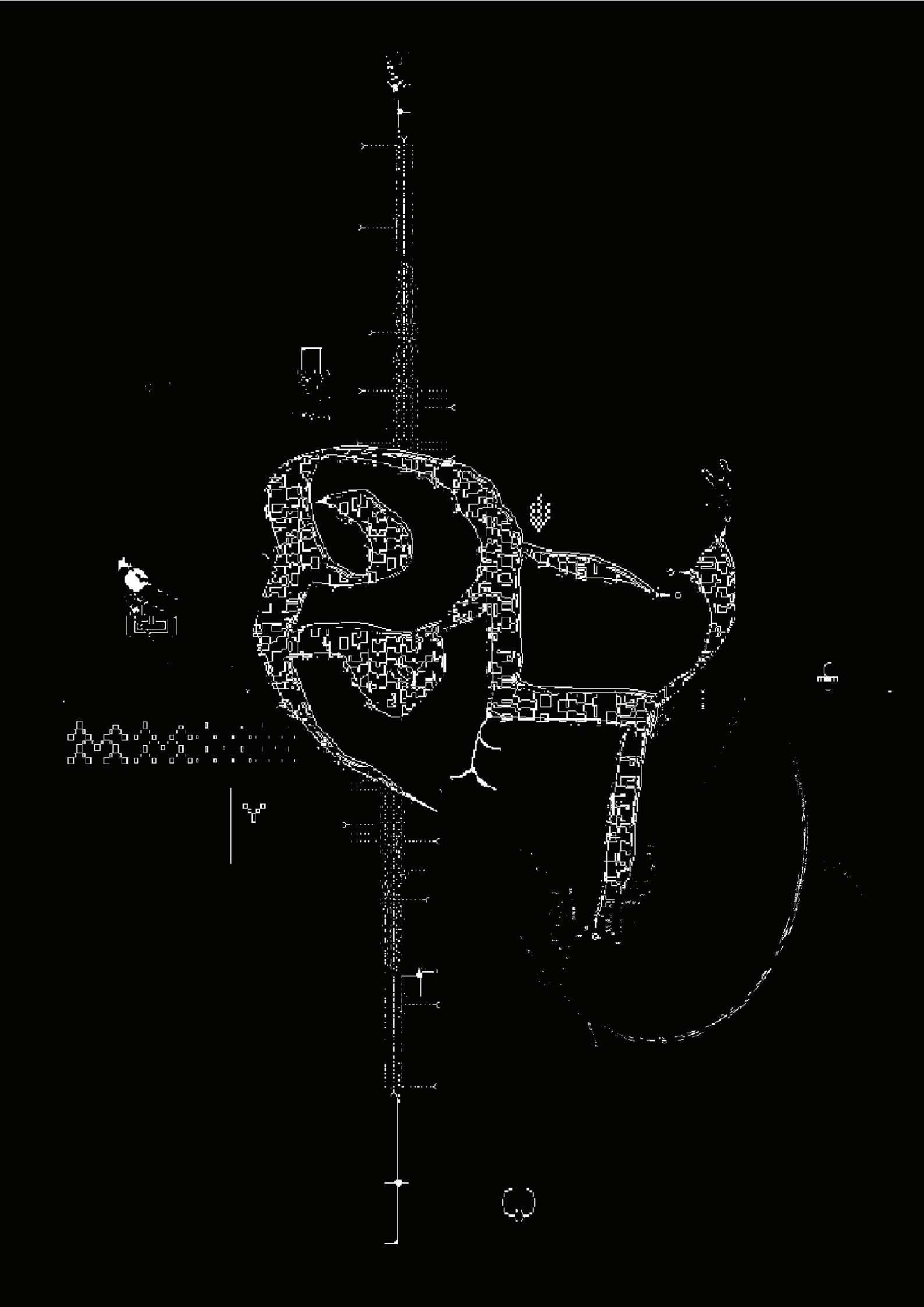

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A Sign in Space is an interdisciplinary project by media artist Daniela de Paulis, in collaboration with the SETI Institute, the European Space Agency, the Green Bank Observatory and INAF, the Istituto Nazionale di Astrofisica.

The project consists in transmitting a simulated extraterrestrial message as part of a live performance, using the Trace Gas Orbiter ESA spacecraft as celestial source. The objective of the project is to involve the world-wide Search for Extraterrestrial Intelligence community, professionals from different fields and the broader public, in the reception, decoding and interpretation of the message.

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A Look Behind the Sign

Chelsea Haramia

A Sign in Space

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1. INTRODUCTION

Imagine that aliens have found us. They appear to have sent us a message. What might it say? And what could this mean — for us and for them?

First, who's "us"? Could that refer to all Earthlings? Or could "us" mean just humans? Perhaps aliens know about the human species and want to communicate with a species that—at least according to many people's beliefs — may be the most intelligent or important species on the planet. But we cannot simply assume that we are the intended recipients.
Aliens might have detected only our planet, and, seeing that it may be life-supporting, decided to send a message to whatever or whoever is here. Or, what if they have somehow closely observed the workings of life on our planet and have decided to attempt communication with some non-human species here instead of us — maybe with whales, or mushrooms, or even a grove of aspen trees? Perhaps we humans are uninteresting to them, or unintelligent according to their understandings of the concept. Or, what if we're imagining this all wrong? Perhaps they developed a new technology and simply sent a signal in all directions just because they could, not knowing whether anyone else is out there at all?

