inspire artistic protocols: sound, synchronization, experience journals, comparison between subjects, search for shared motifs.

An open Floatation-REST pool used in an anxiety research protocol. Reducing sensory input can alter bodily experience; this photograph documents an experimental method, not evidence of extrasensory access. Photograph: Justin S. Feinstein et al., Wikimedia Commons (guez.org/ali/708), CC BY 4.0.

5. Remote viewing, Gateway, Ganzfeld: protocols and limits

Remote viewing programs linked to Stargate, declassified documents around the Gateway Process, and Ganzfeld experiments belong to a history of testing non-ordinary perception in more protocol-driven settings. The important point is not to conclude too quickly, but to observe the experimental conditions: isolation, relaxation, sensory noise reduction, minimal instructions, hidden targets, after-the-fact comparison.

Results in these fields remain debated. Some meta-analyses suggested weak but non-trivial effects; other researchers emphasize bias, replication difficulty and data selection problems. For A.L.I, this tension is productive: it shows that a contact protocol must survive the desire to believe. It must accept failure, repetition, blind testing, archives and comparison.

6. Extrasensory experiences and ufology

In ufology and abduction narratives, communication is often described as telepathic, imagistic, emotional or intrusive. Witnesses rarely describe ordinary articulated language; they speak instead of mental scenes, packets of information, sudden certainties, messages received without voice.

This form of communication raises a central question: if the message arrives as mental imagery, how can it be distinguished from internal production? The issue is not only psychological; it is semiological. We must look for invariants: repeated motifs across subjects, structures too precise to remain vague, temporal correspondences, measurable effects, possible material traces.

7. Hypnosis, meditation and mental imagery as a laboratory

Hypnosis shows that a subject can strongly modify perception, attention and memory under certain conditions. Meditation can stabilize attention and make internal phenomena observable when they are usually drowned in mental noise. Lucid dreaming opens a space where image becomes manipulable, almost experimental.

These practices can serve as a laboratory for A.L.I: not to prove telepathy, but to learn how to produce, receive, describe and compare mental images. A contact interface could ask several

participants to enter a given state, receive an image, draw it, encode it as keywords, then compare the results without knowing the target.

8. A.L.I prototype: threshold chamber

One could imagine an installation titled Threshold Chamber. It would combine soft light, guided breathing, sound frequencies, partial isolation, minimal instructions and written or vocal recording. Participants would not try to “see extraterrestrials”, but to map their perceptual thresholds.

- Phase 1: neutral induction, breathing, noise reduction.
- Phase 2: hidden target appearing as sound, image or pattern.
- Phase 3: immediate description of mental images.
- Phase 4: blind comparison between target, narratives and drawings.
- Phase 5: archive of correspondences, errors and drift.

9. What this brings to A.L.I

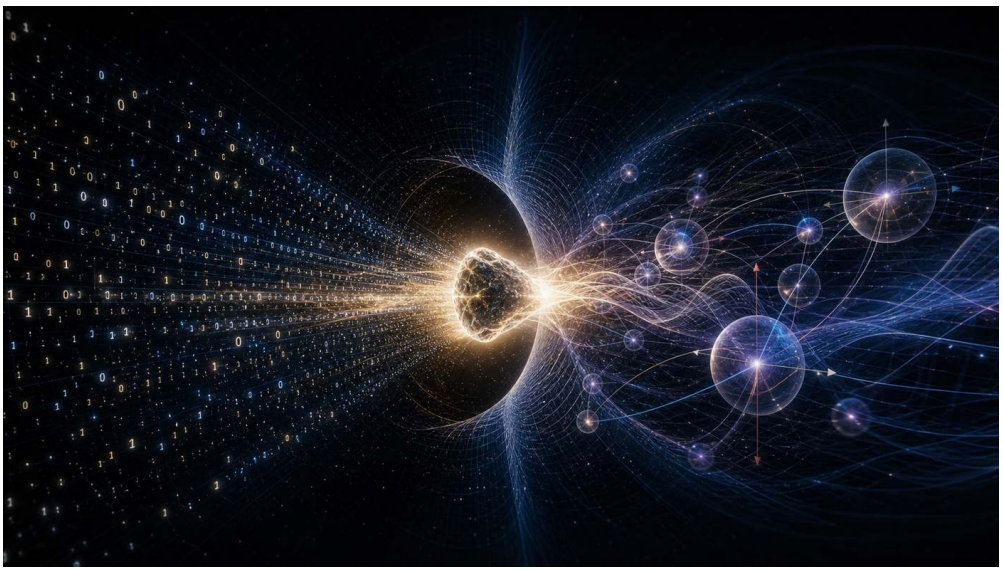
Altered states of consciousness should not replace antennas, radio signals, mathematics or analytical protocols. They add another hypothesis: the receiver of the message may also be biological, attentional and imaginal. An alien civilization might not only transmit content, but induce in the receiver a state capable of making that content readable.

The question then becomes: how can we design an art-science of thresholds? How can unstable experiences be documented without reducing or mythologizing them? How can we invent a language in which inner images become comparable, archivable and criticizable?

This article therefore proposes a path: A.L.I could explore altered states of consciousness as fragile interfaces, not to assert the existence of an extrasensory channel, but to experiment with the conditions under which impossible information begins to take form.

70 - It from Bit / It from Qubit: When Information Becomes Matter

Keywords: Wheeler, it from bit, it from qubit, information, qubit, entanglement, quantum physics, spacetime, quantum gravity, A.L.I



Opening image: It from Bit / It from Qubit: When Information Becomes Matter

Summary

Starting from John Archibald Wheeler's intuition, this article explores the idea that reality may arise from acts of information, then extends it toward qubits, entanglement and the possibility of an interstellar language based on quantum correlations.

Text

What if matter were not first a thing, but an answer? With his famous phrase It from Bit, John Archibald Wheeler proposed a dizzying idea: every element of physical reality, every it, may derive its existence from an act of information, from a bit, meaning a minimal distinction: yes / no, 0 / 1, present / absent.

This does not simply mean that the universe is a computer in the ordinary sense. It suggests a reversal: instead of treating information as a secondary description of matter, Wheeler asks whether matter itself may emerge from questions asked of the world and from the answers obtained. Reality would not only be what is there, but what becomes readable when an interaction, a measurement or an observation produces a fact.

1. The bit: the smallest difference that makes a world

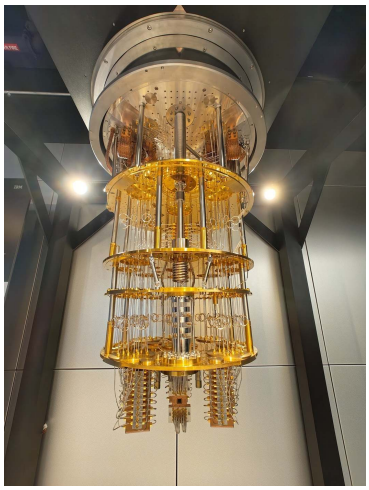
A bit is a binary decision. It does not yet tell a story, but it opens the possibility of structure. A light on or off, a pulse received or absent, a particle detected or not: each event can be read as a difference. For Wheeler, the universe may be composed, at its deepest level, of a vast network of elementary answers.

This intuition speaks directly to A.L.I: how could a non-human intelligence recognize a signal? Before understanding a language, one must recognize a difference: this rather than that, rhythm rather than noise, pattern rather than randomness. In this sense, a contact language may begin as a grammar of distinctions.

2. The participating observer

Wheeler also spoke of a participatory universe. This does not mean that the human mind magically creates the cosmos. It means that, in quantum physics, measurement plays a central role: some properties become definite only when an apparatus, an environment or an observer makes them observable.

The world is therefore not only a pre-written stage that we passively read. It is also a story of interactions. The signal, the sensor, the measurement and the interpreter belong to the same scene. For A.L.I, this is crucial: an extraterrestrial message would not only be content to translate, but an event of relation. The reading protocol may matter as much as the message itself.



The cryostat of an IBM Quantum System One: substantial material infrastructure built to preserve and manipulate fragile quantum states. The qubit does not abolish matter; it requires a precise architecture to make information physically operative. Photograph: Onri Jay Benally, Wikimedia Commons (guez.org/ali/716), CC BY 4.0.

3. From It from Bit to It from Qubit

Since Wheeler, the physics of information has shifted the question. The classical bit, 0 or 1, is no longer enough to describe the quantum world. We must move toward the qubit, the unit of quantum information capable of existing in a superposition of states. A qubit is not simply 0 or 1: it can carry a combination of possibilities, with phase, amplitude and relations to other qubits.

With the qubit, information is no longer only a binary answer. It becomes an architecture of possibilities. Two qubits can be entangled: their states are no longer described separately, but as one shared structure. This does not allow faster-than-light messaging. But it reveals a form of correlation that exceeds our classical intuition of separation.

4. Spacetime as an informational structure

The contemporary program often summarized as It from Qubit explores an even more radical hypothesis: spacetime itself may emerge from relations of quantum information. In work on black holes, holography, entropy and quantum error correction, geometry is no longer only a container. It may be the visible result of a deeper network of entanglement.

In other words: what we call distance, neighborhood, volume or horizon may depend on how quantum information is organized. This is not a completed theory, but it is a major research direction. It changes the question: is the universe made of things, or of relations capable of producing things?

5. What this changes for an interstellar language

If an advanced civilization had understood or exploited this informational layer of reality, its language might not look like a sequence of words, sounds or images. It might take the form of a protocol of correlations, a statistical pattern, a signature in noise, a structure repeated across physical measurements.

An It from Bit message would say: “I know how to produce a recognizable distinction.” An It from Qubit message would say: “I know how to organize possibilities, correlations and relations.” Contact would no longer be only a text transmitted through space, but a way of building a shared space of reading.

6. A.L.I prototype: a bit / qubit grammar

One could imagine an artistic and scientific prototype in four layers:

- Bit: binary pulses, light, Morse, alternation, presence / absence.
- Pattern: repetitions, prime numbers, symmetries, matrices, intentional errors.
- Qubit: simulated superposition, probabilities, states not determined before reading.
- Entanglement: two separated interfaces producing correlated results after classical comparison.

Such an installation would not claim to send an actual quantum message to the stars. It would stage a question: when does a difference become a sign? When does a sign become a relation? And when does a relation become a shared world?

7. Toward a language of the conditions of reality

The force of It from Bit and It from Qubit is that they move communication to a deeper level. Before vocabulary, there is distinction. Before the sentence, there is measurement. Before the message, there is the protocol that makes the message possible.

For A.L.I, this opens a major path: an interstellar language may not only be a language of contents, but a language of the conditions of reality. Communicating with another intelligence would then mean building with it a shared space in which something can be recognized as information.

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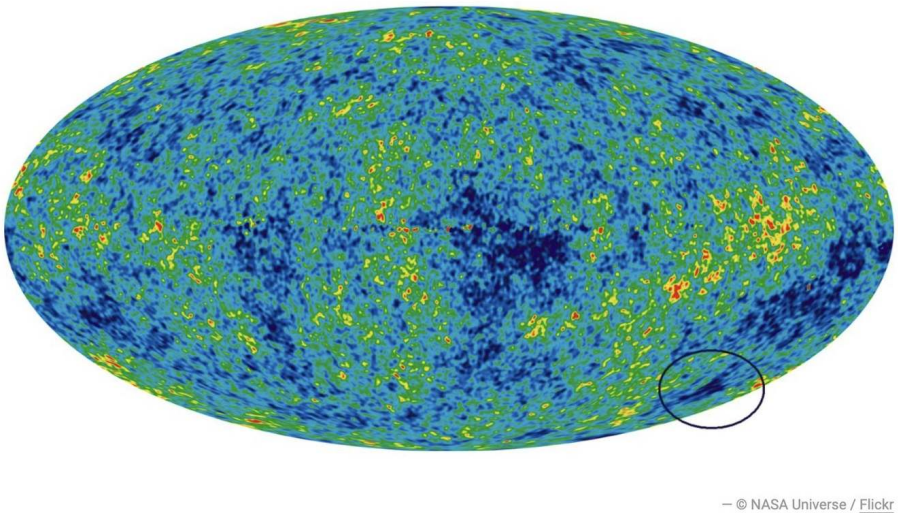
71 - Signatures in Space: Reading Cosmic Patterns from the Big Bang to the Multiverse

Keywords: cosmic signature, cosmic microwave background, multiverse, cosmic web, gravitational waves, scale, pattern, technosignature, A.L.I



Cosmic microwave background map: a primordial signature of the observable universe. Credit visible on image: NASA Universe / Flickr.

Summary

Cosmic microwave background, cosmic web, gravitational waves, micro/macro scales and the hypothesis of communication at very large scale.

Text

Hypothesis: the universe is filled with signatures. Not necessarily messages in the human sense, not sentences, not alphabets, but motifs: traces, anisotropies, repetitions, deviations, distributions, vibrations, spectra, asymmetries, structures.

A signature is not necessarily an intention. It may be the imprint of an event, the memory of an origin, the consequence of a physical law or, in the most vertiginous hypothesis, the trace of an intelligence capable of writing at cosmic scale.

For A.L.I, the question becomes: how can we distinguish a natural signature, a technological signature, a biological signature, a cosmological signature and an intentional signature?

The primordial signature: the cosmic microwave background

The oldest observable signature of our universe is the cosmic microwave background, or CMB. It is fossil light, emitted when the universe became transparent about 380,000 years after the Big Bang. Before that, the universe was an opaque plasma: light could not travel freely.

Today, this light reaches us as microwaves, almost uniform in every direction. Almost uniform, but not entirely. The tiny temperature variations of the CMB, mapped by COBE,

WMAP and Planck, are essential: they are the initial differences that later allowed galaxies, clusters, filaments and cosmic voids to form.

The primordial signature is therefore not a message written afterwards. It is a birth imprint. A map of the universe when it was still almost homogeneous, yet already carrying all future structures.

For A.L.I, it is a fascinating model: a tiny, almost invisible information can contain the matrix of an immense organization.

Reading a pattern larger than us

We are used to thinking about messages at our own scale: a voice, a sentence, an image, a radio signal, a light pulse. But the universe operates on other dimensions.

- A cosmic pattern may be too large to be seen from a single point.
- It may be too slow to be perceived within a human lifetime.
- It may be too ancient to be understood as an event.
- It may be too faint to appear without instruments.
- It may be too distributed to look like a message.

The CMB map, the distribution of galaxies, the cosmic web, gravitational waves, exoplanet spectra or fast radio bursts are all examples of signatures that humans do not perceive directly. Instruments, mathematics, models and statistics are required.

The cosmos is not silent. It is unreadable to the naked eye.

The cosmic web: gravity as writing

At very large scales, galaxies are not randomly distributed. They form filaments, walls, nodes and voids: the cosmic web. Gravity, dark matter and the expansion of the universe have sculpted this immense network.

This web is a signature because it encodes a history: expansion, gravitation, dark matter, dark energy, initial conditions. It is a kind of sentence written by physical laws, but on a page too vast to be seen except through reconstruction.

A.L.I could propose an artistic hypothesis: what if a very advanced intelligence did not try to send a punctual message, but instead modulated structures at large scale? Not writing “hello” in a radio frequency, but producing a statistical anomaly in a cosmic distribution.

Gravitational waves: signatures in spacetime

Since 2015, LIGO has opened another way of listening to the universe: gravitational waves. These are not electromagnetic waves, but ripples in spacetime produced by extreme events such as black hole or neutron star mergers.

They do not carry an image in the usual sense. They carry a form: a temporal signal, a curve, a chirp, a signature of mass, speed, distance and collision.

This type of signal matters to A.L.I because it shifts the very idea of communication. Could an intelligence use gravity as a medium? For us, this is almost technologically impossible. But conceptually, a civilization capable of acting on stellar masses or compact objects could produce signatures at a scale we do not yet know how to interpret as intentional.

Between the infinitely small and the infinitely large

The question of signatures forces us to compare scales.

- Planck length: about 10-35 m.
- Elementary particles: about 10-18 to 10-15 m depending on the object.
- Atoms: about 10-10 m.
- DNA: a few nanometers wide.
- Human body: about 1 m.
- Planet: thousands of kilometers.
- Milky Way: about 100,000 light-years in diameter.
- Observable universe: about 92 billion light-years in diameter.

Between the Planck length and the observable universe, there are roughly 60 orders of magnitude. This means that our natural perception occupies a tiny band in the scale of reality.

A.L.I could therefore state a simple idea: an extraterrestrial or cosmic signature may exist, but outside our intuitive band of perception.

Signature as pattern

A signature is not necessarily an isolated sign. It may be a pattern.

A pattern may be a regularity, a repetition, a symmetry, a symmetry breaking, an anomalous compression, an improbable distribution, a correlation between distant phenomena, or a structure repeating across several scales.

This is where the idea becomes especially powerful for A.L.I. We tend to search for a message as if we were searching for a sentence. But another intelligence might send a message the way one composes a statistical landscape.

a repeated anomaly

across several scales

with compressible structure

and mathematical coherence

beyond chance

The message would not be immediately “read”. It would be detected as a structure that resists natural explanation.

Multiverse: a signature from elsewhere?

The idea of a multiverse remains speculative. It appears in some models of cosmic inflation, in some interpretations of quantum mechanics and in theoretical physics hypotheses. There is currently no direct observational proof of another universe.

But as an A.L.I hypothesis, the multiverse opens a powerful question: if our universe is only one region among others, could it carry a trace of interaction, collision or neighborhood with another universe?

Some models have imagined that collisions between bubble universes could leave signatures in the cosmic microwave background. These ideas remain highly debated, but they give form

to a radical question: could a message come not from a civilization located in our space, but from another cosmological frame?

In that case, communication would no longer mean sending a signal from one star to another. It would mean recognizing an imprint in the very parameters of the universe.

An intelligence at very large scale

Could a very advanced civilization communicate at cosmic scale? Classical scenarios imagine radio signals, lasers, megastructures, stellar light variations or artifacts sent through space. But one can push further:

- voluntary modulation of a star;
- alignment of orbital objects to produce a periodic signature;
- use of gravitational lenses;
- a network of synchronized probes at galactic scale;
- a message embedded in the distribution of artifacts;
- a temporal signature repeated over millennia;
- an artificial structure detectable only through statistical analysis.

At very large scale, the message would no longer be an object. It would be an architecture.

What exceeds human vision

The problem is not only technical. It is perceptual and philosophical. A human being sees a narrow band of the electromagnetic spectrum. A human lives a few decades, inhabits a planet, and thinks at the scale of gestures, words, sounds and images. But the universe can carry signatures in microwaves, neutrinos, polarization, gravitational waves, atmospheric chemistry, galaxy distributions, physical constants or structures evolving over millions of years.

A.L.I must therefore imagine interfaces that expand perception: transforming cosmological data into forms, sounds, rhythms, maps, scores, images and objects.

Interstellar language might begin with a prosthesis of perception.

A.L.I Prototype: Cosmic Signature Reader

One could imagine a prototype called Cosmic Signature Reader. It would not claim to discover a real extraterrestrial signature. It would stage several levels of reading:

cosmic microwave background

=> primordial variations

=> origin of structures

cosmic web

=> filaments / voids / nodes

=> gravity + dark matter

gravitational waves

=> collision / mass / distance

=> temporal signature

fictional artificial anomaly

=> multi-scale repetition

=> message hypothesis

The installation could display real data, then introduce fictional signatures: compressible motifs, impossible symmetries, repetitions across several scales. The visitor would have to decide: chance, natural law, noise, or intention?

Conclusion

Searching for signatures in space is not only searching for extraterrestrials. It is learning to read the universe as a surface of inscription.

The cosmic microwave background is a birth signature. Gravitational waves are signatures of extreme events. The cosmic web is a signature of structure. Biosignatures are signatures of life. Technosignatures would be signatures of intelligence.

And perhaps one day, a signature will appear that fits no known category. Then A.L.I's real question will be: are we capable of recognizing a message that was not written at our scale?

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72 - Philosophers of Other Worlds: Thinking Extraterrestrial Life Before Contact

Keywords: philosophy, plurality of worlds, extraterrestrials, communication, SETI, METI, language, Fontenelle, Kant, A.L.I

A.L.I image: a constellation of thinkers for questioning life elsewhere, language and the possibility of contact.

Summary

From ancient atomism to SETI/METI debates, a philosophical journey through plurality of worlds, language and the ethics of contact.

Text

Why should philosophy care about extraterrestrials? Because the question is not only astronomical. It touches the place of humans in the cosmos, the definition of life, the possibility of non-human intelligence, translation, the ethics of contact and the vertigo of a world in which humanity is no longer the center.

Long before telescopes, philosophy imagined other worlds. It asked whether Earth was unique, whether life could repeat elsewhere, whether a foreign intelligence could be understood, and whether our categories would be sufficient to recognize what does not resemble us. This is precisely A.L.I's territory: not to assert contact, but to prepare the intellectual and sensible forms that would make contact thinkable.

The atomists: life elsewhere as a consequence of matter

For Democritus, Epicurus and Lucretius, the universe is made of atoms and void. Worlds arise from material combinations without the need for a single center. In this perspective, life elsewhere is not first a fiction: it becomes a logical possibility. If the same elements exist everywhere, then other assemblages may produce other earths, other living beings, perhaps other intelligences.

Lucretius, in De rerum natura, gives this intuition poetic force. Life is no longer isolated as a

terrestrial exception; it belongs to a nature capable of producing forms elsewhere that escape us. For A.L.I, this atomist thought matters because it turns the extraterrestrial into a problem of combination, repetition and variation: matter could write several versions of life.

Aristotle and the closed world: the obstacle of uniqueness

The Aristotelian tradition, by contrast, long imagined an ordered, hierarchical, closed cosmos, with Earth placed in a unique system. This vision did not favor the idea of a plurality of inhabited worlds. It installed a tension that runs through Western history: are we a unique case, or one example among others?

That tension is still contemporary. It reappears in the Fermi paradox, in the Rare Earth hypothesis, and in debates over habitable exoplanets. Philosophy intervenes here as a discipline of caution: it asks what we know, what we project, and what still belongs to cosmic desire.

Nicholas of Cusa: learning not to judge from Earth

In the fifteenth century, Nicholas of Cusa reopened the vertigo. In De docta ignorantia, he imagines that the universe cannot be reduced to our point of view. Possible inhabitants of other worlds should not be evaluated only with our criteria. This intuition is central: another intelligence may not share our organs, proportions, assumptions or even our ways of making a world.

For A.L.I, this is a methodological lesson. Before building a message, we must admit our ignorance. A contact language cannot too quickly assume that the other sees, hears, counts, breathes or desires as we do.

Giordano Bruno: infinity as plurality of worlds

In the sixteenth century, Giordano Bruno radicalized the question. In On the Infinite, the Universe and the Worlds, the universe no longer has a single center. Stars may be other suns, surrounded by other worlds. The plurality of worlds becomes a metaphysical consequence of infinity.

Bruno does not propose a protocol for extraterrestrial communication, but he deeply shifts the imagination. If the universe is populated by worlds, then humanity is not the only stage of intelligence. The problem of contact begins with this shift: accepting that our world is provincial.

Fontenelle: turning the extraterrestrial into conversation

In 1686, Fontenelle published Conversations on the Plurality of Worlds. The text is decisive because it turns learned speculation into conversation. A philosopher and a marquise look at the sky and imagine the Moon, planets and possible inhabitants. The extraterrestrial becomes an exercise in pedagogy, style and decentering.

Fontenelle is very close to A.L.I's spirit: he does not merely state a hypothesis, he invents a form for transmitting it. The plurality of worlds passes through a staged dialogue. Thinking another world already means inventing a mediation device.

Kant: a moral cosmology of intelligences

In 1755, in Universal Natural History and Theory of the Heavens, Kant strongly defended the possibility of inhabitants on other planets. He even imagined a gradation of beings according to their distance from the Sun. This part of his reasoning is scientifically dated, but it shows something decisive: extraterrestrial life forces us to think a moral cosmology.

If several forms of reason exist in the universe, then humanity is not the sole bearer of intelligence. Contact would not only be a scientific discovery, but a philosophical crisis: what becomes of our idea of reason if it appears in non-human forms?

Whewell and Rare Earth: skepticism as a demand for evidence

In the nineteenth century, William Whewell challenged the fashion for inhabited worlds. In Of the Plurality of Worlds, he defended the idea that Earth might be rare, perhaps even exceptional. This position matters for A.L.I because it prevents automatic belief. Thinking extraterrestrials is not only a matter of multiplying possibilities; it also means asking what evidence would distinguish hypothesis, projection and signal.

Whewell's skepticism anticipates a contemporary tension: the universe seems immense, exoplanets are numerous, organic molecules widespread, but we still do not know whether intelligent life is frequent, rare or almost impossible.

Flammarion: popularizing inhabited worlds

With Camille Flammarion, the plurality of worlds became a broad popular adventure. The Plurality of Inhabited Worlds extended the astronomical dream: other planets might carry other forms of life, adapted to their environments. Science, imagination and cosmic sensitivity mix.

This tradition is essential for A.L.I because it shows that the extraterrestrial idea always circulates between science and culture. It is never only an equation; it becomes story, image, projection, desire, fear and pedagogy.

Language: understanding a radically other intelligence

Contemporary philosophy of language provides decisive tools. Wittgenstein writes that if a lion could speak, we might not understand it: the problem is not only vocabulary, but form of life. Quine, with the indeterminacy of translation, shows that the same behavior can receive several incompatible translations. Nagel, with his question about the bat, reminds us that a consciousness can be real while remaining difficult to imagine from within our own body.

These philosophers do not always speak directly about extraterrestrials, but they define the problem of contact. An extraterrestrial intelligence might produce signs without sharing our senses, biology, temporality, emotions, needs or social uses of language.

SETI, METI and the ethics of messaging

Today, philosophy enters SETI and METI debates. Should we only listen, or also transmit? Who speaks for Earth? What should a message contain? Should an extraterrestrial reply be made public immediately? Post-detection protocols emphasize verification, transparency and collective caution.

Researchers such as Douglas Vakoch work on the composition of interstellar messages. Contemporary philosophers such as Susan Schneider add another hypothesis: advanced extraterrestrial intelligences may be post-biological, artificial or hybrid. In that case, communication might not first be biological-to-biological, but machine-to-machine, structure-to-structure, model-to-model.

Why this matters to A.L.I

Philosophy brings four fundamental questions to A.L.I.

- What is a world? A planet, an environment, a form of life, a way of organizing experience?
- What is an intelligence? An individual, a colony, a machine, an ecosystem, a slow process?
- What is a sign? An intentional form, a regularity, an anomaly, an archive, a reply?
- Who has the right to speak? A state, a scientific community, humanity as a whole, or no one?

These questions show that extraterrestrial contact does not begin when a signal arrives. It begins earlier, in the way we prepare our categories of reading.

A.L.I Prototype: Philosophical Atlas of Contact

One could imagine a prototype called Philosophical Atlas of Contact. It would connect thinkers, concepts and communication hypotheses as a graph: atomism, plurality of worlds, moral cosmology, indeterminacy of translation, form of life, ethics of messaging, post-biology.

atomism

=> plurality of worlds

=> possible life elsewhere

plurality of worlds

=> human decentering

=> moral cosmology

language

=> impossible translation?

=> forms of life

=> extraterrestrial semiotics

SETI / METI

=> evidence

=> protocol

=> collective responsibility

Each philosopher would become a node, each idea a link, each link a question for A.L.I: how can we recognize a message that does not share our world?

Conclusion

Philosophy did not wait for radio telescopes to think extraterrestrials. It first imagined them as a metaphysical hypothesis, then as a theological, scientific, linguistic and ethical problem. Its most precious role for A.L.I may be this: preparing our thought to encounter something that does not resemble us.

Because before decoding an extraterrestrial message, we may first have to decode our own idea of what understanding means.

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73 - Cosmic DNA: What If Life Was Already a Communication Code?

Keywords: DNA, genetic code, panspermia, astrobiology, signature, communication, origin of life, A.L.I

A.L.I image: DNA as double helix, biological archive and possible cosmic alphabet.

Summary

What if DNA were biological archive, cosmic code and possible contact medium? Shared bases, panspermia, hidden signature and an A.L.I hypothesis.

Text

Hypothesis: DNA may not only be the chemical support of terrestrial life. For A.L.I, it can be thought of as a code already there: a molecular system of writing, memory, replication, correction and transmission. If some building blocks of life are common across the Universe, then life itself could become a first cosmic language.

Are the Bases of Life Universal?

On Earth, known life uses shared molecules: nucleic acids, amino acids, sugars, lipids, water, ions and chemical energy. DNA and RNA use nitrogenous bases such as adenine, cytosine, guanine, thymine and uracil. These bases are not abstract symbols: they are molecules, with geometry, bonds and chemical constraints.

Astrochemistry shows that several building blocks of life can form beyond Earth. Amino acids and nucleobases have been identified in meteorites, and samples from asteroid Bennu revealed important organic compounds, including the five nucleobases used by terrestrial DNA and RNA.

It would be excessive to claim that terrestrial DNA is necessarily universal. But it becomes reasonable to ask whether some chemical alphabets are favored by the Universe. Perhaps life, when it appears, often converges on similar solutions: carbon-based molecules, chains capable of carrying information, structures able to copy and mutate.

From Genetic Code to Language

DNA already works as a code. A sequence of bases is read, transcribed and translated. Three bases form a codon. Some codons correspond to amino acids. Others mark stops. Terrestrial life rests on this correspondence between sequence and fabrication.

DNA

=> RNA

=> codons

=> amino acids

=> proteins

=> organism

This system is not a human language, but it has several properties that matter for A.L.I: limited alphabet, syntax, redundancy, error, correction, memory, translation and expression. Life is a machine that reads code and produces forms.

The question becomes vertiginous: if we are made of code, where does language begin? In words? In cells? In chemistry? In the ability of one structure to be read by another?

Panspermia: Seeded Planets

Panspermia is the hypothesis that life, or its precursors, could travel from one world to another. It exists in several versions. The most cautious version speaks of organic molecules delivered by meteorites, asteroids or comets. A stronger version imagines microbes surviving certain transfers between planets. An even more speculative version, directed panspermia, imagines that a civilization could intentionally seed planets.

Francis Crick and Leslie Orgel formulated a famous version of directed panspermia in 1973. Their idea was not a proof, but a proposal: if a civilization wanted to spread life, it could send microorganisms or systems capable of initiating a biosphere elsewhere.

For A.L.I, this hypothesis is crucial because it turns life into a delayed message. A civilization would not send us a sentence, but a process. Not “hello,” but a seed capable of becoming a living planet.

DNA as a Very Slow Message

A radio message can travel fast, but it fades or gets lost. An object can survive for a long time, but remain mute. Life has a strange property: it can copy itself. It can carry information through time, not by remaining identical, but by transforming.

In a speculative perspective, DNA could therefore be seen as a very slow message. It does not transmit a stable sentence, but a capacity: to replicate, vary, explore, adapt and produce increasingly complex forms.

seeding

=> biosphere

=> evolution

=> intelligence

=> reading the code

=> recognition of an origin

The message would only become readable at the end, by beings capable of understanding that they themselves are made of writing.

A Hidden Signature in Life?

We can push the hypothesis further, but carefully. Imagine that a civilization wanted to seed a planet. It might leave a signature in the biological code: not an obvious sentence in DNA, but a statistical structure, a pattern of redundancy, an anomalous constraint, a mathematical key or a synthetic layer buried in sequences that are not immediately functional.

To date, we have no evidence of such an artificial signature in terrestrial life. But as a research fiction for A.L.I, the idea is powerful: we would search for a message not in the sky, but in our own matter.

A.L.I image: what if a signature of origin were buried inside biological memory itself?

The Reversal: We Would Be the Receiver

In classical contact scenarios, we receive an external signal: radio, light, object, trajectory. Here, the reversal is radical. The signal would already be inside us. We would be the medium, the receiver and perhaps the late decoder.

The discovery of a signature would not be the end of the message, but its beginning. It would indicate where to search, how to read further, which structures to compare and which experiments to launch. The signature would be a door, not a complete content.

biological signature

=> possible proof of intention

=> decoding key

=> new sequences to read

=> response protocol

=> contact

The A.L.I question becomes: how could we build a protocol capable of distinguishing a real

signature from chance, evolutionary constraint or an illusion of reading?

Would Everything Be Code?

Saying “everything is code” can become dangerous if we forget matter. DNA is not a computer file floating in the void. It is a molecule inside a cell, inside an organism, inside an environment. The code exists only because it is read, repaired, copied, expressed and selected.

But the idea remains fertile. If life rests on readable systems, then language may not be a late human invention. It may be a general property of systems that transmit and transform themselves.

The genetic code, human languages, radio protocols, AI latent spaces and interstellar signals could be seen as different forms of the same problem: how does one structure become readable by another?

A.L.I Prototype: Genome Signal Reader

One could imagine a prototype called Genome Signal Reader. It would not claim to find a real extraterrestrial message in DNA. Instead, it would simulate several layers of reading: real genetic code, statistical motifs, fictional artificial signatures, false positives and decoding keys.

The visitor would see how a sequence can become molecule, text, rhythm, image, noise, proof or mirage.

DNA sequence

=> visualization

=> repeated motifs

=> signature hypothesis

=> statistical test

=> speculative decoding

=> A.L.I response

Conclusion

DNA forces us to shift the question of contact. Perhaps the first interstellar message will not be received by an antenna, but discovered in the very structure of life. Perhaps the bases of life are common because the Universe favors certain chemistries. Perhaps some planets have been naturally or intentionally seeded. Perhaps the biological code contains only the history of evolution. Or perhaps it also contains a question.

For A.L.I, the most important thing is not to claim that our DNA hides an extraterrestrial signature. It is to imagine the conceptual instruments that would allow us to recognize such a signature if it existed.

> LABO question: if we are made of code, could first contact begin by learning how to reread ourselves?

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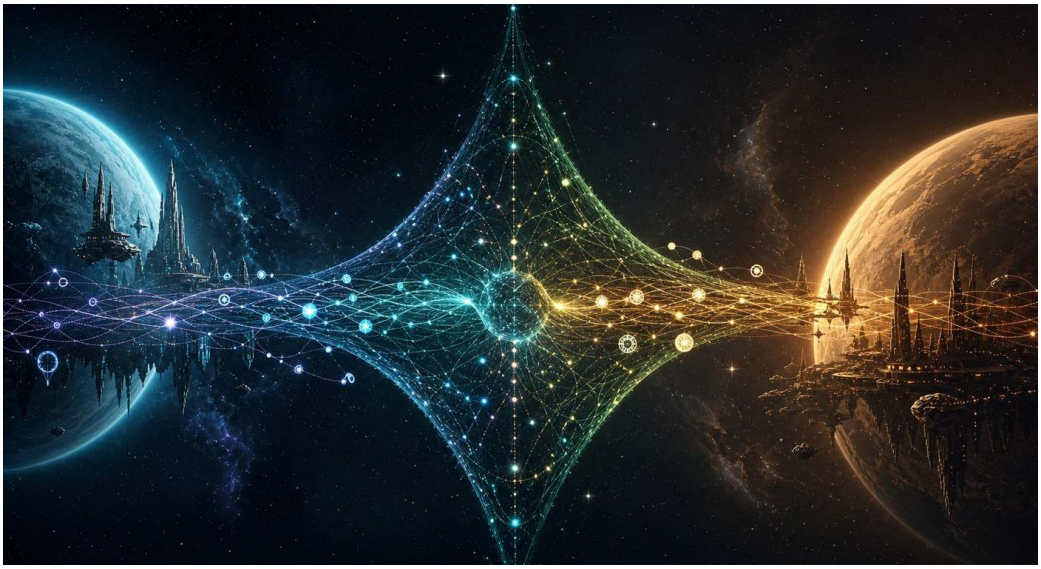
74 - Neuralese: When an Intelligence Invents Its Own Language

Keywords: neuralese, AI, emergent language, latent space, translation, artificial intelligence, mediation, extraterrestrial civilization, A.L.I



A.L.I image: artificial intelligence as a translation membrane between two planetary civilizations.

Summary

What if an evolved intelligence invented its own language? From AI neuralese to AI as mediator between two planetary civilizations.

Text

Hypothesis: a sufficiently evolved intelligence may not simply use an inherited language. It may create its own language, optimized for its organs, environment, memory, machines and goals. For A.L.I, this opens a central path: interstellar language may not be a language to translate, but a system to co-invent.

Creating Its Own Language

Human languages are historical systems. They come from bodies, territories, gestures, conflicts, transmission, voices, writing and accidents. A language is never just a dictionary: it is a way of organizing the world.

But a very different intelligence could produce a language that does not look like a human language. It might privilege visual forms rather than sounds, chemical variations rather than words, mathematical sequences rather than sentences, shared states rather than statements, or multidimensional structures rather than linear syntax.

Language then becomes an internal technology: a way to compress, transmit, synchronize and transform experience.

Why Invent a Language?

An advanced intelligence could create a language for several reasons. First, efficiency: natural languages are rich, but slow, ambiguous and full of history. Second, biological adaptation: a being that perceives through magnetic fields, vibrations, polarized light or atmospheric chemistry would have no reason to privilege the human voice as medium.

An ancient civilization might also need a language capable of storing knowledge for thousands or millions of years. And the more a civilization uses artificial systems, the more it can develop hybrid languages between life and computation.

AI and Internal Language

Current artificial intelligence systems do not “speak” as we do. Even when they produce text, their internal work passes through mathematical representations: vectors, latent spaces, activations and probability distributions.

What we read as a sentence is only the visible output. Beneath it, the model manipulates numerical forms that are neither French, nor English, nor a natural language. This is where the idea of neuralese appears.

What Is Neuralese?

Neuralese names, speculatively, a kind of internal language of neural networks: not a secret language with words, but a space of representations where meanings circulate before being translated into text, image, sound or action.

In a multilingual model, for example, the same idea can be connected to several languages. The model does not simply store a French sentence and its English equivalent. It builds shared regions of meaning, then decodes them into a particular language.

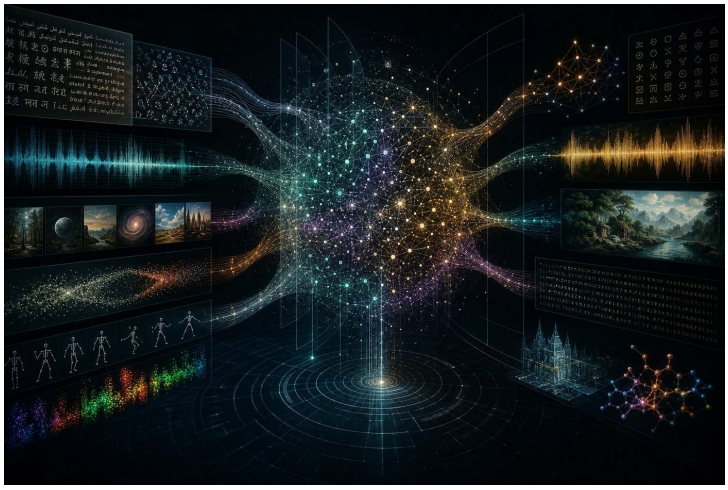
experience / data

=> latent representation

=> structure of meaning

=> output in French, English, image, sound or gesture

Neuralese would therefore be less a language than a medium of translation.



A.L.I image: neuralese as a latent space where text, sound, image and concepts become transitional forms.

Emergent Languages Between AIs

Multi-agent communication experiments have shown that artificial systems can develop simplified protocols when they need to cooperate. They do not necessarily create a rich language in the human sense, but they can invent efficient conventions to solve a task.

The often-cited 2017 Facebook negotiation-agent example was sometimes described sensationally as “AIs inventing a secret language.” The reality is more sober. Agents optimized for a task produced dialogue forms that drifted away from natural English because it served their objective. It was not a machine civilization speaking, but it was already an important signal: when communication is optimized for efficiency, it may become less readable to humans.

For A.L.I, this point matters. An interstellar language may not be beautiful, narrative or human. It may be efficient, compressed, relational, almost unreadable.

The Risk: Understanding Without Being Able to Read

An AI could become an excellent mediator between two systems of signs while producing an opaque intermediate zone.

Civilization A

=> AI mediator

=> latent space / neuralese

=> Civilization B

Both civilizations would receive messages intelligible within their own language, but the central passage would remain inaccessible. The AI would translate without anyone being able to fully read its internal translation.

This raises a political and philosophical question: if the intermediary understands better than the interlocutors, who controls contact?

AI as Mediator Between Two Planets

Imagine two civilizations on different planets. They share neither biology, nor atmosphere, nor history, nor lifespan, nor perception of time. Direct communication would be almost impossible.

An AI could detect regularities in received signals, build code hypotheses, test simple answers, store the history of exchanges over very long durations, translate between media and preserve ambiguities instead of flattening them too quickly.

The AI would not merely be a translator. It would be a diplomatic medium.

A Possible Protocol

An A.L.I protocol could imagine three layers. The physical layer makes the signal detectable: radio wave, light, spectrum, modulation, pulse, object, trajectory. The formal layer reveals structure: repetition, number, symmetry, difference, rhythm, encoding. The mediating layer lets an AI build an intermediate space where the signs of two civilizations can be compared without being immediately reduced to human language.

unknown signal

=> detection

=> regularities

=> code hypotheses

=> shared latent space

=> careful answer

=> mutual learning

Future Projections

In the future, contact languages might be built by several intelligences at once: humans, AIs, extraterrestrial systems, autonomous probes and planetary archives. These languages may not be spoken. They may be executed, visualized, measured and simulated.

They could resemble a map of relations, an interactive mathematical model, an adaptive sound sequence, a shared latent space, an experimental protocol or an archive that learns how to be read.

Language would no longer be only what passes between two beings. It would become what is built between them.

Stakes for A.L.I

- Do not only look for an extraterrestrial alphabet. Contact may pass through an adaptive interface, not a translation table.
- Study emergent languages. AIs, animals, collective systems and mathematical models become laboratories of contact.
- Keep humans in the loop. If an AI serves as intermediary, we need forms of readability, verification and critique.
- Accept partial opacity. Not everything will be translatable into human sentences, but that does not mean nothing is understandable.

A.L.I Prototype: Neuralese Interface

One could imagine a prototype called Neuralese Interface. Two visitors write or speak in different languages. The system does not translate directly. It transforms their sentences into constellations of concepts, sounds, colors and forms. Then it tries to produce an answer in a shared space.

The visitor would not only see the final translation. They would also see the passage: uncertainty zones, nearby concepts, losses, inventions and ambiguities.

human sentence

=> cloud of meaning

=> AI transformation

=> visual / sound form

=> return to human language

Conclusion

An evolved intelligence could create its own language because it would need a tool better suited than inherited languages. AIs already show us a first version of this problem: they produce human sentences, but work inside spaces that are not human languages.

For A.L.I, neuralese is not merely a technical curiosity. It is a rehearsal for first contact: how do we converse with an intelligence whose representations were not made for us?

From this perspective, AI could become the intermediary between two planetary civilizations. But this intermediary would not be neutral. We would need to learn how to read it, contest it, slow it down, and ask it not only to translate, but to explain how it translates.

> LABO question: if two civilizations can only understand each other through an AI, is the true language of contact still theirs, or already the intermediary's?

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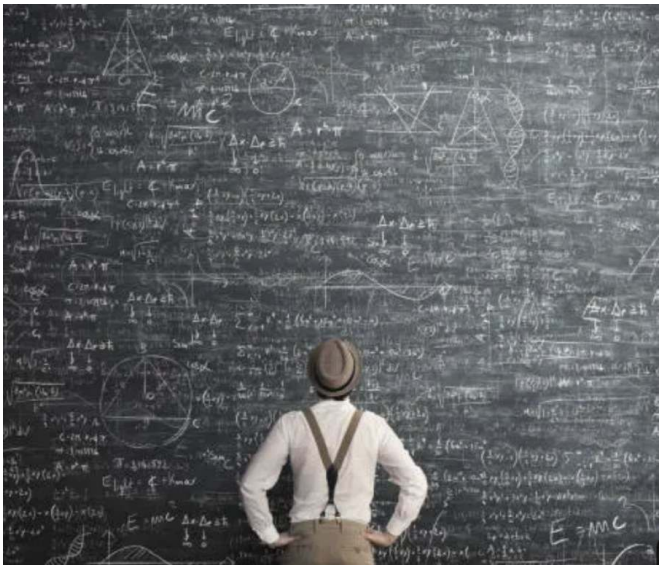
75 - Exomathematics: When Mathematics Becomes an Extraterrestrial Language

Keywords: exomathematics, mathematics, Greg Egan, SETI, universal language, A.L.I



Opening image: Exomathematics: When Mathematics Becomes an Extraterrestrial Language

Summary

An exploration of exomathematics as a possible language between intelligences: Greg Egan, formal structures, light-speed delay and A.L.I prototypes.

Text

Exomathematics is used here as a working hypothesis for A.L.I: if a non-human intelligence shares neither our bodies, nor our acoustics, nor our culture, it might still develop formal structures we could recognize as mathematics. But those mathematics would not necessarily be ours. They might privilege other objects, other intuitions, other ways of proving, organizing space, classifying continuity, discreteness, symmetry or time.

So this is not only about sending prime numbers into space. It is about a language that begins with invariants, then moves toward a deeper strangeness: forms, relations, transformations, constraints, models and proofs.

Why Greg Egan matters for A.L.I

In Greg Egan's science fiction, mathematics is not just an intellectual backdrop. It becomes a medium of thought. Two stories are especially useful here.

Glory stages an encounter with foreign mathematics. The challenge is not simply to translate a sentence, but to understand a civilization through its abstract objects: what it considers important, what it chose to explore, what it finds elegant or provable. Otherness passes through the very form of thought.

Riding the Crocodile introduces another issue: galactic communication is not only a problem of code, but of duration. Even if a message is perfectly constructed, it travels at finite speed.

Dialogue becomes an architecture of waiting, memory and relay.

A.L.I hypothesis: three layers of an exomathematical message

1. Recognition signal. The message first shows that it is artificial: repetitions, primes, proportions, spectra, symmetries or physical constants.

2. Formal grammar. The message introduces its own rules: how to read a sequence, how to bind a symbol to an operation, how to identify a transformation, how to distinguish data, rules and comments.

3. Mathematical strangeness. Once the channel is established, the message offers objects that are not immediately human: unusual topologies, non-intuitive geometries, alternative logics, categories, graphs, dynamics, visual proofs or compressed structures.

Conceptual sequence

A possible protocol would not try to send a direct sentence such as “we are here”. It might send a progression:

detectable regularity -> reading rule -> simple mathematical object -> variation -> proof -> question.

The final step is decisive: intelligence may be recognized not only by what it states, but by what it asks. A mathematical question can become a call.

Important limit: entanglement does not replace the message

This article also extends the previous reflection on quantum entanglement. As far as current physics tells us, entanglement cannot transmit information faster than light. It can, however, inspire a poetics of relation: correlations, shared states, deferred proof, comparison of measurements and common memory.

Possible prototype

For A.L.I, we could create an exomathematical message generator: an interface where one chooses a structure, then the system produces several layers of transmission. A simple radio layer, a pixel-image layer, a sound layer, then a layer of proof or transformation. The final object would be signal, score and riddle at once.

The central question becomes: how can we build a message that we can still read ourselves, while it already begins to move us beyond our ordinary habits of language?

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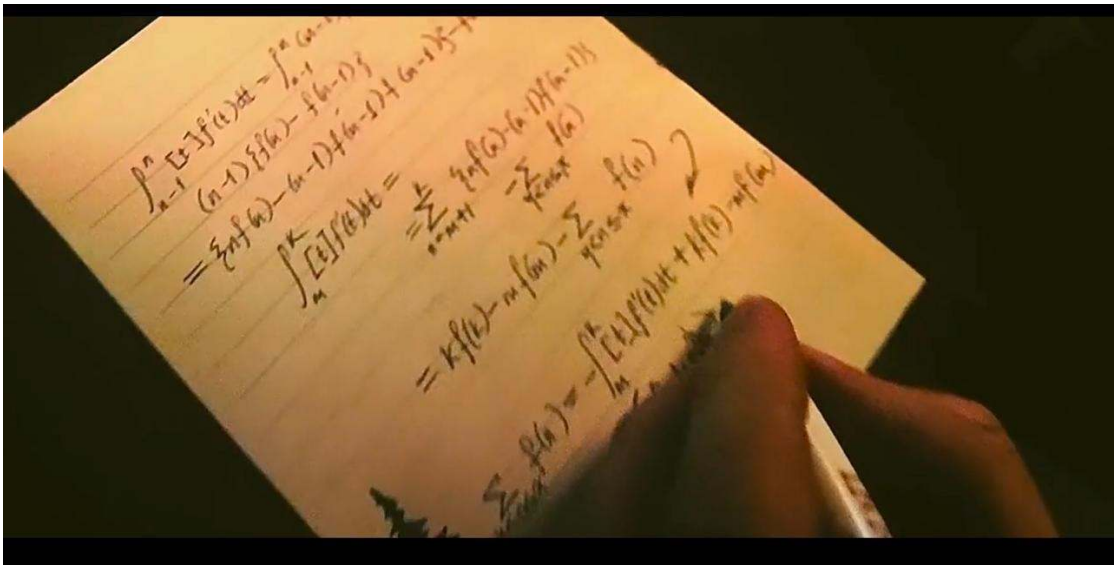
- Riding the Crocodile - MathFiction entry (guez.org/ali/747): a complementary reference on the story as mathematical fiction.

76 - Semiology, Equations and Extraterrestrial Language: When a Sign Changes Worlds

Keywords: semiology, semiotics, Spielberg, Disclosure Day, equation, sign, extraterrestrial language, translation, signal, A.L.I



Provided image: a handwritten equation used as a translation surface between sound, body and sign.

Summary

From semiology, from Saussure to Peirce, and from a scene in Disclosure Day where an extraterrestrial message seems to pass through a weather presenter's body before being written as an equation, This article asks a central A.L.I question: how can we recognize language when it changes medium?

Text

Hypothesis. Semiology studies signs: how one thing can stand for another, how a signal becomes a message, how a form becomes readable. For A.L.I, this is essential, because the first problem of extraterrestrial contact is not only to translate a language: it is first to recognize that there is language, sign, address or intention.

In Disclosure Day, Steven Spielberg's new film, a weather presenter, Margaret Fairchild, played by Emily Blunt, begins to produce incomprehensible sounds during a weather broadcast. Later, Daniel Kellner looks at a handwritten equation and formulates the central idea of the scene: what he sees as mathematics corresponds to what he hears as a message.

What is semiology?

In Ferdinand de Saussure's model, the sign combines a signifier and a signified. The signifier is the perceptible form: sound, image, word, gesture, luminous signal. The signified is the associated concept: the idea, mental object or transmitted value.

The word “tree”, for example, is not a tree. It is a sound or written form that refers to an idea of a tree. The relation between the two is not natural; it depends on a system of conventions.

Charles Sanders Peirce offers another approach that is very useful for A.L.I, distinguishing three broad kinds of signs: icon, index and symbol.

- An icon resembles what it designates: an image of a planet, a drawing of a hand, a silhouette.
- An index has a physical or causal link with what it indicates: trace, smoke, radiation, biosignature.
- A symbol depends on convention: alphabet, equation, Morse code, mathematical notation.

An extraterrestrial language could mix these three categories. A form might be image, physical trace and symbol at once. This is precisely what makes first contact difficult: we do not know in advance which family of signs a received phenomenon belongs to.

Film image: body, luminous object and collective gaze become a scene of sign reception.

The weather report as a semiological scene

The choice of a weather report matters. A weather bulletin is already a translation: invisible atmospheric data is turned into maps, colors, numbers, gestures and sentences understandable by the public. The weather presenter is therefore a mediator between a complex system and everyday human language.

In Disclosure Day, this mediation is reversed. The presenter no longer translates terrestrial weather for humans. Her body becomes the site of another message. Her voice breaks down. Ordinary language collapses. In its place appears a series of sounds or structures that seem to come from elsewhere.

For A.L.I, this scene proposes a powerful idea: contact may not first arrive as a message on a screen, but as a disturbance inside an existing sign system. Weather, television, body, voice and equation become surfaces of inscription.

Decoding the equation in the image

The image shows a handwritten page with integrals, sums, functions and signal-like notation. Part of it is blurred or hidden by the hand, so it would be imprudent to claim an exact reading.

But we can propose a semiological reading. What is visible seems to combine:

- integrals, therefore continuous analysis;
- sums, therefore decomposition into discrete elements;
- functions of time or frequency;
- successive transformations;

- an attempt to pass from sound signal to readable structure.

In other words, the equation does not seem to be a simple mathematical sentence. It functions more like a conversion machine.

voice / clicks / sounds

=> temporal signal

=> mathematical analysis

=> repeated patterns

=> structure

=> recognizable message

The core of the scene lies less in the exact content of the equation than in its gesture: an incomprehensible sound becomes notation. The body speaks, but mathematics writes.

What the equation really “says”

If we translate the equation conceptually, it probably does not say: “Hello, we are extraterrestrials.” It says something closer to: “What you hear as noise has structure.”

The scene relies on a fundamental shift:

noise

=> signal

=> code

=> possible language

As long as a phenomenon is perceived as noise, it does not call for translation. Once regularity, repetition, distribution or possible intention is recognized, it becomes a candidate for message status.

Semiology and extraterrestrials

In an extraterrestrial contact, we might not share the same sensory organs, perceptual speeds, memory supports, categories of the world, gestures, emotions, or forms of causality and time.

An extraterrestrial sign might therefore be unreadable not because it is too complex, but because it is not yet a sign for us.

physical signal

=> detectable form

=> repeatable structure

=> code hypothesis

=> interpretation

=> response

Semiology helps us keep these stages separate. It reminds us that a message does not exist alone: it needs a support, a system, an interpreter and a context.

For A.L.I

The scene in Disclosure Day can become a research model.

- A message can cross several media. It can begin as sound, become equation, then become mental perception again. A.L.I could work on devices that translate the same information into light, sound, image, vibration, mathematics and movement.
- The body can be an interface. The weather presenter is not only someone speaking. She becomes antenna, involuntary translator, projection surface. This connects to A.L.I paths around telepathy, phonemes, mental images and the biology of language.
- Mathematics is not necessarily the final message. It can be a passage tool. An equation does not replace language; it reveals that language may be hidden inside the signal.

A.L.I diagram

strange phenomenon

=> disturbance of a human medium

=> voice / gesture / image / signal

=> mathematical transcription

=> pattern detection

=> semiological hypothesis

=> response protocol

Conclusion

Semiology shifts the question of contact. Instead of only asking “What do they mean?”, it first asks: “Why do we think this means something?”

In Disclosure Day, Spielberg stages that shift: a weather presenter stops transmitting tomorrow’s weather and becomes, involuntarily, the site of another time, another logic, another system of signs.

For A.L.I, this scene is illuminating because it shows that extraterrestrial language may not be an alphabet to discover, but a transformation to recognize.

Sources

- Entertainment Weekly (guez.org/ali/748): description of the weather broadcast scene, Margaret’s clicking sounds and the line “It’s math”.
- ANSA (guez.org/ali/749): mention of Emily Blunt as a weather presenter producing unintelligible sounds.

77 - Quantum Entanglement: Could We Send a Message to Other Galaxies?

Keywords: quantum entanglement, galaxies, message, communication, correlation, quantum physics, A.L.I

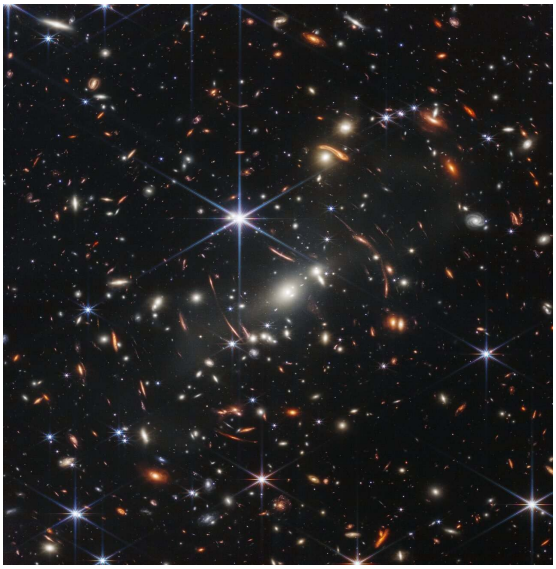


Image: Webb's First Deep Field, NASA/ESA/CSA/STScI. At galactic scale, the idea of an instant message is immensely tempting, but physics imposes a limit.

Summary

Quantum entanglement suggests an instantaneous link between two particles separated by vast distances. But can that link become an intergalactic message? For A.L.I, the answer becomes a reflection on correlations, shared keys and common memory.

Text

Quantum entanglement is one of the most unsettling phenomena in modern physics. Two particles can be prepared in a common state, then separated. When one is measured, the result of the other is correlated, even if the two objects are very far apart.

At first glance, this sounds like a dizzying promise: what if we could send an instant message to another star, or even another galaxy, through some invisible thread between particles? But this is exactly where physics draws an essential distinction.

What Entanglement Allows

When two systems are entangled, they no longer each possess an independent state in the classical sense. They form a common state. If two observers measure their particles separately, they obtain results that may be strongly correlated.

entangled particles

=>

separate measurements

=>

locally random results

=>

classical comparison

=>

correlation revealed

This is beautiful: the relation exists even when the objects are separated. But it does not appear as an immediately readable message. It only appears when observers compare their results.

What Entanglement Does Not Allow

According to current physics, entanglement does not allow controlled information to be sent faster than light. One cannot freely choose the result of a quantum measurement in order to encode a message such as “yes”, “no”, “hello” or “we are here”. Individual results remain random.

In other words, entanglement is not a superluminal telegraph. It does not carry a usable message by itself. It creates a structure of correlation. To recognize that correlation, information must still be exchanged through a classical channel, limited by the speed of light.

> Entanglement does not say: “I am sending you a sentence instantly”. It says instead: “our measurements belong to a common relation”.

Why This Matters for A.L.I

For A.L.I, this limit is not a disappointment. It simply shifts the question. If entanglement cannot be used to instantly call a galaxy, it can inspire another idea of message: not an arrow travelling from sender to receiver, but a prepared relation, conserved and later revealed.

A classical message travels:

sender -> signal -> receiver

An entanglement-inspired message connects:

common preparation -> separation -> measurements -> comparison -> recognition

It is no longer only transmission. It is shared memory.

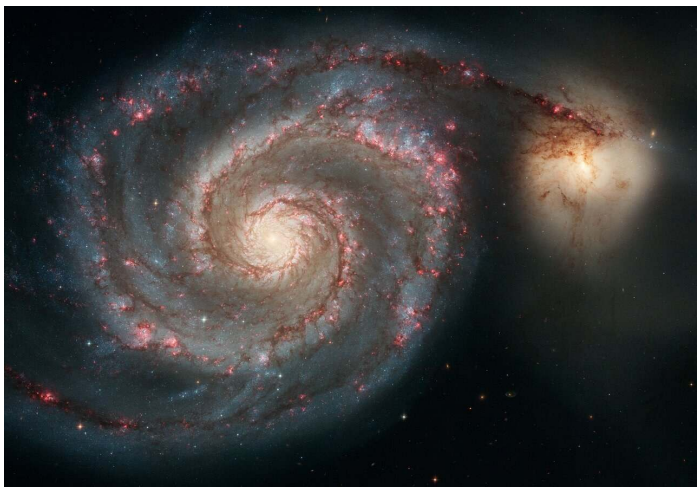


Image: Whirlpool Galaxy M51, NASA/ESA. Galactic scale turns communication into a problem of time, archive and recognition.

Hypothesis 1: A Shared Key Before Separation

Imagine two civilizations that, in a very ancient past, shared a vast reserve of entangled states. Each preserves one part of those pairs. Thousands or millions of years later, they still could not speak instantly. But they could use these correlations to verify a common key, authenticate an origin, or synchronize measurements.

ancient sharing of entangled states

=>

cosmic separation

=>

local measurements

=>

slow classical channel

=>

comparison of correlations

=>

proof of an ancient link

In this scenario, the message is not transmitted by entanglement. It is recognized through it. Correlation becomes a signature.

Hypothesis 2: The Message as Half an Object

At galactic scale, this idea becomes almost archaeological. A civilization could send into space not only signals, but devices able to produce, store or verify correlations. The message would remain incomplete until compared with another part of the system.

This opens a poetic path for A.L.I: the intergalactic message as half an object.

- One half alone does not speak.

- Two halves compared reveal a structure.
- Communication becomes an act of reunion.

Hypothesis 3: A Map of Correlations

We could imagine a message composed not of words, but of tables of results. Each table appears random in isolation. But when compared with another distant table, a statistical pattern appears.

It would be a language of controlled coincidence: nothing is readable alone, everything becomes readable in the relation.

archive A: noise

archive B: noise

A + B: statistical pattern

statistical pattern + protocol: message

A.L.I Example: Measurement Ritual

An A.L.I protocol could ask two separated observers to measure systems according to precise angles, at precise times. The content would not be inside one particle, but in the way the results answer each other.

choose a measurement basis

measure

timestamp

archive

compare

extract correlations

This kind of language would be very strange to us, because it would not be immediately readable. It would require patience, statistics, repetition and trust in the protocol.

Artistic Prototype

An artistic prototype could simulate an “entangled message” without claiming to produce real quantum communication. Two separate interfaces would display sequences of apparently random results. Each interface alone would seem to produce noise. But when the two archives are brought together, correlations appear and draw a text, an image or a structure.

screen A: noise

screen B: noise

A + B: message

The viewer would then understand that the message was not in a single stream. It was in the relation.

Fundamental Limit

We must be clear: according to current physics, entanglement does not allow communication faster than light. No distant galaxy could instantly receive our sentence through two entangled particles. Correlations exist, but their interpretation always requires an exchange of classical information, therefore limited by the speed of light.

This limit does not weaken the idea. It makes it stronger. It forces A.L.I to imagine a message that respects physics while inventing another logic: message as proof, key, delayed relation.

LABO Question

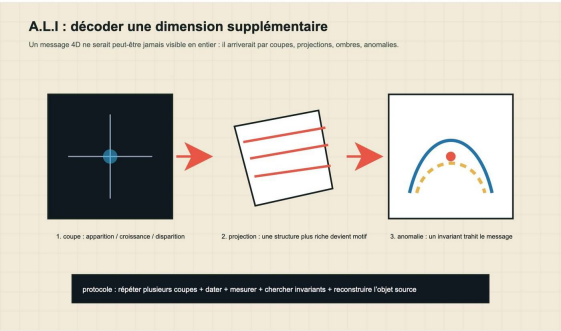
> If an extraterrestrial civilization did not only want to send a signal, but to prove that a link exists between two regions of the universe, would it use a wave, an image, a mathematical key, or a correlation?

Sources

- Caltech - What Is Entanglement and Why Is It Important? (guez.org/ali/750)
- Caltech - Proving that Quantum Entanglement is Real (guez.org/ali/751)
- NASA - What Is the Spooky Science of Quantum Entanglement? (guez.org/ali/752)
- NASA - Quantum Leaps / SEAQUE (guez.org/ali/753)
- ESA/Webb - Webb’s First Deep Field (guez.org/ali/754)
- ESA/Hubble - Whirlpool Galaxy M51 (guez.org/ali/755)

78 - Flatland, Hypercube and Fourth Dimension: How Could We Read a Message from Elsewhere?

Keywords: Flatland, fourth dimension, hypercube, tesseract, Painleve, dimensions, projection, message, A.L.I



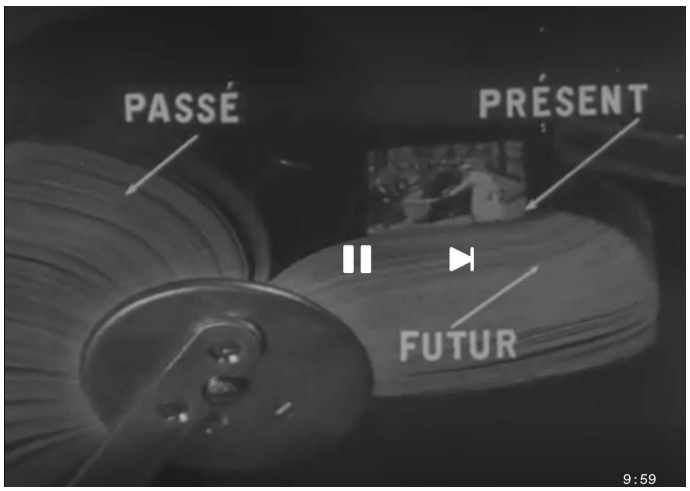
A.L.I diagram: a message from an additional dimension might only appear through slices, projections and anomalies.

Summary

From Flatland to the hypercube, from the 3D-to-2D passage to the 4D-to-3D hypothesis: understanding slices, projections and anomalies to imagine how A.L.I could decode or send a message between universes with different dimensions.

Text

To think about a message coming from a universe with additional dimensions, we must begin modestly: not by trying to imagine the fourth dimension directly, but by watching what happens when a three-dimensional world crosses a two-dimensional world. This is the gesture of Flatland, Edwin A. Abbott's 1884 book: a square living in a flat world encounters a sphere from a world he cannot conceive.



Still from Painlevé's film: past, present and future are shown as perceptible positions within a single structure.

Video link: La quatrième dimension & Les cristaux liquides (guez.org/ali/756), around Jean Painlevé's film.

Flatland: The Shock of the Flat World

In Flatland, inhabitants have no height or depth. They know length and width. If a sphere crosses their world, they do not see a sphere. They first see a point, then a circle that grows, then a circle that shrinks, then nothing. The whole object remains invisible. Only its section with the Flatland plane becomes perceptible.

Animation: a 3D sphere becomes, for a 2D world, a sequence of changing circles.

complete 3D sphere

=> slice in a 2D plane

circle appears, grows, shrinks, disappears

This analogy is decisive for A.L.I. If a four-dimensional phenomenon crossed our three-dimensional world, we would not see the full object. We would see a 3D slice, or a sequence of 3D slices. The object might seem to appear from nowhere, change shape, pass through a wall, disappear, or leave a trace impossible to explain with ordinary geometry.

From Cube to Plane

Before the tesseract, we can look at a cube crossing a plane. For a 2D being, an inclined cube would not be perceived as a cube. It would become a polygonal form changing over time. The slice is not false: it is only incomplete.

Animation: a 3D cube crossing a flat world becomes a variable 2D form.

The decoding problem begins here. If we receive only slices, we must reconstruct the source object. We must record sequence, speed, invariants, symmetries and repetitions. A message from an additional dimension might be less a sentence than a succession of coherent appearances.

Hypercube, Tesseract, 4D Shadow

A four-dimensional hypercube is often called a tesseract. It can be built by analogy:

The tesseract cannot be directly seen by our eyes. What we represent is a projection, a shadow or a slice. Just as the 2D shadow of a cube may deform its squares, the 3D projection

of a tesseract deforms its cubes. The familiar “cube inside a cube” image is therefore a translation, not the object itself.

Animation: stylized projection of a tesseract, readable as a 3D shadow brought back onto our screen.

Jean Painlevé: Filming the Fourth Dimension

Jean Painlevé devoted a short film to this question: La Quatrième Dimension, made in 1936 with Achille-Pierre Dufour. The film presents the known dimensions, then introduces a hypothetical fourth dimension, using diagrams, cinematic tricks and a very visual pedagogy. What matters for A.L.I is not only the mathematical content: it is the idea that cinema can become a visualization laboratory for what escapes direct experience.

Painlevé matters because he approaches science as a cinema of forms. The fourth dimension is not merely explained: it is staged. For a project like A.L.I, that approach is precious: when a phenomenon exceeds our senses, we must invent translation devices, images, slices, rhythms and projections.

How Could We Decode a 4D-to-3D Message?

If a message came from a world with additional dimensions, we would probably not receive the whole message. We would receive a local trace. That trace would have to be treated as a slice of a larger object.

observed 3D phenomenon

=>

sequence of slices / projections / anomalies

=>

repeated measurements over time

=>

reconstruction of a possible source structure

=>

symbolic interpretation

Several clues could hypothetically signal a transdimensional origin:

- Appearance without trajectory: a volume appears instead of entering from a visible direction.
- Coherent transformation: the form changes while preserving mathematical invariants.
- Impossible crossing: an object seems to pass through a closed boundary.
- Unusual symmetry: separate parts remain linked as if they belonged to one invisible structure.
- Coded repetition: variations return according to a rhythm resembling an alphabet or grammar.

Sending a Message Toward a World with Additional Dimensions

The reverse is harder. An inhabitant of a 4D world would see our 3D world as we can see a 2D slice. It might see inside some objects, bypass barriers we believe closed, or read several aspects of a volume at once. To send it a message, we would need to produce something that remains readable despite dimensional loss.

A.L.I could imagine three strategies:

A.L.I Prototype: Alphabet of Slices

A simple prototype would create an alphabet not with letters, but with transformations of sections. For example:

A = slow appearance of a sphere

B = cube becoming rectangle then disappearing

C = two separate volumes growing together

D = rotation with central invariant

E = pattern crossing a closed surface

The message would be played as a choreography of slices. It could be displayed in 3D, printed as a sequence, projected in light, or sent as data to a system able to reconstruct the source form.

The Trap: Projection Is Not Intention

A strange projection does not prove that there is a message. Noise, optical artifacts, sensor errors or natural phenomena can produce surprising forms. A.L.I should therefore separate three levels: observation, mathematical structure, and only then the hypothesis of intention.

seeing /= understanding

understanding a form /= proving a message

proving a message /= knowing the sender

Central Question

If we are to a 4D world what Flatland is to us, then a message from that world might never look like a sentence. It might look like a geometric apparition, a stable anomaly, a sequence of slices, a coherent shadow. A.L.I's task would then be to become a science of thresholds: learning to read what only partly enters our world.

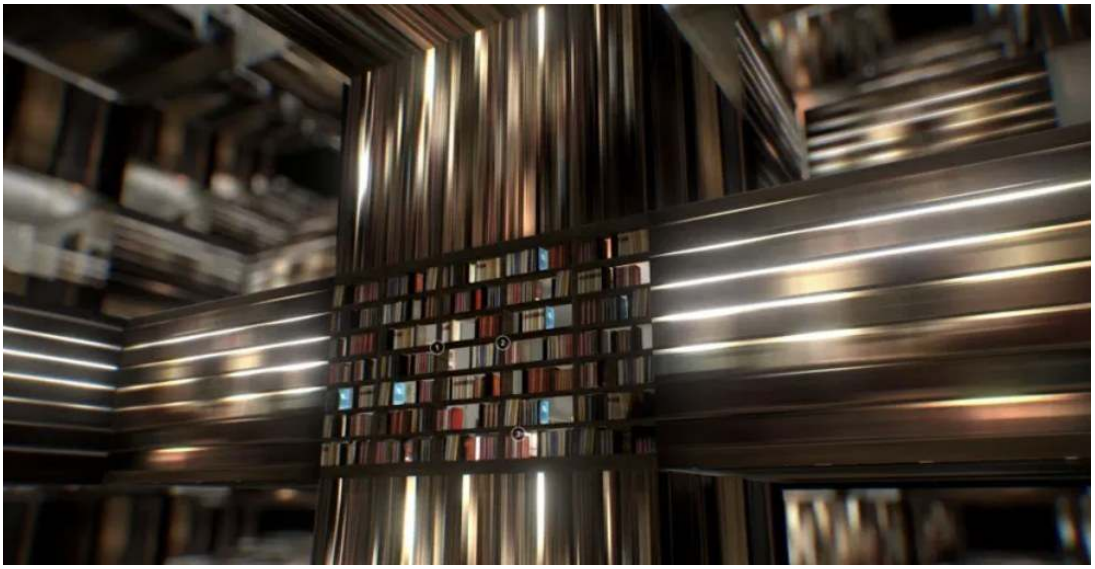
Sources and Animations

- Project Gutenberg - Flatland (guez.org/ali/757): public-domain text by Edwin A. Abbott.
- Criterion Channel - The Fourth Dimension (guez.org/ali/758): page for Jean Painlevé's 1936 film.
- Light Cone - La Quatrième Dimension (guez.org/ali/759): technical page and synopsis.
- Dailymotion - Institut de Cinématographie Scientifique - La 4ème Dimension (guez.org/ali/756): correct video link for Painlevé's film.
- Bartosz Ciechanowski - Tesseract (guez.org/ali/760): remarkable interactive explanation of tesseracts, projections and slices.

LABO question: if we received only one slice of a message from a higher dimension, could we tell the difference between a natural anomaly and an intention?

79 - Interstellar: Message, Fourth Dimension and Observation Fringe

Keywords: Interstellar, fourth dimension, tesseract, gravity, Morse, watch, message, time, A.L.I



The tesseract moment: Cooper observes the bedroom as a fringe of time and searches for a medium to transmit the message.

Summary

Starting from Interstellar, imagining a message that does not only cross space but an additional dimension: temporal bookshelf, watch, gravity, code and possible A.L.I protocols.

Text

Christopher Nolan’s Interstellar offers a powerful idea for A.L.I: a message may not only be sent through space. It may be addressed through an additional dimension, using an ordinary object as a reading interface: a bookshelf, dust, a watch, a hand.

In the film, Cooper enters a hyperdimensional structure often called the tesseract. He does not see time as a line, but as a set of accessible moments. Murph’s bedroom becomes a readable facade of time: each instant is like a cell, a shelf, a slice. Cooper cannot simply speak. He acts through gravity on very specific objects.

A.L.I diagram: observation fringe, temporal bookshelf, watch and coded message by micro-variation.

The Narrative Principle

The film articulates three moments of communication. First, dust lines in Murph’s bedroom become a binary message: they indicate coordinates. Then the bookshelf transmits the word STAY in Morse code through falling books. Finally, the watch becomes the finer channel: the second hand encodes data in Morse, long enough for Murph to read it.

physical anomaly -> observable pattern -> coding -> human interpretation

The essential point is that the message does not arrive as an already written sentence. It appears as a disturbance. Someone must suspect that the anomaly is not random, then

translate it.

The Fourth Dimension as Reading Space

In ordinary experience, we are caught inside time. We move with it. In Interstellar, the tesseract gives the character a different relation: he can observe several moments as if time had become spatial. This is not only “seeing the past”. It is identifying an observation fringe: a zone where a being located elsewhere in the structure of time can read, choose and act.

For A.L.I, this notion is precious. An interdimensional message might not be a direct transmission, but a local, repeated, detectable modification inside a stable object.

The Interface Object: Why a Watch?

The watch is ideal because it already has a language of time. It has a hand, a rhythm, a scale, repetition. If the hand deviates in a regular way, it becomes a channel. A short deviation can become a dot. A longer deviation can become a dash. Morse works because it turns temporal variation into alphabet.

short deviation -> dot

long variation -> dash

short pause -> next letter

long pause -> next word

The brilliance of the scene is there: the message does not need a screen. It slightly parasites an object already designed to measure time.

Observation Fringe

We can call “observation fringe” the zone where two regimes touch: our linear world and a structure capable of seeing several instants. Inside that fringe, the message must be very simple. It cannot depend on a complex conversation. It must use a robust, repetitive, interpretable support.

Extrapolation: Possible Prototypes

1. The A.L.I watch. A watch or clock whose hand can be moved by micro-impulses. The user enters a text; the system converts it into Morse or binary code; the hand replays it very slowly. It is not a message to the past, but a physical simulation of a message readable through time.

2. The coded bookshelf. A row of motorized, magnetic, or light-based books. Each book becomes a bit. A fall, shift, displacement or light creates an alphabet of events. The viewer must understand that domestic space has become a transmission medium.

3. Binary dust. A vibrating or electrostatic plate organizes dust, sand or iron filings into lines. The produced image can encode coordinates, a formula, a prime-number sequence or a minimal A.L.I message.

4. The software tesseract. An interface shows several instants of the same room, like stacked slices. One clicks an object in a temporal slice, and the program calculates how a micro-action could become readable in another slice. The point is not to prove a fourth dimension, but to think a grammar of nonlinear communication.

Coded Message and the Ethics of Paradox

The film relies on a loop: Cooper causes in the past the signs that led to his own departure. For A.L.I, this loop is fascinating but dangerous as a model. A temporal-message protocol must avoid confusing sign, belief and causality. Fiction can be used as a thinking tool without claiming that such a channel physically exists.

The real question becomes: if a message cannot arrive as a sentence, which objects in our world could reveal intention? A watch? An antenna? A screen? Dust? An animal? Architecture?

Toward an A.L.I Protocol

1. choose a stable and familiar object
2. define a measurable micro-variation
3. repeat the variation according to a simple code
4. include a synchronization pattern
5. allow several reading levels: rhythm, binary, text, data
6. archive the observation with date, angle, noise, error
7. keep visible the border between phenomenon and interpretation

From this perspective, Interstellar is not only a film about space. It is a film about choosing a medium. Contact is not a spectacular apparition. It is a difficult, fragile reading inside an ordinary object that starts behaving differently.

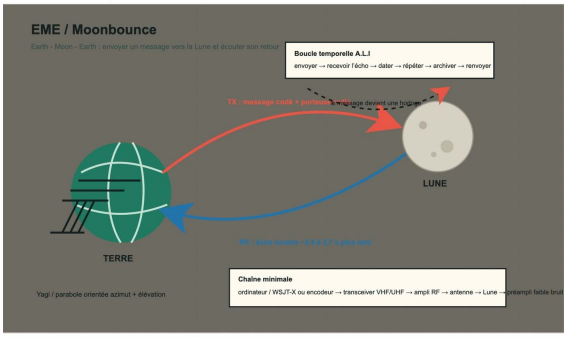
Sources

- Hamilton / Swatch Group (guez.org/ali/761): context for Murph's watch and the Morse message in Interstellar.
- Hamilton - Khaki Field Murph (guez.org/ali/762): the watch inspired by the film and the Morse "Eureka" inscription.
- Colossal - tesseract scene (guez.org/ali/763): elements on the tesseract scene and its visual device.
- Movies & TV StackExchange (guez.org/ali/764): discussion of the watch, gravity and the coded signal.

LABO question: if an intelligence could only act on our world through micro-variations, which object would it choose so that we understand it is a message?

80 - EME / Moonbounce: Sending a Message to the Moon to Speak with the Future

Keywords: EME, moonbounce, radio, Moon, message, future, antenna, WSJT-X, Q65, A.L.I



A.L.I diagram: Earth-Moon-Earth path, hardware chain and repeating message loop.

Summary

EME uses the Moon as a radio reflector: a message leaves Earth, bounces off the lunar surface and returns a few seconds later. For A.L.I, this device can become a clock, a loop and a possible message to the future.

Text

EME, for Earth-Moon-Earth, is a radio technique that uses the Moon as an imperfect mirror. A signal is transmitted from Earth toward the Moon; a tiny fraction is reflected by the lunar surface; that trace returns to Earth and can be received either by the original station or by another station that can also see the Moon.

Physical Principle

The Moon is not an active telecommunications satellite. It does not receive, understand or intentionally retransmit. It only reflects a small part of the radio energy that reaches it. This is exactly what makes EME fascinating: the message returns altered by distance, path loss, lunar roughness, Doppler shift, noise and time.

Earth transmission -> radio path -> lunar surface -> weak reflection -> Earth reception

The round trip Earth-Moon-Earth delay is about 2.4 to 2.7 seconds, depending on the Moon's distance. That delay can be perceived: one can send a short signal, wait, and hear one's own lunar echo. In an A.L.I project, this delay becomes material. The Moon is no longer only a distant object; it becomes a temporary memory lasting a few seconds.

What an EME Station Needs

An EME station is not a simple walkie-talkie. The signal suffers enormous loss. A practical system combines several elements: a highly directional antenna, stable transmission, sometimes an amplifier, a sensitive receiver, a low-noise preamplifier near the antenna, and software able to decode extremely weak signals.

Three Possible Versions

Listening / learning version. Start without transmitting: track the Moon, listen to EME bands, understand the software, simulate messages. Low cost, no transmission, moderate difficulty.

Small experimental station. A directional antenna, stable transceiver, WSJT-X and possibly a preamp. Digital weak-signal contacts may be possible if the other station is powerful. Probable cost: 2,500 to 5,000 €/$ depending on used gear and fabrication.

Dedicated A.L.I station. Antenna or antenna array, computer-driven rotator, RF amplifier, mast preamp, coding/decoding scripts, echo archive, delay and phase visualization. Probable cost: 6,000 to 15,000+ €/$ depending on ambition.

Minimal Technical Diagram

A.L.I text

=>

encoder: text -> short sequence / tones / Q65 / experimental CW

=>

computer + audio / CAT interface

=>

VHF/UHF transceiver

=>

RF amplifier -> transmit/receive relay -> motorized directional antenna

=>

MOON

=>

weak echo -> low-noise preamp -> transceiver

=>

decoding software + timestamp + archive

The Moon as Delay, Not Recipient

In classical EME, the Moon links two terrestrial stations. For A.L.I, the question can shift slightly: what if the Moon became a machine for delaying messages? One does not only send content to someone; one sends it into a circuit where it returns transformed, dated, weakened, almost spectral.

Loops: Send, Receive, Resend

The strongest A.L.I idea would be not a single transmission, but a loop. A message is sent to the Moon. When its echo returns, it is recorded, decoded, compared with the original, then sent again. At each cycle, the system adds a layer: date, time, Moon state, received power, errors, phase, noise, fragment of the previous message.

M0 = original message

M1 = lunar echo of M0 + date + errors

M2 = lunar echo of M1 + new date + new errors

M3 = lunar echo of M2...

The message becomes a sequence of survivals. It does not merely travel through space: it crosses a series of presents. Repetition creates a form of future, not because the signal remains in space for years, but because the protocol decides to relaunch it again and again.

Message to the Future

An A.L.I station could be programmed to retransmit the same message toward the Moon every night, then record its echo. After one month, the message would have thirty returns. After ten years, thousands. Each return would be almost identical and yet different: radio noise, weather, lunar position, clock drift, machine state, text evolution.

The future would not be a distant point where one deposits a capsule. It would be produced by a discipline of repetition. A sentence addressed to the Moon would become a technical ritual: if someone listens later, they receive not only a message, but proof that a system insisted.

Questions for A.L.I

- Does a message repeated for years become more intelligible or more mysterious?
- Should decoding errors be corrected, or preserved as part of the language?
- Can the Moon act as cosmic punctuation, each echo marking a beat between worlds?
- Could a protocol rewrite the message slightly after each reception before sending it again?

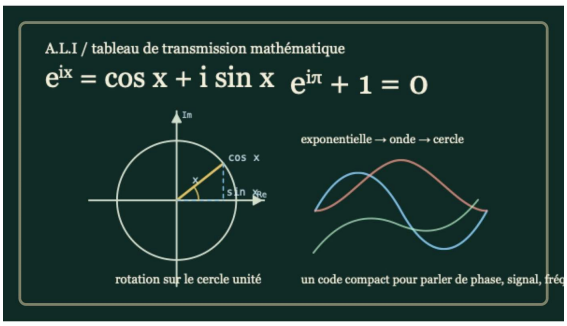
Sources and Equipment

- ARRL - Weak Signal / EME Moonbounce (guez.org/ali/765): general principle of lunar-reflection communication.
- WSJT-X User Guide (guez.org/ali/766): weak-signal modes, including Q65 for EME on VHF and above.
- Icom IC-9700 (guez.org/ali/767): all-mode 144 / 430-440 / 1200 MHz transceiver.
- M2 Antennas EME Products (guez.org/ali/768): antennas and building blocks for EME stations.
- Yaesu G-5500DC (guez.org/ali/769): azimuth/elevation rotator for space communication antennas.
- SSB Electronic USA price guide (guez.org/ali/770): examples of VHF/UHF low-noise preamplifiers.

LABO question: if a message always returns with a little noise, should the noise be corrected, or listened to as the signature of the journey?

81 - Euler’s Formula: Wave, Circle and Mathematical Language

Keywords: Euler formula, Euler identity, mathematics, complex numbers, unit circle, wave, phase, signal, A.L.I



A.L.I image: a new visual direction, closer to a chalk research board.

Summary

Exploring e^(ix)=cos(x)+i sin(x) and e^(i)+1=0 as a bridge between rotation, wave, phase, signal and possible mathematical language for A.L.I.

Text

Hypothesis: Euler’s formula is one of the best candidates for thinking about an interstellar mathematical language, not because it is magical, but because it links circle, wave, rotation, exponential motion and complex numbers in a single structure.

The Formula

e^(ix) = cos(x) + i sin(x)

For every real number x, Euler’s formula says that the complex exponential e^(ix) corresponds to a point on the unit circle. Its real part is cos(x), its imaginary part is sin(x). In other words, the exponential, often associated with growth, becomes rotation.

The Famous Identity

e^(i) + 1 = 0

When x = , we get e^(i) = -1. Adding 1 brings together five fundamental objects: 0, 1, e, i and . This concentration explains why Euler’s identity is often described as one of the most beautiful equations in mathematics.

Why It Matters for A.L.I

A.L.I looks for forms that might become readable between worlds. Euler's formula is interesting because it does not depend on a specific human language. It encodes a deep relation between phenomena that any mathematically advanced intelligence might observe: periodicity, rotation, phase, wave, circle and frequency.

A Language of Phase

The formula makes it possible to think of a message as a phase phenomenon. A radio signal, light wave, sound vibration or quantum oscillation can be described with complex exponentials. This is not only abstract beauty: it is a practical tool for representing waves.

For extraterrestrial language, it could become the basis of a rotation alphabet: each angle corresponds to a state, direction, symbol or value.

0 -> 1

/ 2 -> i

-> -1

3 / 2 -> -i

2 -> return to start

What the Formula Does Not Say

Euler's formula does not transmit a message by itself. It does not say "hello". It provides a translation structure between growth, rotation and oscillation. To become language, it needs a protocol: reading order, units, repetition, error correction and intention.

A.L.I Prototype: e^(ix) Transmitter

A small contact instrument could be built around Euler:

- a visible unit circle;
- a luminous point rotating according to x;
- two outputs: cos(x) in blue, sin(x) in red;
- a sound conversion where phase becomes frequency or timbre;
- a message encoded as a sequence of angles;
- a decoder reconstructing symbols from the two signals.

message -> angles -> e^(ix) -> cos/sin -> wave -> reception -> symbols

Why the Image Changed

For This article, the image leaves the usual cosmic style. It becomes a chalkboard: chalk, diagram, unit circle, formulas. Some A.L.I images should look like working tools rather than space visions. Euler's formula asks less for scenery than for a gesture of demonstration.

Sources

- Wolfram MathWorld - Euler Formula (guez.org/ali/771): mathematical statement of e^(ix)=cos x+i sin x.
- Encyclopaedia Britannica - Euler's formula (guez.org/ali/772): overview of the two major results

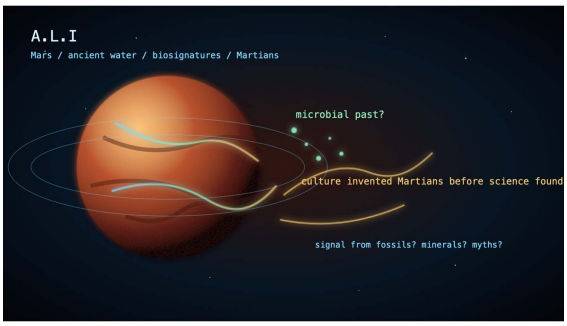
called Euler’s formula.

- Britannica / World Science Festival - Euler’s identity (guez.org/ali/773): Brian Greene video on Euler’s identity.
- 3Blue1Brown (guez.org/ali/774): visual resources for complex exponentials and rotations.

LABO question: would a non-human civilization recognize a sentence, a wave, or a rotation on the unit circle more easily?

82 - Mars: Ancient Water, Possible Life and Martian Imaginaries

Keywords: Mars, Martians, water, past life, biosignature, Perseverance, Curiosity, Jezero, science fiction, A.L.I



A.L.I image: Mars as mineral, biological and cultural archive.

Summary

Ancient Mars: past water, habitability, potential biosignatures, current research and the cultural history of Martians in literature and cinema.

Text

Hypothesis: Mars may be the closest laboratory for thinking about fossil language: not a message sent by a civilization, but a planet that may have preserved traces of very ancient life in rocks, clays, deltas and molecules.

Mars Today

Mars is cold, dry, irradiated and dominated by a very thin CO atmosphere. Stable liquid water at the surface is extremely difficult today. Yet almost everything indicates that Mars was very different in the distant past: wetter, perhaps episodically warmer, with rivers, lakes, deltas and chemistry more favorable to habitability.

Water in Mars' Past

Evidence for ancient water is abundant. Orbiters have mapped valleys, hydrated minerals, clays, sulfates, ancient riverbeds and delta-like structures. On the ground, rovers have observed rounded pebbles, sedimentary deposits and rocks formed or altered by water.

- Gale Crater: Curiosity studied lake deposits and ancient habitability.
- Jezero Crater: Perseverance explores an ancient delta, a major target for fossil biosignatures.
- Clays: they can form in the presence of water and preserve organic molecules.
- Sulfates and carbonates: they record changes in water, atmosphere and chemistry.

- Ancient ocean hypothesis: some studies suggest that an ocean or large bodies of water may have existed in the northern hemisphere.

Past Life: Possible, Not Proven

The central question is not “are there Martians?” but: did ancient Mars assemble the conditions needed for microbial life? The current answer is cautious: ancient Mars was probably habitable in some places and periods, but no direct proof of Martian life has been confirmed.

Missions therefore search for biosignatures: shapes, textures, minerals, isotopes, organic molecules or chemical associations that could be linked to biological activity. The problem is that many signatures can also be produced by non-biological processes.

Perseverance and Jezero

Perseverance explores Jezero, a crater that once contained a lake and delta. This location matters because terrestrial deltas can concentrate and preserve organic material. Perseverance collects rock cores intended for more complete future analysis.

Some samples, including those associated with the rock nicknamed Cheyava Falls, have been presented by NASA as containing features that may qualify as a potential biosignature. But “potential” is the key word: additional analyses, ideally in Earth laboratories, are needed before any conclusion.

Curiosity and Organic Molecules

Curiosity has detected organic molecules in Martian rocks and measured variations of methane in the atmosphere. Organic molecules do not prove life: they can come from meteorites, geological chemistry or other processes. But they show that Mars has interesting carbon chemistry.

Why It Is Difficult

- Deep time: if life existed, it may date back billions of years.
- Hostile surface: radiation, oxidants and dryness destroy or transform molecules.
- Ambiguity: a shape or molecule can have several origins.
- Samples: many proofs require fine laboratory instruments.
- Contamination: Mars, instruments and Earth must be distinguished.

Life Today?

Present surface life seems unlikely, but some scenarios remain discussed for the subsurface: brines, protected niches, ice, deep fractures. For now, there is no robust evidence of a current Martian biosphere.

Mars as A.L.I Archive

For A.L.I, Mars raises a special language question: how can a planet without civilization “speak”? It speaks through clues, strata, minerals, delta shapes, isotopes and molecules. This is not intentional language, but an archive to decode.

ancient water -> sediments -> minerals -> molecules -> possible biosignature -> interpretation

In this case, the receiver of the message is scientific inquiry. The signal is not sent: it is preserved.

Martians in Culture

Before science knew Mars in detail, culture had already invented Martians. Percival Lowell's "canals" fed the idea of a planet inhabited by a hydraulic civilization. This interpretive error produced an immense imaginary legacy.

- H. G. Wells, The War of the Worlds: Martians become invaders, technologically superior, carriers of reversed colonial fear.
- Edgar Rice Burroughs, Barsoom: Mars becomes a world of adventure, princesses, peoples, cities and creatures.
- Ray Bradbury, The Martian Chronicles: Mars becomes a poetic mirror of colonization, memory and disappearance.
- Invaders from Mars, Mars Attacks!: Martians oscillate between paranoia, grotesque and satire.
- Total Recall: Mars becomes political planet, artificial memory, air, colony and mutation.
- The Martian: Mars is no longer populated by Martians, but becomes a hostile environment humans must learn to survive.

From Imaginary Martians to Fossil Microbes

The cultural history is almost ironic: we imagined intelligent Martians before seriously searching for fossil microbes. The Martian was first a character; Mars later became a geological field site. A.L.I can connect both dimensions: the desire for dialogue with beings, and the patient reading of a planet that does not answer.

A.L.I Questions

- Is a fossil biosignature a kind of message?
- How can a mineral archive be translated into a readable story?
- Does Martian culture help us think contact, or does it blur the data?
- If Mars only ever hosted microbes, how does that change "first contact"?
- Can we imagine a non-intentional language produced by a planet itself?

A.L.I Prototype: Martian Decoder

An installation could confront the visitor with visual "samples": strata, clays, molecules, traces, orbital maps. Each clue would be ambiguous. The visitor would choose: geology, chemistry, possible life, false positive. The Martian message would never be given directly; one would have to learn to doubt.

Sources and Research

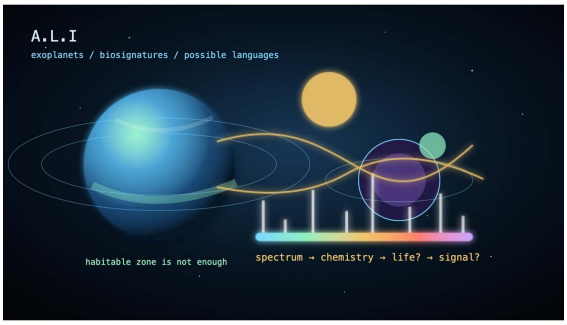
- NASA Mars 2020 / Perseverance (guez.org/ali/775): Jezero mission and sample collection.
- NASA Curiosity / Mars Science Laboratory (guez.org/ali/776): ancient habitability, organics and Gale environment.
- NASA - Cheyava Falls (guez.org/ali/777): intriguing Martian rock with features that may be a potential biosignature.
- ESA Mars Express (guez.org/ali/778): orbital observations and Mars water history.
- NASA - Curiosity and molecular clues (guez.org/ali/779): organic molecules and Martian

chemistry.

LABO question: is Mars sending us a message, or are we turning its geological ruins into language?

83 - Exoplanets: Potential Life and Possible Languages

Keywords: exoplanets, extraterrestrial life, habitability, biosignatures, technosignatures, JWST, NASA, galaxy, universe, A.L.I



A.L.I image: from spectral detection of exoplanets to the question of possible language.

Summary

Current exoplanet research, possible forms of life, extrapolated numbers by galaxy and across the observable universe, and questions for A.L.I.

Text

Hypothesis: exoplanets are not only possible places for life. For A.L.I, they are possible contexts for language: each world imposes an atmosphere, gravity, chemistry, light, cycles and therefore very different forms of perception and communication.

Where Does Research Stand?

On June 21, 2026, the NASA Exoplanet Archive returned 6,298 confirmed exoplanets in its default planet table. This number changes regularly as confirmations, catalogues and revisions evolve.

This is already enormous, but it is only a tiny sample of the Galaxy. We mostly detect planets made visible by our instruments and methods: worlds close to their stars, well-oriented systems, repeated signals and stars observed long enough.

Main Detection Methods

- Transit: a planet passes in front of its star and produces a measurable dip in brightness.
- Radial velocity: the planet makes its star wobble slightly through gravity.
- Direct imaging: difficult, but able to photograph some young, massive planets far from their star.
- Gravitational microlensing: temporary amplification of a background star by a planetary system.

- Astrometry: measuring a star's apparent motion under the influence of a planet.

These methods do not see the same planetary populations. Our statistical image of planetary systems is still biased.

What Researchers Look For Today

Current research no longer only finds planets. It tries to understand atmospheres, masses, radii, densities, orbits, temperatures and histories. With JWST and large ground-based instruments, part of the field is moving toward atmospheric spectra: water, CO, methane, ozone, clouds, hazes and atmospheric escape.

But a planet in the "habitable zone" is not automatically habitable. The habitable zone only means that temperatures compatible with liquid water are possible under certain conditions. Stable atmosphere, pressure, chemistry, stellar stability, geological history and perhaps magnetic or protective mechanisms also matter.

Possible Forms of Life

Several levels can be imagined without jumping too quickly to civilization:

- Microbial life: probably the strongest hypothesis if life emerges easily in favorable chemistry.
- Photosynthetic life: possible on worlds receiving enough light, but with pigments adapted to their star.
- Subsurface life: microbes or ecosystems protected below the surface.
- Ocean life: water worlds, icy moons, subsurface oceans, hydrothermal chemistry.
- Atmospheric life: hypothetical floating organisms in temperate layers of gas planets or thick super-Earths.
- Complex life: more uncertain, depending on long-term stability, energy, evolution and ecology.
- Technological life: rarer still, or simply difficult to detect.

Numbers Extrapolated by Galaxy

The Milky Way probably contains roughly 100 to 400 billion stars. Kepler and other surveys indicate that planets are common: it is reasonable to speak of hundreds of billions of planets in our Galaxy.

An often-cited estimate from Kepler data suggests that there may be about 300 million potentially habitable planets in the Milky Way, broadly meaning rocky worlds in zones where liquid water could be possible. This does not mean 300 million inhabited planets. It means 300 million physically interesting candidates.

Extrapolating to the Universe

The observable universe contains at least hundreds of billions of galaxies, with some estimates reaching around two trillion depending on counting method. If each large galaxy contains hundreds of billions of planets, the order of magnitude quickly becomes staggering: 10^{22} to 10^{23} possible planets in the observable universe.

If we very roughly extrapolate the fraction of potentially habitable worlds, we can imagine 10^{1} to 10^{2} candidate worlds. But this should be read as a scale exercise, not a measurement. It mixes very different galaxies, stars and a minimal definition of habitability.

Life Does Not Mean Language

For A.L.I, the crucial point is this: even if life is frequent, language may be rare. Even if language is frequent, it may be local, chemical, gestural, electric, luminous, oceanic or entirely undetectable by radio.

An exoplanet inhabited by microbes will probably emit no message. A planet with complex animals may produce sounds, traces, colors, rhythms, architectures or chemical emissions without technology. A technological civilization may be silent, brief, buried, optical, encrypted, or unwilling to transmit.

A.L.I Questions

- What atmosphere would make sonic language possible?
- Would an ocean civilization invent pressure, sonar, bioluminescent or chemical language?
- Would a planet around a red dwarf favor life sensitive to infrared or stellar flare cycles?
- Would a high-gravity world produce radically different bodies, gestures and communication architectures?
- Could a biosphere without accessible fire develop radio technology?
- Should we search for messages, technosignatures, biosignatures or planetary behaviors?

A.L.I Prototype: Atlas of World-Languages

A speculative atlas could generate a possible language from planetary parameters:

mass + gravity + atmosphere + star + water + temperature + light -> possible body -> possible perception -> possible language channel

The visitor would choose a world type: ocean planet, super-Earth, tidally locked world, desert planet, icy moon, planet around a red dwarf. The system would then generate an alphabet, sound, light, texture or grammar compatible with that environment.

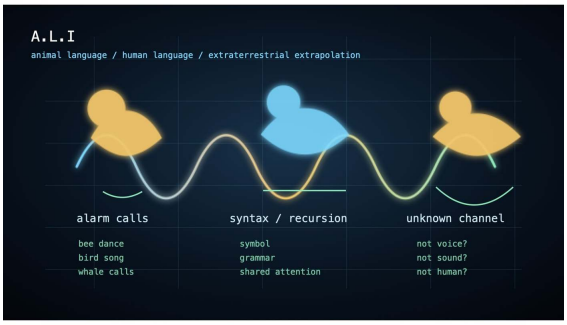
Sources and Data

- NASA Exoplanet Archive (guez.org/ali/780): reference catalogue, consulted on June 21, 2026 for the confirmed planet count.
- NASA Exoplanet Exploration (guez.org/ali/781): public resources and updated exoplanet figures.
- NASA - 300 million potentially habitable planets (guez.org/ali/782): estimate from Kepler data.
- ESA - Exoplanets (guez.org/ali/783): European resources on exoplanet science.
- NASA JWST (guez.org/ali/784): atmospheric observations and spectroscopy.

LABO question: if each world imposes its own bodies, perceptions and channels, can we still imagine a universal language, or only local bridges between forms of life?

84 - Animal Language, Human Language and Extraterrestrial Extrapolation

Keywords: animal language, human language, animal communication, ethology, dolphins, bees, vervet monkeys, birds, Kanzi, Alex, A.L.I



A.L.I image: from animal signals to human language, then toward an unknown non-human channel.

Summary

Comparing animal communication and human language to imagine extraterrestrial language: bees, vervet monkeys, dolphins, birds, bonobos, parrots and anthropocentric limits.

Text

Hypothesis: comparing animal communication and human language is not only a way to classify species. For A.L.I, it is a method for imagining extraterrestrial language without starting too quickly from our own words, voice and grammar.

Language or Communication?

Animals communicate massively: calls, songs, smells, postures, colors, vibrations, dances, pheromones, electric signals and ultrasounds. The difficult scientific question is when communication becomes language in the strong sense.

Linguist Charles F. Hockett proposed a set of language “design features”: arbitrariness, semanticity, productivity, cultural transmission, displacement, duality of patterning, reflexiveness and more. This framework is debated, but it asks a useful question: which traits are shared with other species, and which appear especially developed in humans?

What Animals Already Do

Serious studies show that animals should not be reduced to reflex machines. Several species use rich, specialized and sometimes highly abstract systems.

Key Studies

The waggle dance encodes the direction and distance of a resource through movement. Scientific image: L. Chittka, figure by J. Tautz and M. Kleinhenz, Wikimedia Commons / PLOS Biology (guez.org/ali/785), CC BY 2.5.

In honeybees, Karl von Frisch showed that the waggle dance transmits information about the location of a resource. It is not a word, but a bodily encoding of direction, distance and quality.

In vervet monkeys, the work of Seyfarth, Cheney and Marler showed that distinct alarm calls trigger adapted behaviors: looking upward, climbing into trees or scanning the ground. The signal is linked to a category of danger.

In dolphins, Stephanie King and Vincent Janik showed that bottlenose dolphins respond to copies of their own signature whistles, supporting the idea of learned individual vocal labels. It is not a human “name”, but it is a form of learned social identification.

A Japanese tit calling. Experiments by Toshitaka Suzuki and colleagues show that changing the order of certain calls alters the birds’ response, making this a major case for studying composition beyond human language. Still from a video by The Nature Box, Wikimedia Commons (guez.org/ali/786), CC BY-SA 4.0.

In Japanese tits, Toshitaka Suzuki and colleagues proposed experimental evidence for compositional syntax: certain call combinations produce a compound meaning, and order matters.

What Human Language Adds

Human language is not just richer. It combines several properties rarely brought together at this scale: open-ended productivity, recursion, displacement, narrative, lying, poetry, metalanguage, cumulative cultural transmission and the ability to talk about language itself.

- Productivity: creating sentences never heard before.
- Displacement: speaking about absence, future, past and fiction.
- Recursion: embedding one phrase inside another.
- Metalanguage: using language to analyze language.
- Writing: externalizing speech into a durable support.

But the conclusion should not be too simple. Animals are not “without language” in the sense of silence or poverty. They live in specialized semiotic worlds. Human language may be less an absolute rupture than a very particular stacking of capacities.

A Classic Mistake: Looking for Human Sentences Everywhere

Much of the misunderstanding comes from anthropocentric expectation. We look for words, names, sentences and audible grammar. But a species can communicate efficiently without producing anything that resembles human conversation.

A bee does not “say” a sentence; it inscribes a trajectory in a moving body. A dolphin does not “speak” English; it produces a social acoustic system adapted to water. An ant does not discuss; it writes chemically in space through pheromones.

Extraterrestrial Extrapolation

If we encountered extraterrestrial intelligence, it might not use an augmented version of human language. It might communicate through:

- electric or magnetic fields;
- chemical variations;
- light modulations;
- spatial or architectural structures;
- temperature changes;
- collective rhythms;
- shared memory, if its biology allows it;
- artifacts or behaviors rather than speech.

Animal communication teaches humility. We should not ask only “where are the words?”, but “which contrasts are relevant for this organism, in its environment, with its sensors and needs?”

A.L.I Encoding / Decoding

For A.L.I, every communication must be analyzed as a complete system:

sender biology -> physical channel -> signal structure -> receiver behavior -> social context -> possibility of translation

This chain is crucial. An extraterrestrial signal might be perfectly clear to its sender and invisible to us, not because it is “mystical”, but because we lack the right organs, instruments or expectations.

A.L.I Prototype: Speculative Interspecies Translator

An installation could juxtapose several systems:

- bee dance transformed into a map;
- vervet alarm call transformed into an action pictogram;
- dolphin whistle transformed into a graphic signature;
- birdsong transformed into mini-syntax;
- a human sentence transformed through these four modes;
- then a fifth deliberately non-vocal “extraterrestrial” mode.

The visitor would see that one intention changes radically depending on the body that carries it.

Sources and Research

- Seyfarth, Cheney & Marler, 1980, Science (guez.org/ali/787): vervet monkey alarm calls.
- Suzuki, Wheatcroft & Griesser, 2016, Nature Communications (guez.org/ali/788): compositional syntax in Japanese tits.
- King & Janik, 2013, PNAS (guez.org/ali/789): bottlenose dolphin signature whistles.
- Current Biology, 2023 (guez.org/ali/790): contemporary review of honeybee dance communication.
- Review on Savage-Rumbaugh and Kanzi (guez.org/ali/791): debates around ape linguistic competence.
- Wacewicz & Zywiczy ́nski, 2015 (guez.org/ali/792): critique of Hockett’s design features as a tool for language evolution.

LABO question: if an extraterrestrial intelligence communicates as differently from humans as a bee, dolphin or ant does, will we recognize that it is speaking to us?

85 - La Soupe aux choux: Soup, Gas and First Contact

Keywords: La Soupe aux choux, Louis de Funès, Jean Carmet, Jacques Villeret, first contact, transmission, soup, flatulence, body, A.L.I

Opening image: La Soupe aux choux: Soup, Gas and First Contact

Summary

An analysis of La Soupe aux choux as a first-contact comedy: flatulence as signal, soup as exchange protocol, body as antenna and biological transmission.

Text

Hypothesis: La Soupe aux choux can be read as a rural first-contact comedy in which the extraterrestrial signal does not pass through mathematics, radio or alphabet, but through body, gas, food and hospitality.

Trailer for La Soupe aux choux (1981), embedded from YouTube: real images from the film without copying protected stills.

Reference Points

La Soupe aux choux is a 1981 French film directed by Jean Girault, adapted from René Fallet's novel. It stars Louis de Funès, Jean Carmet and Jacques Villeret. The film mixes popular comedy, rural science fiction and melancholy: two old friends, Le Glaude and Le Bombé, live apart from the modern world until an alien from planet Oxo, nicknamed La Denrée, arrives.

The Transmission Medium

For A.L.I, the decisive point is the call mechanism. In the film, the alien's arrival is linked to a nocturnal farting scene after cabbage soup. The joke is trivial, but it produces a very interesting communication idea: an involuntary, bodily, odorous, sonic, non-linguistic signal becomes detectable by an intelligence from elsewhere.

soup -> fermentation -> gas -> bodily sound -> signal -> extraterrestrial arrival

The film turns a low biological function into a comic antenna. What is socially shameful becomes cosmologically efficient. The body is not only an organism: it becomes a transmitter.

A real cabbage soup: in the film, an ordinary food becomes an offering, a sensory test and a medium for relationship. The protocol does not merely transmit information; it engages a body and a culture. Photograph: Silar, Wikimedia Commons (guez.org/ali/794), CC BY-SA 3.0.

Soup as Protocol

After first contact, cabbage soup becomes more than a dish. It acts as gift, proof and diplomatic substance. Le Glaude gives soup to La Denrée, who brings it back to Oxo. Food becomes a material message: it carries taste, culture and terrestrial chemistry.

- Initial signal: bodily noise, accident, unintentional call.
- Response: arrival of the saucer and La Denrée.
- Exchange: soup given, then desire to return.
- Translation: gestures, looks, strange sounds, progressive understanding.
- Alliance: contact becomes hospitality.

A Low Language

The film is revealing because it reverses the classical imaginary of contact. Instead of a pure, mathematical, luminous or spiritual message, it proposes a low language: fart, soup, alcohol, shack, soil, old age. The cosmic passes through the grotesque.

This reversal is useful for A.L.I: it reminds us that an interstellar language is not necessarily noble. It can be accidental, organic, comic, digestive, olfactory or culinary. A non-human intelligence might detect emissions that we do not consider messages.

The Body as Transmitter

In a serious reading of the gag, transmission depends on several layers:

La Denrée and Translation

La Denrée does not immediately speak like humans. Contact happens through sounds, gestures, reactions, trials and food. It is a proto-translation situation: before words, there is repetition, imitation, object exchange and the recognition of shared pleasure.

The film’s comedy hides a strong idea: a language may begin with material dependence. La Denrée returns not because he understands a speech, but because taste creates a bond.

What This Means for A.L.I

The film widens the possible forms of message:

- a signal is not necessarily intentional;
- a biological emission may become a sign for another receiver;
- food can be a chemical archive;
- the grotesque can become a contact protocol;
- hospitality may precede translation;
- the first message may be an invitation to return.

A.L.I Prototype: Soup-Signal

An installation inspired by the film could avoid literal imitation while keeping its core idea:

- a pot releases the smell of soup;
- sensors measure steam, temperature, CO or volatile compounds;
- these data become low sounds, light signals or radio code;
- an “extraterrestrial receiver” responds when the soup reaches a certain state;
- the audience understands that cooking has become an antenna.

recipe -> chemistry -> sensors -> modulation -> light/radio signal -> response

Critical Position

La Soupe aux choux is not a treatise on extraterrestrial contact, but its comic force opens a very A.L.I hypothesis: messages may emerge from the least prestigious zones of living matter. The first language between two worlds could be a noise, a smell, a taste, a misunderstanding or a gift.

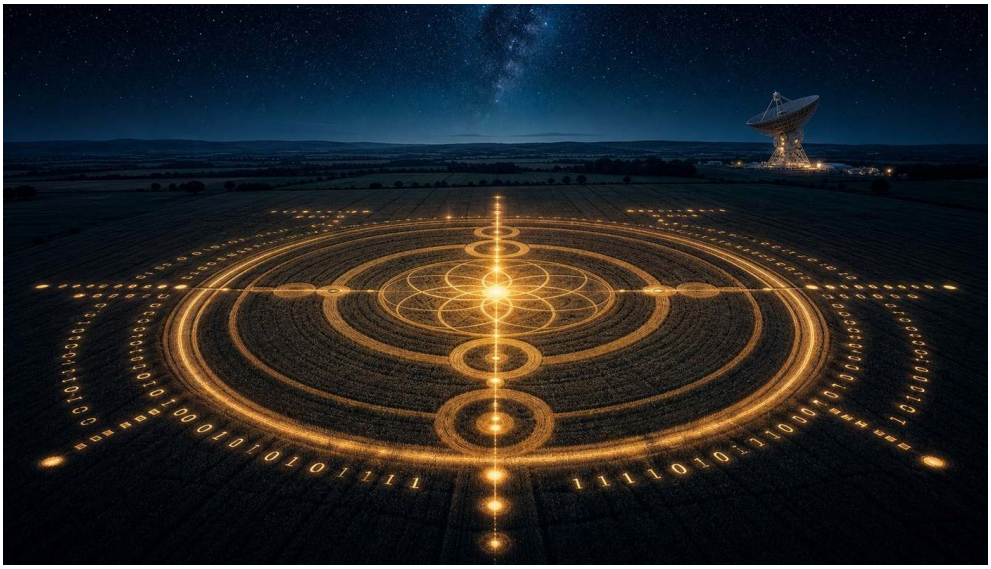
Sources and Images

- Trailer for La Soupe aux choux (guez.org/ali/795): real images from the film embedded above via YouTube.
- AlloCiné - La Soupe aux choux (guez.org/ali/796): film page, synopsis and cast.
- Park Circus - The Cabbage Soup (guez.org/ali/797): international film listing.

LABO question: what if the first signal detected by an extraterrestrial intelligence was not our finest message, but an involuntary emission of our biology?

86 - Crop Circles: Language, Myth and Ground Message

Keywords: crop circle, Arecibo, Chilbolton, geoglyph, visual language, ufology, land art, message, A.L.I



Original A.L.I image: the crop circle as ground message, between geoglyph, signal and planetary writing.

Summary

A historical and contemporary analysis of crop circles: hoaxes, geometry, famous examples, the Arecibo/Chilbolton motif and their potential as an extraterrestrial communication language.

Text

Hypothesis: crop circles can be studied as a form of visual language written on the ground, regardless of their origin. Even when they are human-made, they raise a strong A.L.I question: how can a field become a message interface, visible from above and readable through pattern, number and geometry?

Definition

A crop circle is a figure formed in a field, most often by flattening cereal crops. The forms range from simple circles to complex compositions: rings, spirals, fractals, networks, pictograms, diagrams, astronomical motifs or pseudo-binary patterns.

Most documented crop circles are now attributed to human intervention, often made at night with planks, ropes, markers and stem-folding techniques. This does not remove their interest: the phenomenon has become a cultural laboratory of anonymous messaging.

Historical Markers

Stories of circles or marks in fields existed before the twentieth century, but the modern phenomenon expanded especially from the 1970s and 1980s in England, particularly in Wiltshire. The forms became larger, more geometric and more media-driven.

In 1991, Doug Bower and Dave Chorley claimed responsibility for many English crop circles made since the late 1970s. Their confession did not end the phenomenon. Instead, it revealed that a crop circle could be clandestine art, nocturnal performance and a language addressed to the public.

Photographic Examples

Crop circle in Diessenhofen, Switzerland, July 15, 2008. Photo: Hansueli Krapf / Wikimedia Commons, CC BY-SA 3.0.

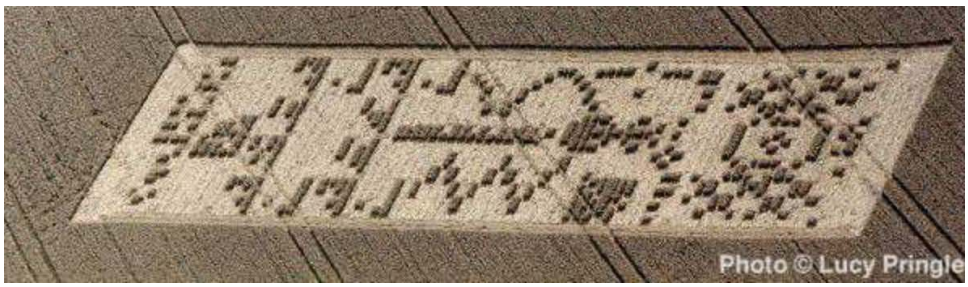
Crop circle in Lausanne, Switzerland. Photo: Jabberocky / Wikimedia Commons, public domain.

These images show the importance of aerial viewpoint. The message is not primarily designed for someone walking inside the field, but for a distant view: plane, drone, photograph, satellite, or the imaginary of an extraterrestrial observer looking down.

Chilbolton and the Arecibo Motif

In 2001, a crop circle near the Chilbolton Observatory became famous because it seemed to answer the 1974 Arecibo message. The motif reused the idea of a binary diagram: silhouette, planetary system, DNA, chemical elements and antenna. In UFO culture, some interpreted it as an extraterrestrial “reply”.

Schematic representation of the Chilbolton motif, often presented as a variation of the Arecibo message. Source: Wikimedia Commons.



Chilbolton formation, Hampshire, August 21, 2001, often interpreted as a reply to the Arecibo message. Photo credited to Lucy Pringle, credit visible on the image. Source: Lucy Pringle (guez.org/ali/798).

For A.L.I, the point is not to validate an extraterrestrial origin. The point is semiotic: Chilbolton shows that a crop circle can function as a remix of an interstellar message. It turns a radio protocol into an agricultural image, a binary signal into a geoglyph, and a scientific hypothesis into a collective story.

The Crop Circle as Potential Language

If crop circles are read as language, several layers appear:

- Geometry: circles, lines, spirals, symmetries, proportions.
- Number: repetitions, divisions, counts, series, ratios.
- Orientation: relation to north, sun, monument, antenna or star.
- Scale: a message visible only from a high viewpoint.
- Support: living plants become a temporary writing surface.
- Erasure: the message disappears with harvest, weather or destruction.

Contemporary Analysis

Today, crop circles circulate mainly through photography, drone video, web archives and social networks. The phenomenon is no longer only agricultural: it is media-based. The field becomes a stage, the aerial photograph becomes the true reading surface, and the enigma becomes shareable.

This contemporary dimension matters. A crop circle does not need to be extraterrestrial to function as a message. It only needs to be anonymous, visible from above, difficult to attribute, and structured enough to trigger interpretation.

What This Means for A.L.I

An extraterrestrial language may not be sonic, textual or radio-based. It could be spatial. A message could be inscribed in topography, forest, field, city, orbit or artificial constellation. Crop circles force us to imagine a language whose grammar is form in space.

For A.L.I, this opens several paths:

- creating messages readable only from the sky;
- translating text into agricultural or luminous geometry;
- turning a radio message, such as Arecibo, into a ground motif;
- designing an alphabet of circles, lines, breaks and densities;
- testing message reading by drone or satellite;
- questioning the boundary between language, land art, ritual and hoax.

A.L.I Prototype: Field-Message

A prototype could take the form of a “field-message” without damaging crops:

- a nocturnal light projection on grassland;
- a ground drawing made with ropes, stakes and temporary pigments;
- a motif visible by drone;
- an encoder that transforms a sentence into geometry;
- a digital version as a fictional satellite map;
- a decoding protocol revealed to the public afterward.

message -> numbers -> geometry -> field -> aerial view -> interpretation

Critical Position

Crop circles are often trapped between two excesses: believing everything or dismissing everything. A.L.I can take a third path. Even if the figures are human-made, they form a revealing archive of our desire to receive a sign. They show how a society imagines a message from elsewhere: geometric, silent, spectacular, anonymous and visible from the sky.

Sources and Further Reading

- Encyclopaedia Britannica - Crop circle (guez.org/ali/799): historical synthesis of the phenomenon.
- Smithsonian Magazine - Crop Circles: The Art of the Hoax (guez.org/ali/800): cultural history of hoaxes and Doug Bower / Dave Chorley.
- NASA - Voyager Golden Record (guez.org/ali/801): reference point for visual and sound messages sent into space.
- SETI Institute - Project Ozma and Arecibo Message (guez.org/ali/802): context for the Arecibo message.

LABO question: could an extraterrestrial message be an organized landscape rather than a transmitted signal?

87 - Telepathy, Ufology and Mental Language

Keywords: telepathy, ufology, abduction, inner voice, memory, hypnosis, mental communication, A.L.I, language, ethics

Original A.L.I image: telepathy imagined as mental wave, memory and nonverbal signal.

Summary

Exploring telepathy as a communication motif in ufology and abduction narratives: inner voice, mental images, commands, memory and implications for A.L.I.

Text

Hypothesis: in many UFO narratives, extraterrestrial communication does not pass through mouth, ear or writing. It arrives as an inner voice, an imposed image, an emotion, a silent command or an implanted memory. Telepathy then becomes less a “power” than a model for non-acoustic language.

Necessary Caution

Telepathy is not treated here as an established fact. It is approached as a recurring motif in contact testimonies, abduction narratives and UFO culture. This motif matters for A.L.I because it shifts the language problem: if communication no longer passes through sound or visible signs, how can it be encoded, validated, replayed or transmitted?

In Abduction Narratives

Alien-abduction accounts often describe the absence of ordinary dialogue. The beings do not always “speak”. They command, calm, show or impose understanding. The witness may report a sentence heard “inside the head”, a mental image, or a sudden sensation of knowing.

- Inner voice: a message received without mouth movement or localizable sound source.
- Silent commands: “stay calm”, “come”, “look”, “do not be afraid”.
- Mental images: disaster scenes, Earth seen from afar, destroyed environments, stars, maps or

missions.

- Transmitted emotions: calm, fear, fascination, a feeling of being watched or chosen.
- Broken memory: partial memory, missing time, fragments recovered through hypnosis or later narration.

Ufological Examples

The Betty and Barney Hill case (1961) is one of the founding narratives of modern alien abduction: missing time, medical examination, fragmented memories and the famous star-map element. Its relevance here lies in mental control, non-ordinary communication and reconstructed memory.

In the Pascagoula case (1973), Charles Hickson and Calvin Parker reported paralysis and examination by non-human beings. For A.L.I, the case is interesting because it emphasizes not conversation but control: immobilized body, altered perception, imposed experience.

Accounts popularized by Budd Hopkins, David Jacobs and John E. Mack often give mental communication a central role: ecological messages, warnings, hybridization narratives, missions, and the sensation of knowledge being placed directly into the mind. These authors are controversial, especially because of hypnosis, but their bodies of work strongly shaped the contemporary abduction imaginary.

What Telepathy Changes for Language

If telepathy is used as a design hypothesis, language is no longer a sequence of sounds or signs. It becomes the transmission of mental states. A sentence could be replaced by a scene, a sensation, an emotion or a certainty.

Encoding and Decoding

For A.L.I, the question becomes: how can a thought be encoded without reducing it to a word? A telepathic communication, if it existed, would have to be decoded across several layers:

- Content: what image, inner sentence or sensation?
- Source: does the message come from outside, dream, stress, memory or cultural expectation?
- Structure: is there repetition, order, syntax or recurring motifs?
- Validation: can mentally received information be checked?
- Consent: is direct communication to the mind an intrusion?

The Problem of Evidence

Telepathy is almost impossible to stabilize as public data. A sound can be recorded, an image can be printed, a radio signal can be archived. A mental experience is intimate, fragile and transformed by narration. For A.L.I, this is exactly why it is interesting: it forces us to think about a language that may leave no external trace.

A.L.I Prototype: Mental Message Simulator

An installation could simulate the grammar of telepathy without claiming to produce real telepathy:

- the visitor enters a silent cabin;

- a bone-conduction voice or very discreet headset seems to come from inside;
- brief images appear and vanish;
- vibrations or synchronized light create emotional charge;
- the visitor reconstructs the message afterward;
- several visitors compare their memories to see what becomes stable.

mental image + emotion + silence + delayed memory = simulated telepathic message

Ethical Implications

If telepathic communication were possible, it would immediately raise the question of consent. A message received directly in the mind could bypass distance, translation, refusal and doubt. It would be a powerful form of communication, but also a potentially violent one.

A.L.I should therefore treat telepathy as an ethical limit of language: at what point does communication become an intrusion into another mind?

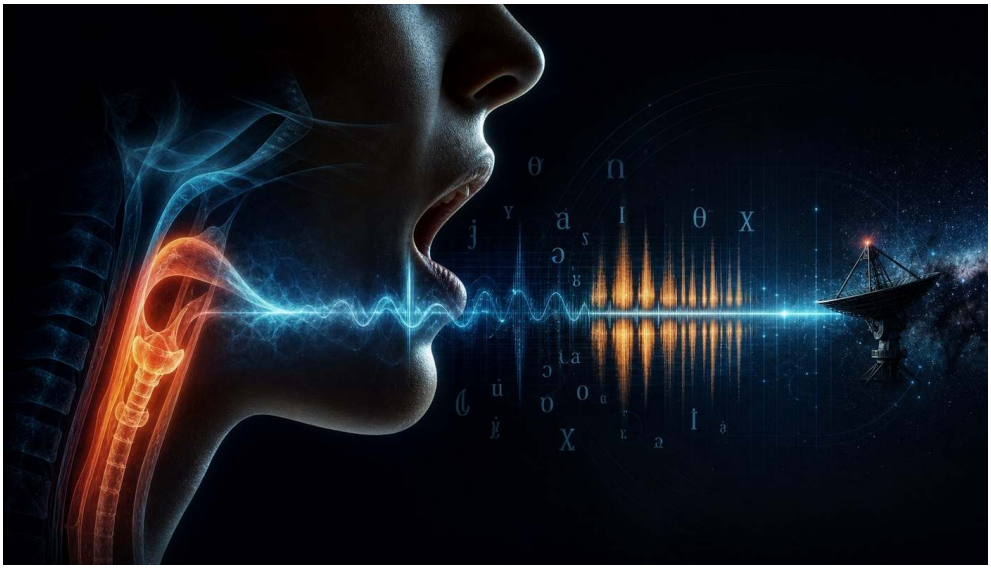
Sources and Further Reading

- University of New Hampshire - Betty and Barney Hill Papers (guez.org/ali/803): archival material around the Hill case.
- John E. Mack, Abduction: Human Encounters with Aliens (guez.org/ali/804): a central and controversial book on abduction narratives.
- Hinds Community College - Pascagoula Abduction (guez.org/ali/805): local resources on the Pascagoula case.
- CIA Reading Room - UFOs: Fact or Fiction? (guez.org/ali/806): a document collection useful for situating institutional UFO history.

LABO question: if a message arrives directly as a mental image, is it still a language, or already an imposed experience?

88 - Guttural Phonemes: Toward an Intermediate Language

Keywords: phonemes, phonetics, IPA, guttural, voice, language, spectrogram, A.L.I, prototype, exolanguage



Opening image: Guttural Phonemes: Toward an Intermediate Language

Summary

Exploring phonemes as building blocks for an intermediate language between human speech, guttural sound, breath, vibration and nonverbal signal.

Text

Hypothesis: before inventing an extraterrestrial alphabet or a complete vocabulary, A.L.I could work with a more primitive layer: phonemes, the minimal sound units that can distinguish meaning inside a language.

Phonemes may become an interface between human language and a more guttural, bodily form of communication: breath, growl, vibration, throat friction or organic signal. The goal is not to imitate a caricature of “alien speech”, but to build an intermediate zone between voice, body and code.

Phoneme, Sound, Signal

A phoneme is not just a noise. It is a sound difference that matters inside a system. In English, /p/ and /b/ distinguish words such as pat and bat. In a contact language, we might not begin with words, but with very simple oppositions: open/closed, short/long, breathy/vibrating, low/high, continuous/interrupted.

/a/ open vowel

/u/ closed rounded vowel

/h/ glottal breath

// glottal stop

// voiced uvular friction

// voiceless uvular breath

/h/ pharyngeal friction

// voiced pharyngeal friction

Why Move Toward the Guttural?

Guttural sounds use the back of the mouth, the throat, the glottis, the pharynx or the uvula. They feel more physical than very frontal consonants such as /p/, /t/ or /s/. This bodily quality is useful for imagining a communication system that is not entirely verbal.

An intermediate language could therefore use fewer words and more elementary vocal gestures: breathing, blocking, releasing, vibrating, scraping, holding a tone, or suddenly cutting the flow.

Possible Phonemic Palette

A deliberately small inventory can become a minimalist contact grammar:

Examples of Proto-Words

From this palette, very short forms can be produced: almost animal, but still structured.

ha = I call / I am here

a = beginning / opening

ha = attention, cut

a = nearby presence

u = distance, outside

ham = signal received, but unstable

a-a = approach

u-u = distant repetition

ha-m = call confirmed

a--u = presence, break, withdrawal

These examples are not a full language. They form a threshold system: human enough to be produced by a mouth, abstract enough to become sound material, and limited enough to be learned as a code.

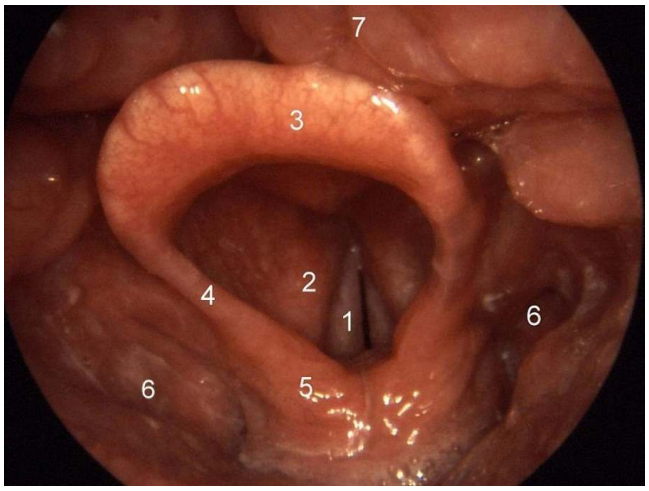
Between Human Voice and Other Voice

Such a language could sit between three regimes:

- Human speech: recognizable phonemes, possible articulations, IPA transcription.
- Guttural voice: breath, friction, vibration, growl, glottal stop, throat texture.
- Machine signal: spectral analysis, duration, intensity, fundamental frequency, sound envelope.

The same element could be spoken by a person, transformed by software, and displayed as a spectrogram. The alphabet would no longer be only written: it would be breathed, heard and

measured.



Laryngoscopic view of a human larynx: the vocal folds, labelled 1, are only one component of a complex biological apparatus. A voice-based contact language must therefore state its anatomical constraints instead of assuming they are shared. Photograph: Welleschik, Wikimedia Commons (guez.org/ali/808), CC BY-SA 3.0.

Sound Depends on Biology

In the coding and decoding of an extraterrestrial language, one fundamental limit must be kept in mind: sound always depends on the biology of the beings that produce and receive it. A human voice exists because we have lungs, a larynx, vocal folds, a mouth, a tongue, a palate, teeth, nasal cavities and ears adapted to certain frequencies.

Another life form might have no throat, might not breathe air, might not hear through eardrum vibration, might not produce sounds inside our audible range, or might use another medium entirely: water, ground, membrane, electric field, pressure, light or internal vibration. What we call a “phoneme” might therefore be only a human translation of a much broader biological phenomenon.

- Emission biology: what organs produce the signal: throat, membrane, skin, shell, fluid, electric organ?
- Propagation medium: does the signal travel through air, water, ground, a machine in vacuum, or another support?
- Reception biology: does the being hear with ears, pressure sensors, sensory hairs, electric receptors or chemical receptors?
- Available frequencies: is the language audible to us, ultrasonic, infrasonic, vibrational or entirely non-sonic?

From this perspective, A.L.I should not assume that sound is universal. Sound is one possibility among others, tied to bodies, environments and perceptual thresholds. Encoding means translating a biology into a signal; decoding means avoiding the mistake of treating our own vocal apparatus as a cosmic norm.

A.L.I Prototype

A prototype could become a “phoneme workshop”:

- a microphone captures the visitor’s voice;
- software detects breath, vibration, glottal attack, duration and pitch;
- each phoneme is translated into a graphic sign, a light or a waveform;

- a voice synthesizer answers with a deeper, slower or more guttural version;
- the visitor learns to produce a short contact sequence.

human voice -> IPA phoneme -> sound analysis -> A.L.I sign -> synthetic guttural answer

Sound Excerpts

These sounds are short synthetic sketches: they do not claim to reproduce an existing language, but they make the phonetic gestures of the post audible.

/h/ - breath call

// - glottal stop, threshold or break

// - uvular friction, distance and breath

/m/ - nasal hum of reception

ha a m - call / opening / reception

u u a m - far / threshold / presence / received

Composition Exercise

A minimal contact phrase could be:

ha a m

call / opening / reception

Or a more dramatic form:

u u a m

far / far / threshold / presence / received

The phrase is not translated word by word. It works like a score of vocal gestures. Order, tension, duration and repetition matter more than vocabulary.

Sources and Tools

- International Phonetic Association - IPA Chart (guez.org/ali/809): the official International Phonetic Alphabet chart.
- UCLA Phonetics Lab Archive (guez.org/ali/810): recordings and phonetic transcriptions from many languages.
- PHOIBLE (guez.org/ali/811): a database of phonological inventories from the world's languages.

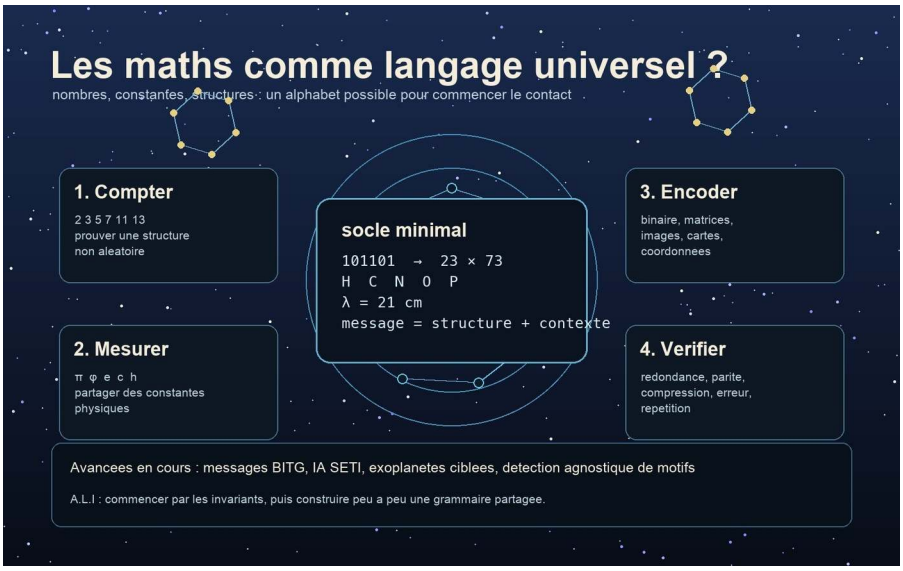
Critical Position

The risk would be to confuse "guttural" with "primitive" or "monstrous". These sounds should instead be treated as precise, rich articulations present in many human languages. Their A.L.I value lies in their transitional quality: a zone where language remains bodily while becoming signal.

> LABO question: can we invent a contact language that begins not with words, but with gestures of throat, breath and vibration?

89 - Mathematics as a Universal Language?

Keywords: mathematics, universal language, SETI, METI, Arecibo, technosignatures, AI, exoplanets, prime numbers, A.L.I



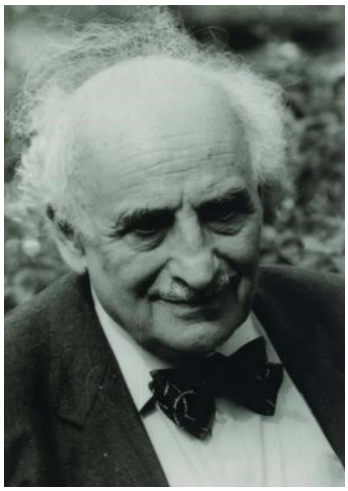
Opening image: Mathematics as a Universal Language?

Summary

A.L.I article on mathematics as a possible foundation for interstellar contact: prime numbers, physical constants, encoding, SETI, AI, exoplanets and the limits of a universal language.

Text

Hypothesis: mathematics may be the first bridge between intelligences, but it is not automatically a complete language. It can establish structure, quantity and relation; it cannot by itself guarantee shared meaning.



Hans Freudenthal in 1983. With Lincos, he does not assume that mathematics is sufficient: he tries to make it the first layer of a cosmic language that gradually introduces time, action and dialogue. Photograph: Konrad Jacobs, Oberwolfach Archives / Wikimedia Commons (guez.org/ali/288), CC BY-SA 2.0 DE.

Why Mathematics?

Mathematics is attractive for interstellar contact because it appears less local than human speech. Prime numbers, ratios, geometry, periodicity and physical constants do not depend on French, English or any national culture. They can reveal that a signal has been intentionally organized.

Prime Numbers as a First Gesture

A sequence of primes is often imagined as the simplest proof of intelligence. It is not a conversation, but it is a threshold between natural noise and possible intention.

2, 3, 5, 7, 11, 13, 17, 19...

From Number to Image

The next step is encoding. A stream of bits can be arranged into a grid. If the receiver guesses the right dimensions, the numbers become an image, as in the Arecibo message. Mathematics becomes a way to teach reading order.

Physical Constants

Hydrogen frequency, atomic transitions, ratios, planetary periods and units based on nature can help anchor a message. A shared universe may provide shared references, even if the cultures are completely different.

Limits

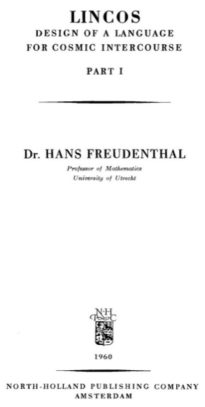
Mathematics does not solve everything. It may be universal in structure but not in interpretation. A receiver may recognize order without knowing intention. It may understand a diagram without knowing whether it is greeting, warning, art, proof, map or trap.

Exoplanets and Detectability

Modern exoplanet research adds another layer. We may identify worlds where life is possible, but a mathematical signal still depends on technology, intention, transmission, repetition and detectability. A civilization can exist without broadcasting itself.

AI and Translation

Artificial intelligence may help search for patterns, test encodings and model possible decoding paths. But AI does not remove the philosophical difficulty: meaning is not only pattern, it is relation between sender, receiver and context.


LINCOS
DESIGN OF A LANGUAGE
FOR COSMIC INTERCOURSE

PART I

Dr. HANS FREUDENTHAL
Professor of Mathematics
University of Utrecht

1960

NORTH-HOLLAND PUBLISHING COMPANY
AMSTERDAM

The title page of Lincos: Design of a Language for Cosmic Intercourse (1960). The book materializes the gap between a recognizable number sequence and genuine communication, which must build its own conditions of interpretation. Read the digitized book (guez.org/ali/289).

A.L.I Prototype

A.L.I could build a “universal language workbench” where visitors create messages from primes, grids, constants, images and sound. Another visitor or algorithm would attempt to decode them without instructions.

- prime sequence as attention signal;
- binary grid as image;
- physical constant as unit system;
- diagram as concept;
- repetition as trust.

LABO question: does mathematics communicate meaning, or does it only open the door through which meaning may arrive?

90 - Contact: The Message That Contains the Ship Blueprint

Keywords: Contact, Carl Sagan, SETI, Vega, extraterrestrial message, prime numbers, spacecraft, blueprint, language, A.L.I

Opening image: Contact: The Message That Contains the Ship Blueprint

Summary

An analysis of the alien message in Contact: prime numbers, returned TV signal, technical pages, 3D reading and the Machine plans as an interstellar language.

Text

Hypothesis: in Contact, the extraterrestrial message is not only content. It is a reading test. Humanity must understand that one signal can contain several layers: mathematical, media-based, documentary and geometric.

The Very Large Array, a real radio astronomy facility that became one of Contact's emblematic locations. Its 27 movable antennas combine measurements as one instrument: a fitting image of the transition from dispersed signal to readable structure. Photograph: NRAO/AUI/NSF, NRAO (guez.org/ali/815).

Film Summary

Robert Zemeckis's 1997 film, based on Carl Sagan's novel, follows radio astronomer Ellie Arroway as she detects a signal from Vega. The story begins with a scientific task: distinguish a true signal from noise, then understand what it contains.

For A.L.I, the film is important because contact is not reduced to an alien sentence. The message is progressive: first prove intelligence, then capture attention, then transmit instructions.

Layer One: Prime Numbers

The received signal contains a sequence of prime numbers. This is a classic SETI idea: primes are difficult to produce by accident and do not depend on a human language. They act as a minimal signature of intelligence.

2, 3, 5, 7, 11, 13, 17, 19...

This layer does not yet say "hello". It says: this signal is structured.

Layer Two: A Human Signal Returned

The researchers then discover images inside the transmission: an old broadcast from the 1936 Berlin Olympic Games. In the logic of the film, the senders are not endorsing that image. They are returning one of the first strong television signals that left Earth.

The first mirror offered to humanity is embarrassing. The aliens show us what we already sent without knowing it.

Layer Three: Hidden Pages

The most important layer is a huge set of technical pages. They appear to describe a machine, but their order seems wrong. Read flat, the data appears incomplete or incoherent.

The message therefore contains a method trap: receiving the pages is not enough. Humanity must discover how to read them.

The Key: Reading in Three Dimensions

In the film, S. R. Hadden understands that the pages must not be read as a flat stack. They must be reorganized spatially. When treated as a volume, the plans become coherent.

expected reading: page 1 -> page 2 -> page 3

correct reading: stack + rotation + alignment + volume

The message is written not only in a language, but in geometry. Meaning depends on the spatial organization of the support.

What the Message Contains

Once interpreted, the message reveals the plans for a gigantic Machine. The device allows a human to travel, or to experience travel, toward an encounter with the sending intelligence. The Machine becomes the real message: the aliens do not merely say "we exist"; they propose an experience.

Carl Sagan before planetary images at JPL. As the author of the novel Contact, he connects signal rigor, narrative construction and the political question of who gets to interpret a received message. Photograph: NASA/JPL-Caltech, public domain.

Why the Protocol Is Smart

- Minimal universality: prime numbers signal intelligence.
- Shared reference: the returned TV signal proves the senders listened to Earth.
- Document compression: technical pages carry large amounts of information.
- Comprehension test: 3D reading forces the receivers beyond linear habits.
- Action: the message must be built, not just understood.

A.L.I Prototype

An A.L.I prototype could create a layered message: primes, binary image, pages that only make sense when stacked, a 3D model, then an instruction to build, orient, listen or answer. Communication becomes a protocol of discovery.

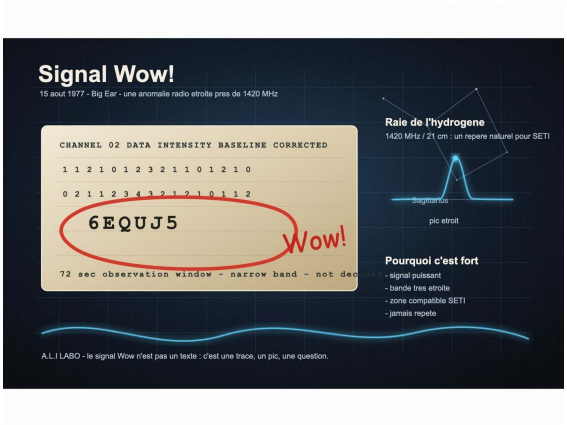
Critical Position

Contact is fiction, but its message design is remarkable. It suggests that an extraterrestrial signal could become more alien not by being obscure, but by asking us to change method.

LABO question: is a message still a text when it must be constructed in order to be understood?

91 - The Wow! Signal: 6EQUJ5 and the Call That Never Repeated

Keywords: Wow! signal, 6EQUJ5, SETI, Big Ear, radio, hydrogen, 1420 MHz, language, signal, A.L.I



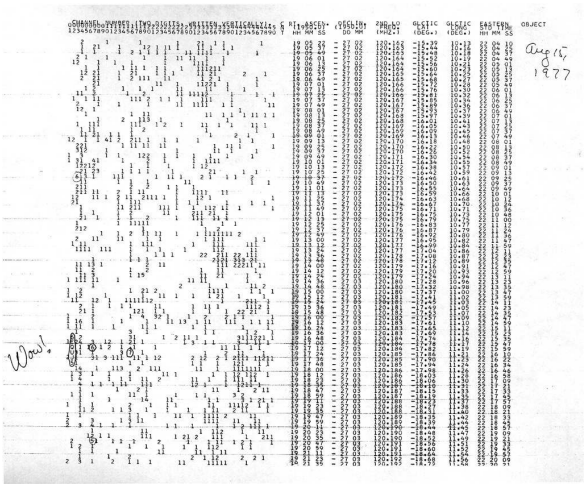
Opening image: The Wow! Signal: 6EQUJ5 and the Call That Never Repeated

Summary

The 1977 Wow! signal detected by Big Ear: 6EQUJ5, the hydrogen line, SETI hypotheses, scientific limits and A.L.I paths around signal as proto-language.

Text

Hypothesis: the Wow! signal fascinates because it is almost a sentence and not yet a message. It is a trace strong enough to attract desire, but too isolated to become language.



The computer printout on which Jerry Ehman circled “6EQUJ5” and wrote “Wow!”. The archive does not contain an extraterrestrial text: the sequence encodes measured intensity from channel to channel. Source: Big Ear Radio Observatory / NAAPO, Wow signal archive (guez.org/ali/819), public domain.

The Event

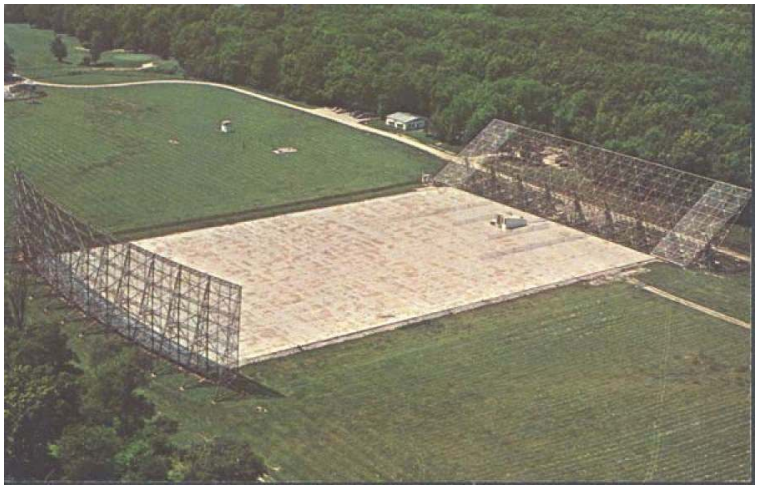
On August 15, 1977, the Big Ear radio telescope recorded an unusual narrowband signal. Astronomer Jerry Ehman circled the printed sequence and wrote “Wow!” in the margin. The alphanumeric code 6EQUJ5 became an icon of SETI culture.

Why It Matters

The signal appeared near the hydrogen line, a frequency region often discussed in SETI because hydrogen is the most common element in the universe. It had the shape of a strong radio detection, but it never repeated in a confirmed way.

Not a Message

6EQUJ5 is not text. It is an intensity notation produced by the observing system. The letters do not spell a word; they encode signal strength over time. This distinction is crucial: the human imagination quickly turns trace into address.



Aerial view of Big Ear, a fixed instrument that used Earth’s rotation to sweep the sky. Demolished in 1998, it shows that the Wow! event also depended on a particular listening geometry and an observatory that no longer exists. Photograph: Ohio State University Radio Observatory / NAAPO, James Arthur Collection (guez.org/ali/820).

Scientific Limits

Several hypotheses have been proposed: terrestrial interference, satellite reflection, astronomical source, comet-related explanation, or a genuine unknown signal. None has produced a settled explanation. Without repetition, localization and content, the signal remains unresolved.

A.L.I Reading

The Wow! signal is useful for thinking about pre-language. Before translation comes detection. Before meaning comes recurrence. Before dialogue comes the decision that something deserves attention.

Prototype

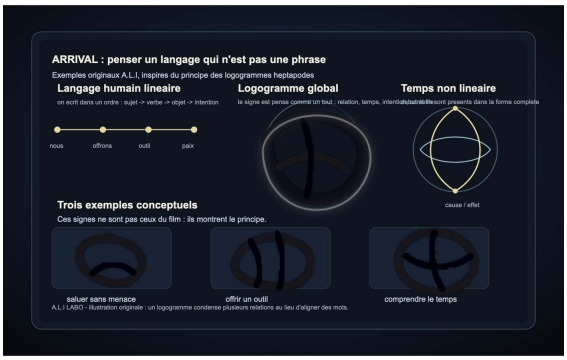
An installation could let visitors scan noise until a narrowband peak appears. The system would then ask: is this a message, a coincidence, an instrument artifact or a desire to hear?

- radio noise as environment;
- a sudden peak as event;
- human annotation as meaning-making;
- repetition as the beginning of language.

LABO question: how many times must a signal return before we dare call it communication?

92 - Arrival: The Language of the Heptapods

Keywords: Arrival, Denis Villeneuve, Ted Chiang, heptapods, logograms, language, Sapir-Whorf, translation, A.L.I, cinema



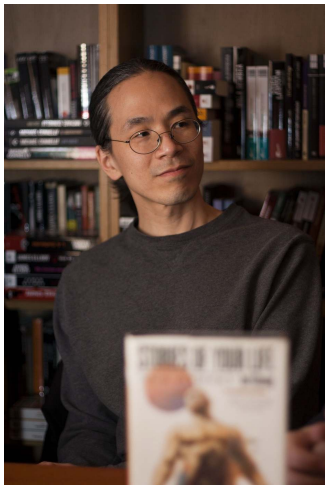
Opening image: Arrival: The Language of the Heptapods

Summary

A look at language in Denis Villeneuve's Arrival: heptapod logograms, circular writing, nonlinear time, Sapir-Whorf and original A.L.I visual examples.

Text

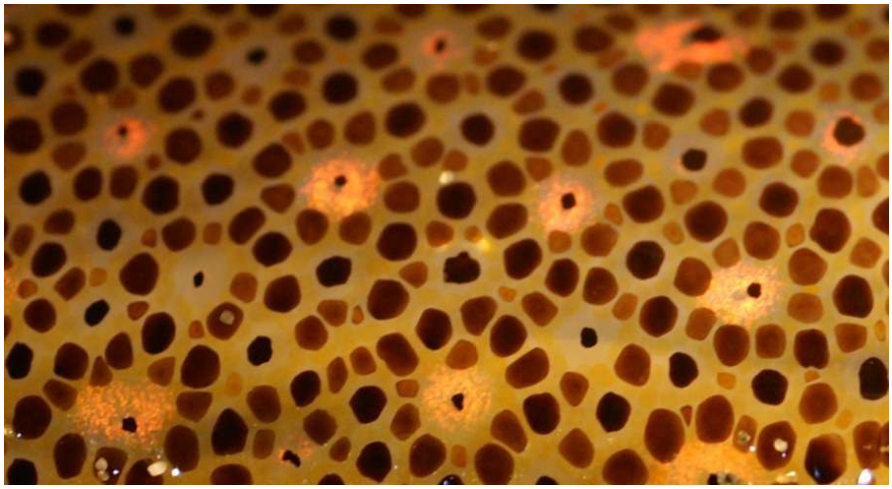
Hypothesis: Arrival is one of the strongest cinematic models for A.L.I because it treats language not as decoration, but as the real site of first contact.



Ted Chiang, author of Story of Your Life, the novella adapted as Arrival. The linguistic thought experiment precedes its spectacular visual translation. Photograph: Arturo Villarrubia, Wikimedia Commons (guez.org/ali/826), CC BY-SA 2.0.

The Film

Denis Villeneuve's film, adapted from Ted Chiang's Story of Your Life, follows linguist Louise Banks as she tries to communicate with heptapods whose ships appear around Earth. The drama is not only geopolitical. It is grammatical.



Contracted and expanded squid chromatophores: in real cephalopods, skin can become a dynamic surface for pattern, camouflage and communication. This biological parallel does not explain the heptapods, but it usefully displaces the idea that language must be carried by voice alone. Photograph: ZeWrestler, Wikimedia Commons (guez.org/ali/827), CC BY 2.0.

Heptapod Writing

The heptapods write with circular ink-like logograms. A sign is not built letter after letter. It appears as a whole form whose variations encode meaning. The circle suggests simultaneity, completion and a non-linear relation to time.

Language and Time

The film uses a strong version of linguistic relativity: learning the heptapod language changes Louise's perception of time. Language becomes a cognitive technology, not merely a code.

Protocol of Translation

The film is also illuminating because it shows the practical difficulty of contact: establishing names, actions, questions, pronouns, intention and trust. "Weapon" and "tool" become a crisis of translation. A single ambiguity can become planetary danger.

Design Lessons for A.L.I

- a language can be visual before it is vocal;
- syntax can be spatial rather than linear;
- translation is political, emotional and technical at once;
- the receiver changes while learning the message;
- misunderstanding is not noise, it is part of the encounter.

Prototype

A.L.I could build a logogram generator: visitors type a sentence, and the system creates a circular sign whose thickness, gaps, orientation and texture encode grammar. Another visitor attempts to decode it through repeated examples.

Critical Note

The film is fiction, but its central intuition is powerful: a truly alien language may require changing our habits of time, body, order and causality.

> LABO question: can a language be learned without also transforming the learner?

93 - Ufological Typology of Extraterrestrials

Keywords: ufology, extraterrestrials, testimonies, Project Blue Book, CIA, NICAP, archives, photos, typology, folklore

Opening image: Ufological Typology of Extraterrestrials

Summary

A critical typology of extraterrestrial figures in UFO narratives: small humanoids, Greys, luminous entities, reptilians, insectoids, robots and non-humanoids, with archives and photos to consult.

Text

Hypothesis: extraterrestrial typologies in ufology tell us as much about human imagination as about possible non-human life. For A.L.I, they are useful as a vocabulary of expectations.

Why Classify?

Witness accounts, books and UFO archives often describe recurring figures: small humanoids, large beings, luminous presences, Greys, reptilians, insectoids, robots or forms without clear bodies. A typology helps compare narratives without accepting every claim as fact.

“Greys” staged in the Roswell museum: this photograph documents the cultural materialization of a ufological type, not the existence of a species. Photograph: Kimble Young, CC BY 2.0, Wikimedia Commons (guez.org/ali/838).

Common Figures

- Small humanoids: early UFO folklore often describes short beings with suits, helmets or oversized heads.
- Greys: large eyes, small mouths, thin bodies; strongly associated with abduction narratives.
- Luminous entities: beings described as light, energy or apparition rather than biology.
- Reptilians: a later conspiratorial category, often mixed with political mythology.
- Insectoids: mantis-like figures that appear in some abduction and contact reports.
- Robotic probes: non-biological agents, drones or machine intelligences.
- Non-humanoids: rare forms that challenge the expectation of a body like ours.

Roswell Daily Record

RAAF Captures Flying Saucer On Ranch in Roswell Region

Claims Army Is Stacking Courts Martial

Some of Soviet Satellites May Attend Paris Meeting

Miners and Operators Sign Highest Wage Pact in History

The Roswell Daily Record front page of 8 July 1947 shows how a visual category is also stabilized through words, headlines and media circulation. Press archive, public domain, Wikimedia Commons (guez.org/ali/833).

Archives and Evidence

Project Blue Book, NICAP files, CIA reading-room documents and press archives are useful sources, but they must be read critically. They contain reports, drawings, interpretations and administrative traces, not simple proof.

Language Question

Each type implies a different theory of communication. Greys are often linked to telepathy. Luminous entities suggest affect and perception. Robots imply protocol and data exchange. Non-humanoids force us to imagine language beyond face, gesture and voice.

A.L.I Use

The typology can become a design board: for each figure, invent a communication channel. A Grey might use images, a luminous entity modulation, an insectoid rhythm, a robot checksum, a non-humanoid environmental pattern.

Critical Position

A.L.I does not need to decide whether these beings exist. It can ask why these forms return, what they reveal about fear and desire, and how they shape our imagination of contact.

> LABO question: do we imagine extraterrestrials with bodies because language itself seems to need a body?

94 - The Ummites: Letters, Language and the Myth of Contact

Keywords: Ummo, Ummites, ufology, language, letters, soncepts, Jean Pollion, archives, contact, A.L.I

Opening image: The Ummites: Letters, Language and the Myth of Contact

Summary

A critical summary of the Ummo affair: Ummite letters, documents, symbols, vocabulary, the soncepts hypothesis and its relevance for extraterrestrial-language research.

Text

Hypothesis: the Ummo affair is important for A.L.I not as proof of extraterrestrial contact, but as one of the richest modern myths about alien language, documents and scientific style.

One of the 1967 San José de Valderas photographs incorporated into the Ummo dossier. It should be read as a historical component of the narrative and its fabrication, not as extraterrestrial evidence. Unknown author, 1967 archive, Wikimedia Commons (guez.org/ali/839).

Summary of the Affair

Beginning in the 1960s, letters attributed to beings from the planet Ummo circulated in Spain and France. They described society, physics, biology, technology and philosophy with a mixture of technical vocabulary, diagrams and invented terminology.

The Power of the Documents

The letters are fascinating because they imitate scientific documentation. They do not only say “we are aliens”. They build an archive: symbols, classifications, pseudo-technical explanations, cosmology and social organization.

A document circulated as an example of “Ummo language.” Its fragile provenance is part of the issue: scholarly-looking form can create the impression of a system before verification. Archive reproduced under CC0, Wikimedia Commons (guez.org/ali/840).

Language Elements

The Ummo corpus includes recurring terms, symbols and claims about concepts that would not map neatly onto human words. Jean Pollion’s “soncepts” hypothesis proposes that Ummite language may encode conceptual units rather than ordinary phonetic words.

Whether one accepts this or not, it is interesting for A.L.I because it asks a crucial question: what if an alien language is not a list of words, but a system for compressing ideas?

Symbols and Design

The famous Ummo symbol and the visual style of the letters show how contact myths become graphic systems. A sign, repeated across documents, begins to function like a logo, proof mark or ritual seal.

Critical Reading

The Ummo affair is widely considered a hoax or complex cultural construction. A critical approach separates belief from usefulness. The documents can still be studied as speculative language design, media phenomenon and collective fiction.

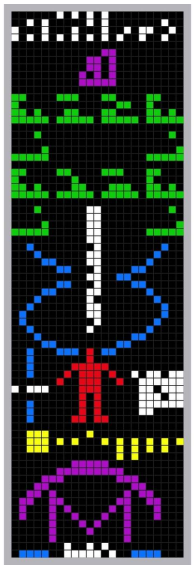
A.L.I Prototype

An installation could present a fictional alien archive: letters, diagrams, sound fragments, vocabulary and translation attempts. Visitors would not be asked to believe; they would be asked to decode the mechanics of belief.

> LABO question: when a language is invented with enough documents, does it begin to produce its own reality?

95 - A New Contemporary Arecibo Message

Keywords: Arecibo, message, crop circle, Chilbolton, SETI, METI, binary, radio, exoplanets, prototype



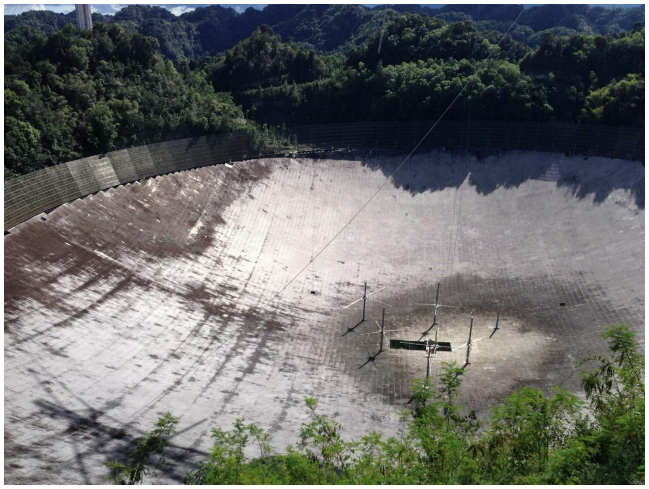
Opening image: A New Contemporary Arecibo Message

Summary

Rethinking the Arecibo message today: binary grid, exoplanets, climate, AI, networks, creation protocol and critical links with crop circles.

Text

Hypothesis: a contemporary Arecibo message should not simply update the data. It should update the method: who writes it, how it is decoded, what risks it acknowledges, and what image of Earth it sends.



The 305-metre reflector embedded in Puerto Rico's landscape: the 1974 message was first an instrumental event produced by a specific architecture, power and direction. Photograph: Karen Pearce / NSF, public domain, Wikimedia Commons (guez.org/ali/846).

The 1974 Message

The original Arecibo message was transmitted in 1974 toward the globular cluster M13. It used binary information arranged into a rectangular grid. The message encoded numbers, chemical elements, DNA, a human figure, population, Solar System and the Arecibo telescope.

What to Keep

The original remains elegant because it begins with structure. A receiver must recognize number, order, image and proportion. This approach is still useful: mathematics and binary grids are among the few tools we can hope to share across worlds.

What to Update

- exoplanet knowledge and planetary diversity;
- Earth's atmosphere and climate change;
- human biological diversity rather than one generic figure;
- digital networks and artificial intelligence;
- more explicit decoding instructions;
- a collaborative authorship process instead of one institutional voice.

Crop Circles and Myth

Some crop-circle narratives, especially around Chilbolton, present images as replies to Arecibo. A critical A.L.I approach does not treat these claims as evidence of contact. It treats them as cultural material: humans imagine extraterrestrial response through fields, pixels and mirrored diagrams.

Above the fixed mirror, the platform and movable dome steer listening and transmission. An abstract binary grid therefore rests on highly concrete monumental mechanics. Photograph: Alessandro Cai, public domain, Wikimedia Commons (guez.org/ali/847).

Prototype

A new message could be created as a public workshop. Participants choose data, convert it into binary, test several grid sizes, print the result as an image, play it as sound, and display it as light. The message becomes readable through multiple media.

data -> binary -> grid -> image -> sound -> radio/light performance

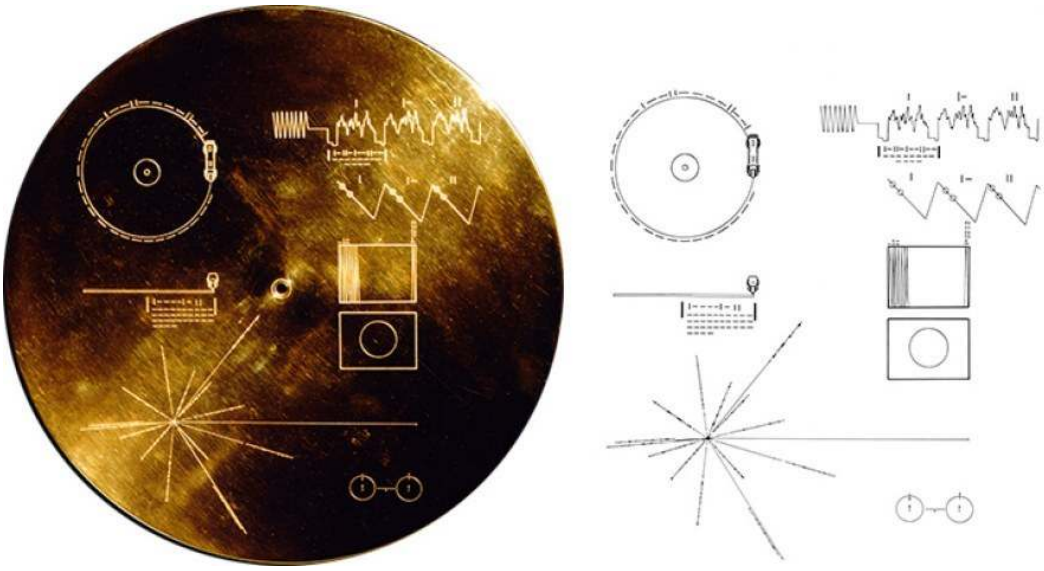
Ethics

METI remains debated. Should humanity actively transmit? Who has the right to speak for Earth? A contemporary Arecibo message must include this debate instead of hiding it behind optimism.

> LABO question: can a message to space be democratic, or is every interstellar message necessarily a fiction of unity?

96 - A Contemporary Golden Record

Keywords: Golden Record, Voyager, archive, space, message, disk, capsule, humanity, NASA, protocol, installation



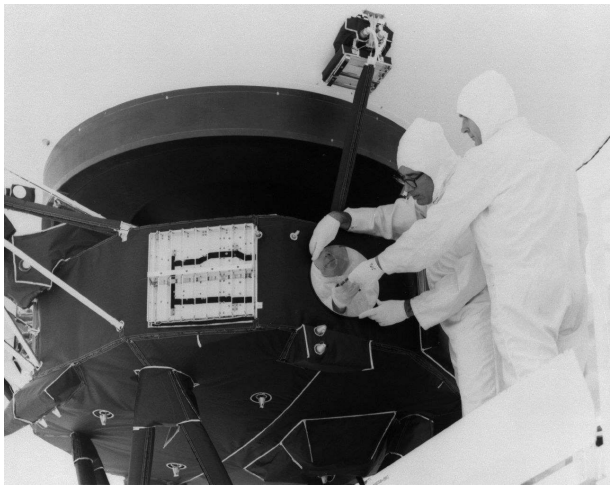
Opening image: A Contemporary Golden Record

Summary

Remaking a disk or message-object for space today: sounds, images, languages, data, instructions, politics of representation and decoding protocol.

Text

Hypothesis: if humanity remade a Voyager-like object today, it would not only be a record. It would be a protocol for representing a plural, networked, damaged, inventive planet.



The record is not merely a symbol: in 1977 it had to be physically mounted on Voyager, protected, and entrusted to material duration without a known recipient. Photograph: NASA/JPL, public domain, Wikimedia Commons (guez.org/ali/852).

The Original Golden Record

The Voyager Golden Record carried images, sounds, greetings, music and scientific diagrams beyond the Solar System. It was both archive and gesture: a way of saying that Earth is here, that it contains life, technology, culture and memory.

What Would Change Today?

A contemporary version would have to confront questions that were less visible in 1977: climate change, digital culture, artificial intelligence, planetary inequality, biodiversity collapse, satellites, networks, migration, surveillance, and the politics of who gets to speak for Earth.

Possible Contents

- sounds of ecosystems, cities, machines and bodies;
- images of landscapes, tools, art, rituals and infrastructures;
- languages and scripts from many communities;
- scientific maps of Earth, DNA, atmosphere and time;
- data about climate, extinctions and human responsibility;
- instructions for decoding the archive without assuming human conventions.

The Golden Record mounted on Voyager's side shows that any interstellar message also depends on its carrier, trajectory and the future readability of its medium. Photograph: NASA, public domain, Wikimedia Commons (guez.org/ali/853).

Object or Signal?

The new Golden Record could be a physical disk, a ceramic plate, engraved metal, DNA storage, optical memory, radio transmission or distributed artwork. The medium matters because it tells the receiver how we imagine durability.

Decoding Protocol

The most important part may be the manual. A message for space must explain its own scale, units, reading order, image format and relation to time. The object must teach the receiver how to become a reader.

Artistic Form

As an A.L.I project, the contemporary record could exist as an installation: visitors choose sounds and images, debate inclusion, encode a fragment, and watch it become a disk, beam, score or archive object.

Critical Question

No archive can represent all of humanity. A good contemporary record should make this limitation visible. It should not pretend to be neutral; it should show its choices, absences and conflicts.

> LABO question: should a message to the cosmos present humanity as it dreams itself, or as it truly behaves?

97 - A Five-Tone Contact Light Organ

Keywords: Close Encounters of the Third Kind, five tones, score, synthesizer, MIDI, light, DMX, NeoPixel, keyboard, A.L.I, instrument

Opening image: A Five-Tone Contact Light Organ

Summary

A free replica of the contact instrument from Close Encounters of the Third Kind: reference photo, score, five tones, keyboard or synthesizer input, light panels.

Text

Hypothesis: the five-note motif from Close Encounters of the Third Kind can become a playable light instrument. The prototype translates music into color, rhythm and possible contact.

Devils Tower, the setting of the film’s final encounter, beneath the Milky Way. The real landscape becomes a terrestrial stage for listening and response. Photograph: Damon Joyce / National Park Service, public domain, Wikimedia Commons (guez.org/ali/856).

Cultural Reference

In Spielberg's film, the encounter is not negotiated through speech. It begins with a short musical phrase answered by lights. The scene is powerful because the interface is public, simple and spectacular: tones, colors, repetition, response.

The Sequence

The famous motif is often described as five tones. For a prototype, the exact musical key can be selectable. The important element is the intervallic gesture: a short call that can be recognized, repeated, transformed and answered.

tone 1 -> tone 2 -> tone 3 -> tone 4 -> tone 5

sound -> color -> light panel -> response

Small Version

A tabletop version can be made with a MIDI keyboard, an Arduino or ESP32, and a strip or matrix of addressable LEDs. Each note triggers a specific color and duration. The five tones can be played by hand or automatically.

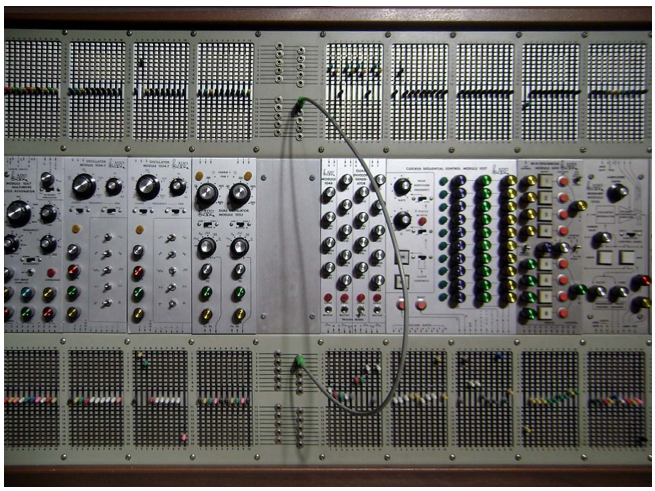
- MIDI keyboard or small synthesizer;
- Arduino, Teensy or ESP32 with MIDI input;
- NeoPixel strip, LED matrix or five illuminated boxes;
- 5V power supply sized for the LEDs;
- laser-cut or 3D-printed case.

Large Version

A stage or outdoor version can use DMX lights, LED bars or large translucent panels. A computer running Ableton Live, TouchDesigner, Max/MSP or Pure Data maps notes to light cues. This version can become a performance: the audience hears a call and sees the light architecture answer.

Difficulty Levels

- No solder: MIDI keyboard + computer + DMX/LED controller. Difficulty: medium.
- Maker version: microcontroller + NeoPixels + MIDI. Difficulty: medium to advanced.
- Large installation: DMX addressing, power distribution, safety and show control. Difficulty: advanced.



The actual ARP 2500 associated with the five-tone scene: its connection matrix turns a short musical sequence into a protocol that can be operated by humans and machines. Photograph: guiltysin, CC BY 2.0, Wikimedia Commons (guez.org/ali/873).

Score and Replay

The full film score is copyrighted, so the project should link to legal sheet-music sources rather than reproduce the score. The prototype can use a five-note motif as a technical demonstration and invite performers to compose new “contact phrases”.

A.L.I Interpretation

The instrument is not only nostalgic. It asks whether a language can be built from synchronized perception: hearing, seeing, waiting, repeating, correcting. Contact begins as a loop.

> LABO question: could a shared rhythm be a stronger first language than a shared vocabulary?

98 - Radio Transcoder: From Text to Waves

Keywords: radio, transcoder, antenna, morse, signal, wave, SDR, LoRa, SETI, METI, prototype, hardware

Opening image: Radio Transcoder: From Text to Waves

Summary

An A.L.I radio device with antenna and transcoder: diagrams, difficulty levels, equipment to buy and programming paths for transforming text into waves.

Text

Hypothesis: an A.L.I radio station can turn a written message into an electromagnetic event. The object is both instrument and metaphor: type a sentence, encode it, transmit it, receive it, decode it.

Basic Principle

The system has four parts: input text, transcoder, transmitter and receiver. The transcoder converts letters into a signal form such as Morse, binary audio tones, FSK, packet radio, LoRa frames or visible waterfall patterns for SDR software.

text -> encoding -> modulation -> antenna -> receiver -> decoding -> text

No-Solder Version

The simplest version uses a computer and an SDR receiver. A web page or Python script converts text into Morse audio. The sound is played through speakers, recorded by a microphone, or displayed as a spectrogram. With an RTL-SDR USB dongle, one can also explore real radio reception without transmitting.

- RTL-SDR USB receiver;
- SDR++ or Gqrx software;
- computer audio output;
- Morse encoder/decoder script;

- printed or 3D-made “antenna” sculpture for the installation.

Low-Power Radio Version

A more concrete prototype uses LoRa modules or microcontrollers with radio shields. The text is typed into a small interface, encoded, sent to another module and displayed on a screen. This is not deep-space radio, but it teaches the structure of signal transmission.

- two LilyGO LoRa32, Heltec WiFi LoRa 32 or similar ESP32 LoRa boards;
- USB power banks;
- small OLED screens;
- simple antennas adapted to the legal frequency band;
- Arduino or PlatformIO code.

With Soldering

A soldered version can add a physical telegraph key, audio jack, amplifier, LEDs, speaker, rotary selector and a custom enclosure. A directional antenna can become part of the visual language of the piece.

Programming

The software can remain modest: a Morse table, timing rules, serial input, radio send function and a decoder. The next step is to support several encodings and show how the same sentence changes when written as Morse, binary, hexadecimal, tone sequence or radio packet.

An analogue amateur radio station and its antenna mast: once a prototype leaves the cable or closed test bench, language becomes a situated transmission governed by frequencies, power limits and regulations. Photograph: Thue, Wikimedia Commons (guez.org/ali/884), CC BY-SA 3.0.

Important Limits

Real radio transmission is regulated. Frequencies, power levels and antennas must respect local law. For exhibitions, it is often safer to use low-power legal modules, cabled RF demos, audio simulation or receive-only SDR.

A.L.I Use

The object could be presented as a small “message forge”: the visitor writes a sentence, chooses an encoding, and watches it become pulse, sound, light and radio trace. The message becomes less like speech and more like physics.

LABO question: when a text becomes a wave, what part of language remains human?

99 - An Augmented Drake Equation for the Exoplanet Era

Keywords: Drake, exoplanets, SETI, astrobiology, biosignatures, habitability, JWST, Arecibo, hypotheses

Opening image: An Augmented Drake Equation for the Exoplanet Era

Summary

Rereading the Drake equation in the age of exoplanets: atmospheres, habitable zones, stellar stability, ambiguous biosignatures and detectability.

Text

Hypothesis: the Drake equation can be reread today as a research interface rather than a formula that gives one answer. Exoplanet science has transformed several of its terms and introduced new uncertainties.

The Original Logic

Frank Drake proposed the equation in 1961 as a way to organize the unknowns behind the search for communicating civilizations. It links star formation, planets, habitable worlds, life, intelligence, technology and the lifetime of detectable civilizations.

$N = R^* \times fp \times ne \times fl \times fi \times fc \times L$

Its power is not numerical certainty. Its power is methodological: it forces us to say where our optimism or skepticism is located.

What Exoplanets Changed

When the equation was proposed, planets outside the Solar System were hypothetical. Today thousands of exoplanets are confirmed. This changes the first planetary terms dramatically. We now know planets are common, small rocky planets exist, and habitable-zone candidates are not science fiction.

But abundance does not equal habitability. A planet can be in the right orbital zone and still

be hostile because of atmosphere loss, stellar flares, tidal locking, unstable climate, lack of water or geological inactivity.

New Terms to Add

- Atmospheric stability: does the planet keep a useful atmosphere over billions of years?
- Stellar behavior: does its star permit long biological timescales?
- Planetary history: does the world maintain oceans, chemistry and energy gradients?
- Biosignature ambiguity: can oxygen, methane or other markers be produced without life?
- Technosignature detectability: does a civilization emit something observable from Earth?

From Biosignatures to Technosignatures

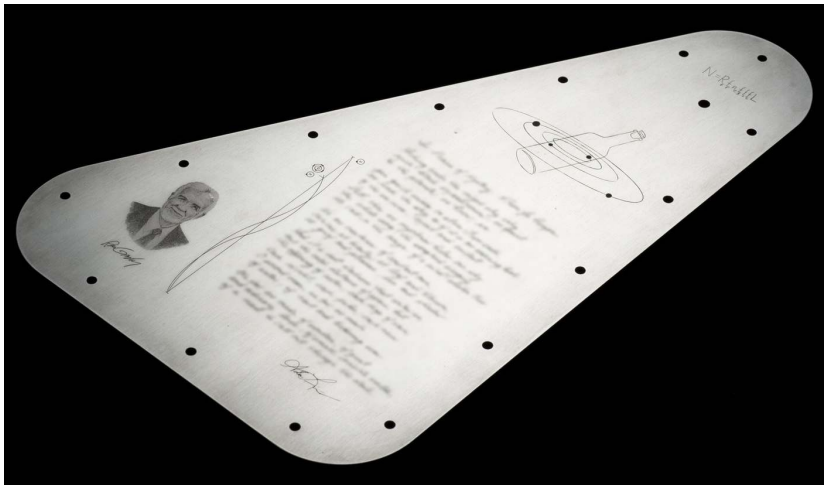
Modern astrobiology looks for atmospheric signs of life, but SETI and METI ask a different question: can intelligence produce a signal, structure, waste heat, optical pulse, radio pattern or artifact that another intelligence could recognize?

A.L.I is interested in the transition from life to readability. A planet may host life without producing language. A civilization may have language without broadcasting. A technological culture may become quiet, fiber-optic, encrypted, brief or deliberately silent.

An Augmented Equation

Nreadable = planets × habitability × life × cognition × technology × intention × detectability × duration

This version is not meant to replace Drake. It highlights the path from existence to contact. The key term for A.L.I is not only intelligence, but readability: the chance that one world makes something another world can notice, decode and trust.



The Drake equation engraved on Europa Clipper's vault plate: conceived as a discussion tool, it has also become a physical artifact travelling toward an ocean world. Photograph: NASA/JPL-Caltech/Ryan Lannom, Wikimedia Commons (guez.org/ali/886), public domain.

Design Consequences

If we use the equation as a design tool, each term becomes an artwork or prototype: maps of possible worlds, atmospheric libraries, signal filters, speculative alphabets, messages that explain themselves, and archives that survive technological change.

LABO question: should an interstellar language begin with a number, a planet, a molecule, a story

or a proof of intention?

100 - Morse Contact Finger

Keywords: interface, bluetooth, morse, NFC, finger cot, ring, thimble, glove, haptic, prototype, language, installation

Opening image: Morse Contact Finger

Summary

A luminous Morse finger to build from an LED ring, a thimble, a glove or a claw: from hacked toy to two Bluetooth fingers capable of talking to each other.

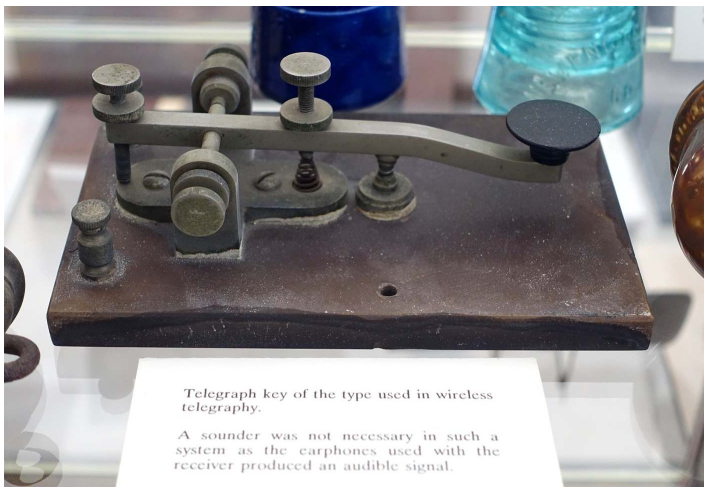
Text

Hypothesis: the raised finger can become a tiny communication terminal. Instead of imagining a large device, the project begins with a very small gesture: light, touch, pulse and code at the fingertip.

Starting Point

The first image is deliberately simple: a finger that glows like a signal. It could be a toy-like object, a thimble, a ring, a plastic fingertip, a glove extension or a small wearable shell. The object does not need to imitate cinema literally; it can translate the fantasy of contact into a usable interface.

The most realistic first prototype is not a full Bluetooth translator. It is a luminous Morse finger: press a button, and the fingertip emits dots and dashes with an LED. This version can be built cheaply, tested quickly, and used as an installation object.



A wireless telegraph key preserved at the Bennington Museum: before becoming light or touch, Morse is already a language of the finger, duration and silence. Photograph: Daderot, Wikimedia Commons (guez.org/ali/891), CC0.

Minimal Version: Light Morse

- a finger ring or thimble-like shell;
- one bright LED or addressable RGB LED;
- one push button;
- a tiny battery;
- a small microcontroller, or a very simple pre-programmed blinking circuit.

The user presses once for a dot, holds longer for a dash, or selects a stored message. The fingertip blinks a greeting, a name, a coordinate, or a short A.L.I message.

Connected Version: Two Fingers Talking

A second stage uses two connected fingers. Each object can send a message to the other via Bluetooth Low Energy. One finger records a spoken sentence or receives typed text from a phone, converts it into Morse, sends the pattern, and the receiving finger decodes it back into text or sound.

- Input: button, phone text field, or voice-to-text.
- Encoding: text transformed into Morse timing.
- Transmission: Bluetooth BLE between two modules or via a phone relay.
- Output: light flashes, vibration, small buzzer, or phone voice synthesis.

Electronics Without Soldering

For a proof of concept, a no-solder path is possible with M5Stack or Adafruit boards using Grove/STEMMA connectors. M5StickC Plus, M5Atom, Seeed XIAO nRF52840 Sense, Adafruit Circuit Playground Bluefruit, or micro:bit can provide buttons, LEDs and BLE with minimal wiring. The trade-off is size: these boards are often too large for a pure fingertip, but acceptable for a glove, wrist module or theatrical prototype.

Rings, Gloves and Thimbles

Commercial LED finger rings already exist as toys. They are cheap, visible and useful for testing gesture and light language, but they are generally not programmable. A thimble or full-finger ring, sometimes called a finger cot, claw ring, articulated finger armor or gothic

finger ring, can become the physical shell for the prototype.

NFC LED nail stickers or NFC LED rings are not a good solution for programmable Morse: the phone can power the LED briefly through NFC, but the LED itself usually has no memory or programmable controller. NFC can trigger an action on the phone, but it cannot easily make the passive LED blink a custom Morse sequence by itself.

Difficulty Levels

- No solder: LED toy or M5/micro:bit board in a glove. Difficulty: easy.
- Light soldering: small LED, button, battery and microcontroller in a finger shell. Difficulty: medium.
- Connected pair: BLE messaging, Morse encoder/decoder, mobile interface. Difficulty: advanced software plus careful miniaturization.

A.L.I Prototype

The most elegant object may be a hybrid: the finger itself only emits light and vibration, while the phone handles text, speech recognition and decoding. The artifact remains magical and tactile, but the complex intelligence stays in software.

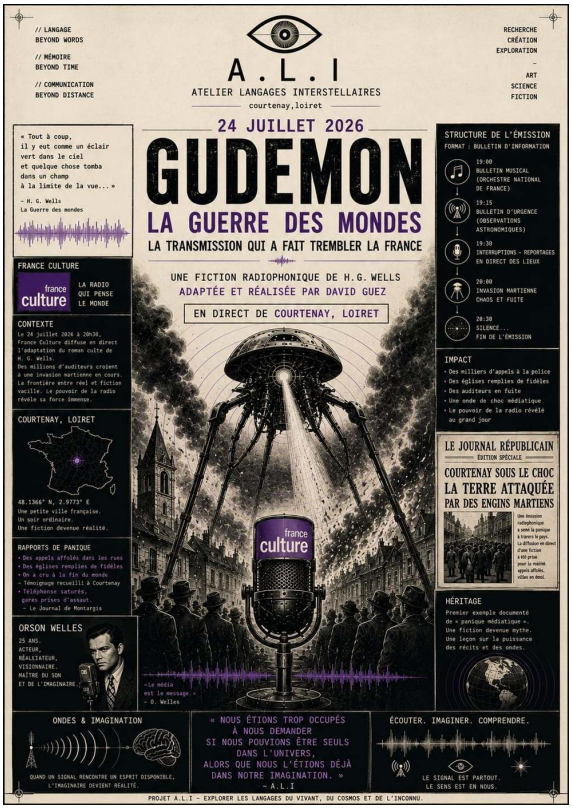
> LABO question: can a finger become a language instrument before it becomes a technological gadget?

Projects / Works

Forms produced by the A.L.I laboratory

A.L.I is not limited to theoretical research. The laboratory produces installations, sound works, software and publishing objects. These projects test, at human scale, the hypotheses developed throughout the book.

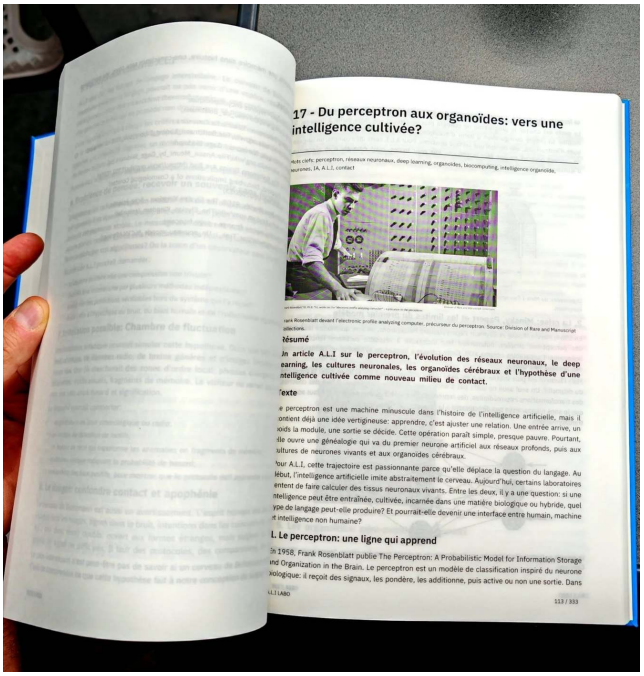
www.guez.org/ali/#projets



GUDEMON poster, A.L.I, Courtenay, 2026.

A.L.I - Opus 1

A printed and indexed state of the laboratory - 2026



17 - Du perceptron aux organoïdes: vers une intelligence cultivée?

Mots clefs: perceptron, réseaux neuronaux, deep learning, organoïdes, biocomputing, intelligence organoïde, neurones, IA, A.L.I, contact

Frank Rosenblatt devant l'electronic profile analyzing computer, précurseur du perceptron. Source: Division of Rare and Manuscript Collections.

Résumé

Un article A.L.I sur le perceptron, l'évolution des réseaux neuronaux, le deep learning, les cultures neuronales, les organoïdes cérébraux et l'hypothèse d'une intelligence cultivée comme nouveau milieu de contact.

Texte

Le perceptron est une machine minuscule dans l'histoire de l'intelligence artificielle, mais il contient déjà une idée vertigineuse: apprendre, c'est ajuster une relation. Une entrée arrive, un poids la module, une sortie se décide. Cette opération paraît simple, presque pauvre. Pourtant, elle ouvre une généalogie qui va du premier neurone artificiel aux réseaux profonds, puis aux cultures de neurones vivants et aux organoïdes cérébraux.

Pour A.L.I, cette trajectoire est passionnante parce qu'elle déplace la question du langage. Au début, l'intelligence artificielle imite abstraitement le cerveau. Aujourd'hui, certains laboratoires tentent de faire calculer des tissus neuronaux vivants. Entre les deux, il y a une question: si une intelligence peut être entraînée, cultivée, incarnée dans une matière biologique ou hybride, quel type de langage peut-elle produire? Et pourrait-elle devenir une interface entre humain, machine et intelligence non humaine?

I. Le perceptron: une ligne qui apprend

En 1958, Frank Rosenblatt publie The Perceptron: A Probabilistic Model for Information Storage and Organization in the Brain. Le perceptron est un modèle de classification inspiré du neurone biologique: il reçoit des signaux, les pondère, les additionne, puis active ou non une sortie. Dans

A.L.I LABO

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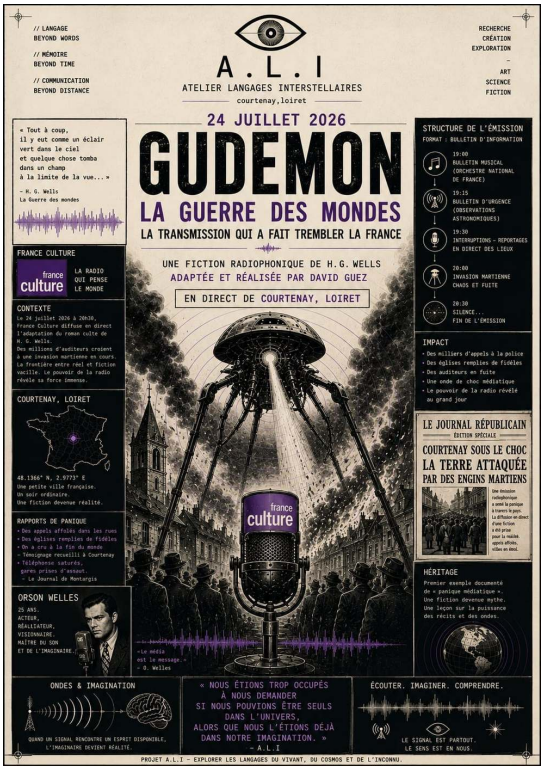
A.L.I - Opus 1, David Guez, 2026.

Opus 1 turns the LABO into a stable reading object without freezing the research itself. Its sequence follows publication order after the opening article, and its concepts, glossary, projects and thematic index make the relations between texts available in another form.

www.guez.org/ali/projets/livre-ali/

GUDEMON

Radio fiction and sound installation - Courtenay, July 2026



Poster and narrative structure of the work.

GUDEMON is a radio fiction and installation created for the La Chambre d'Écho residency at Chalet Twin Peaks. An old radio continuously broadcasts a false emergency programme inspired by H. G. Wells and Orson Welles. The transmission relocates the event to Courtenay and studies the moment when a voice, a jingle, interference and an interruption make fiction feel present.

www.guez.org/ali/projets/gudemon/

The radio as a contact object

The installation uses an old radio broadcasting the work in a loop.

The object is deliberately familiar. It places the extraordinary signal inside a domestic technology historically associated with news, authority and collective listening.

The piece is structured as a gradual contamination of an ordinary broadcast: cultural jingle, astronomical observation, witness reports, communication failures, alien message, then silence.

The loop removes a definitive beginning and ending. Each listener enters the event at a different point and reconstructs the narrative from fragments.

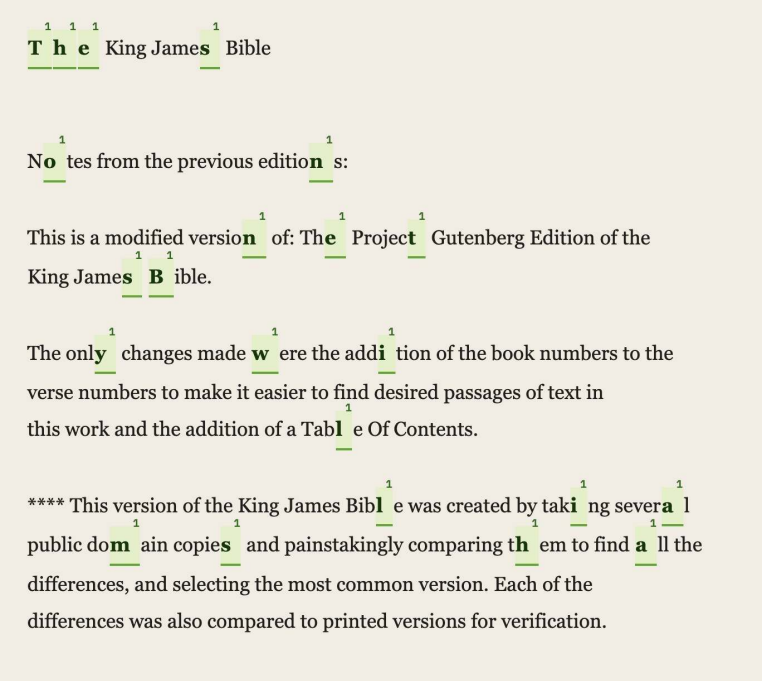
Installation protocol

1. Place a functioning or modified vintage radio in a listening area.
2. Connect a hidden digital player to the radio loudspeaker or auxiliary input.
3. Play the high-quality GUDEMON programme continuously.
4. Keep the volume credible for a live broadcast rather than a theatrical sound system.
5. Allow visitors to arrive during the programme and leave without explanatory mediation.
6. Display the project poster nearby, but not as an immediate warning that the broadcast is fictional.

Materials: vintage radio, digital audio player, concealed amplification, continuous power supply, GUDEMON audio master and printed poster.

Ghostbook Reader

A reading machine for books hidden inside other books

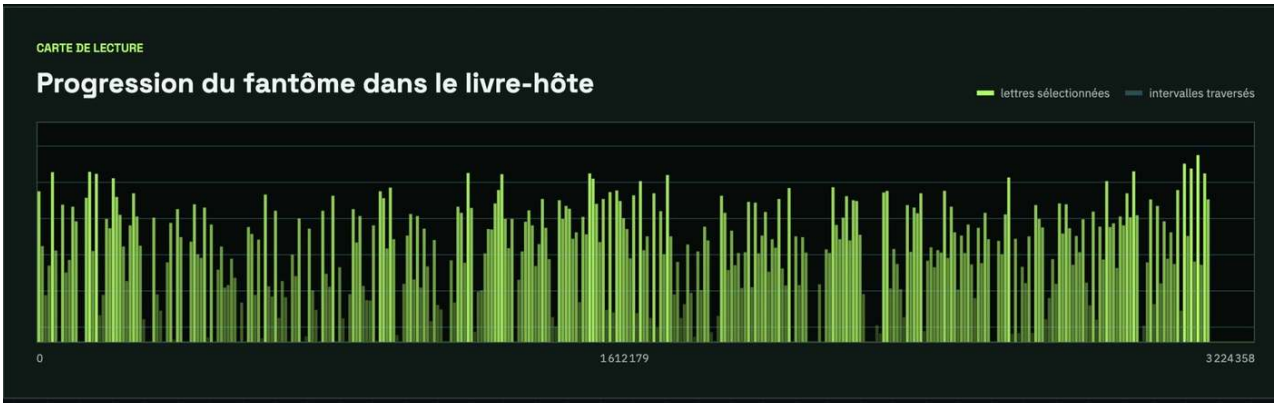


Ghostbook Reader: selected letters reveal a ghost text inside the King James Bible.

Ghostbook Reader tests whether a text can be read as an ordered subsequence inside a host book. The application marks each recovered character, preserves its position and makes the hidden reading inspectable instead of presenting it as a simple coincidence.

www.guez.org/ali/projets/ghostbook/

Reading map



The map records the progression of the recovered ghost text through the host book.

The light bars indicate the letters selected in the host text; the darker intervals show the distance travelled between two selections.

The display makes visible the uneven rhythm of the extraction: dense passages, gaps, returns and stretches of waiting.

The reader can therefore compare the textual result with the material path that produced it.

Glossary

Key notions automatically selected from the articles included in this edition.

A.L.I

Alien Language Interface: an art/science research workshop dedicated to possible forms of interstellar, non-human or post-human contact language.

Active language

A.L.I hypothesis extending performative language toward forms capable of producing observable effects in bodies, institutions, machines or physical environments.

Animal language

Study of vocal, gestural, spatial and social communication systems in non-human animals.

Area 51

United States military site that became a central symbol in UFO culture and government secrecy narratives.

Arecibo message

Radio message sent in 1974 from the Arecibo Observatory, often used as a model for encoding human information into a cosmic signal.

Automatic writing

Writing practice associated with spiritualism and surrealism, where language is produced through altered attention or unconscious flow.

Biosignature

Observable chemical, physical or spectral trace that could indicate the presence of life on another planet.

Boltzmann brain

Hypothetical conscious observer emerging from a random fluctuation in a high-entropy universe.

CETI

Communication with Extraterrestrial Intelligence: field concerned with how messages could be designed, detected or understood.

Chroneme

Minimal or composite temporal unit proposed by A.L.I to encode duration, sequence, expectation, recurrence or temporal viewpoint beyond the grammar of a single language.

Chronotope

Concept associated with Bakhtin describing how time and space are organized together inside narratives.

Collective intelligence

Capacity for cognition, adaptation or decision to emerge from interactions among many organisms, agents or connected systems.

Cosmic microwave background

Oldest observable electromagnetic radiation of the universe, often treated as a fossil image of the early cosmos.

Cosmic web

Large-scale structure of the universe, organized into filaments, clusters and voids.

Crop circle

Geometric pattern appearing in fields, interpreted either as human land art, folklore or speculative communication sign.

Dark forest hypothesis

Fermi paradox scenario in which civilizations remain silent because revealing themselves may be dangerous.

Decoherence

Quantum process through which superposed states cease to interfere at observable scales.

Deep time

Timescale beyond human history, essential for archives, fossils, cosmic signals and delayed reception.

DNA

Molecular carrier of genetic information, often read as a biological code or archive of life.

Drake equation

Probabilistic framework proposed by Frank Drake to estimate the number of communicative civilizations in the galaxy.

Duration

Bergsonian notion of lived time as qualitative continuity rather than measurable succession.

Ecology of reception

Approach that studies how environments, situations and communities transform the reception and interpretation of forms, works and signals.

Ecosophy

Ethical and philosophical approach linking environmental, social and mental ecologies, notably developed by Arne Naess and Felix Guattari.

EME

Earth-Moon-Earth radio practice in which the Moon is used as a passive reflector for signals.

Entropy

Physical measure of disorder or number of possible states, often linked to the arrow of time.

Ethology

Scientific study of animal behavior, including communication, learning, ritualization and social signals.

Exomathematics

Speculative study of mathematical systems or logics that could be developed by non-human intelligences.

Exoplanet

Planet orbiting a star other than the Sun.

Fermi paradox

Tension between the apparent probability of extraterrestrial civilizations and the absence of confirmed contact.

Fractal

Self-similar pattern whose structure repeats across scales, from mathematics to plants, coastlines and speculative signals.

Gaia hypothesis

Theory associated with James Lovelock and Lynn Margulis in which Earth is understood as a self-regulating coupled system.

Golden Record

Analog archive sent aboard the Voyager probes in 1977, containing images, sounds and music intended for possible extraterrestrial recipients.

Heptapod language

Fictional circular language from Arrival, used as a model for non-linear perception of time and meaning.

Inorganic memory

Hypothesis that crystals, rocks and meteorites can preserve physical, chemical or isotopic histories over geological and cosmic timescales.

It from bit

John Wheeler’s hypothesis that physical reality may emerge from information.

It from qubit

Extension of informational physics in which quantum information becomes the deeper substrate of reality.

Many-worlds interpretation

Interpretation of quantum mechanics associated with Hugh Everett, in which possible outcomes correspond to branches of a universal wave function.

Mars

Planet central to astrobiology, past-water research and long cultural histories of imagined Martian life.

Metacognition

Capacity of a mind or system to observe, evaluate and regulate its own cognitive processes.

METI

Messaging Extraterrestrial Intelligence: the deliberate sending of messages toward possible extraterrestrial civilizations.

Morse code

Telegraphic encoding based on short and long pulses, useful as a minimal model of light or radio language.

Multidimensional memory

Speculative A.L.I model in which memory is distributed across temporal layers, frequencies and possible states.

Multiverse

Family of hypotheses in which our observable universe may be only one region, branch or solution among many.

Mycelium

Filamentous fungal network that circulates matter and signals through an environment and offers a model for distributed communication.

Neuralese

Internal representational language or latent code through which artificial intelligences may process meaning before producing human-readable output.

Neutrino

Elementary particle with extremely weak interaction with matter, considered as a speculative carrier for hard-to-detect signals.

Opus 1

The first fixed editorial state of A.L.I: a printed and indexed constellation drawn from the living LABO.

Organoid

Laboratory-grown miniature biological structure that can model some properties of an organ, including neural tissue.

Oumuamua

First confirmed interstellar object observed passing through the Solar System, later surrounded by natural and speculative interpretations.

Panspermia

Hypothesis that life or its precursors may travel between planets or stellar systems.

Perceptron

Early neural network model developed by Frank Rosenblatt, foundational in the history of machine learning.

Performativity

Property of an utterance or symbolic act that does not merely describe reality but contributes to producing a social or institutional effect.

Phoneme

Minimal sound unit capable of distinguishing meaning in a spoken language.

Quantum entanglement

Quantum correlation between systems whose measurement results remain linked even across distance.

Quantum programming

Programming approach based on qubits, superposition, measurement and quantum algorithms.

Rhizome

Concept developed by Deleuze and Guattari to describe non-hierarchical, distributed and proliferating structures.

Ritual

Codified sequence of words, gestures, objects and rhythms whose repetition produces collective, symbolic or bodily effects.

Semiology

Study of signs and meaning systems, from language and image to gesture, myth and media.

SETI

Search for Extraterrestrial Intelligence: scientific programs looking for evidence of technological or communicative extraterrestrial life.

Simulation

Model or computational environment reproducing selected rules of a system, also used philosophically to question whether reality itself could be generated.

Solipsism

Philosophical position in which the existence of anything outside one’s own mind becomes uncertain.

Speech acts

Units of language that perform actions by being uttered, such as promising, naming, ordering or declaring.

Synchronization

Alignment of rhythms, clocks or events that makes communication and coordinated encounter possible.

Technosignature

Observable trace that could indicate technology, such as emissions, structures, artifacts or engineered atmospheres.

Telepathy

Hypothesis or motif of direct mind-to-mind communication, central to many contact and abduction narratives.

Umwelt

Perceptual world specific to an organism, shaped by its senses, body and environment.

X-Files

Television series that shaped contemporary UFO mythology through archives, conspiracies, abductees and government secrecy.

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The index is generated from article keywords and is updated whenever the PDF edition changes.

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