And what of the nature of the alleged message? How it was transmitted and where it came from are surely important. Now we here on Earth know where to look for extraterrestrial others — assuming they sent the signal from their home planet. But did they? Is their home even a planet? Could the message have come from a space-roving robot or an asteroidal outpost? Or, perhaps it came from a rogue planet traveling through the galaxy unattached to any particular star. If the signal didn't come from a home planet or base, it's probably just some stray technology that happened to cross paths with our planet. If it is an intentional attempt to communicate, then that itself is useful to know. Likewise, it would be useful to know if what we're detecting is an unintentional coincidence. How can we tell?

Okay, assuming that it's a message, what does it say? Is it a warning? A distress call? A friendly "hello"? A joke? A work of art? A bit of universal knowledge? *The Encyclopedia Galactica*? The first move in an interplanetary game? The last, desperate plea of a dying species?

And, finally, what does it all mean? I'm not merely asking what the content of the apparent message is. What does confirmation of extraterrestrial life or technology mean for us, for our beliefs, for our future, for our fellow Earthlings — plant, animal, mineral, etc., for our planet, our solar system, our place in the universe?

As far as I know, aliens have not discovered us. At least, expert astronomers have found no confirmed evidence that they have. But we can wonder and imagine. We can consider and analyze. We can receive, believe, deny, debate, collaborate, deviate, cooperate, defect, defy, desire, and more. We have tools to help us through this process: science, philosophy, psychology, theology, history, community, technology, and many others.

And we have art. Art is special. Its value is perhaps ineffable. It isn't necessarily about answers, even though it is often about questions. Since we have so few answers to our questions about aliens, let us instead have art.

This is an art project. A global theatrical performance. Welcome to *A Sign in Space*.

2. SETTING THE STAGE

This is not a real detection. We are not trying to deceive anyone into believing that this is real. Nor do we wish to emulate those who broadcast H.G. Wells' *The War of the Worlds* over the radio in 1938, allegedly accidentally fooling many into believing Earth had been discovered by aliens. We wish to be clear: *the signal is ours*. We are humans. We are not aliens.

But we have imagined the possibility of receiving a signal from aliens. We are far from the first to do so. Aliens and extraterrestrial imaginings have been topics of thought across the globe and across history. For example, Ancient Greeks imagined viewing the Earth from the stars. The Qur'an specifically mentions the prospect of alien others. Science fiction movies, writings, and media often deal in speculations about contact with aliens. And in the academy, scientists, researchers, and others have thought seriously about the reality of a verifiable detection. Of course, many individuals have their own personal ideas, speculations, testimonials, and beliefs regarding the possibilities of extraterrestrial life and their technology.

Some will even assert, here and now, that they personally have confirmation that aliens exist. We members of the project acknowledge that there exist phenomena that science, as we know it, is ill-equipped to measure or verify. Our focus, however, is specifically on *scientific* confirmation of extraterrestrial others. We will leave open the question of whether there is other evidence of aliens and of when such evidence is trustworthy. We maintain, however, that personal testimony is itself a form of evidence that cannot legitimately be automatically dismissed, even though it is not the kind of evidence we are focusing on with this project.

Furthermore, we are not looking to perform any empirical or social scientific research on beliefs about aliens or on the effects of this performance.
Ours is not a data-gathering project. It is an open-ended event, and the audience

has a strong role to play in its interpretation. What individuals and groups do with this message remains to be seen, though we do wish to dispel any misinterpretations about the source of the signal. While we are using real equipment to send a real message, the signal is not really an alien signal. Knowing that important fact, we can proceed.

3. THE PLAYERS

Let's begin here by telling you a bit about ourselves. The Artistic Director of *A Sign in Space* is Daniela de Paulis. Daniela is an Italian artist, licensed radio operator, and member of the International Academy of Astronautics' SETI Permanent Committee who is currently working in The Netherlands. Daniela first conceived of this particular project in late 2019, though the project itself is the result of her ongoing work on the overlap between art and radio technology, which she has been exploring for the past 14 years. What started as a set of small-scale experiments in the field has grown dramatically into this unprecedented, worldwide event.

This global project began with Daniela's undertaking a series of presentations to scientific researchers at various institutions. Then, in August of 2020, Daniela was awarded the Baruch Blumberg Fellowship in Astrobiology, allowing her to develop this project — which she then titled *A Sign in Space* — at the Green Bank Observatory in West Virginia, United States. From that point, Daniela researched crucial technological questions while at the same time laying the foundations for the many collaborations involved in this project.

By July of 2021, she had initiated monthly meetings with individuals who would coalesce into the Advisory Team. These specialists were enlisted to share their vision and advise as the project progressed. She gathered together people whose work focuses on or intersects with space exploration. Many of the researchers who joined the monthly meetings are experts in the field of SETI (the Search for ExtraTerrestrial Intelligence). We began with a small cohort that included an astronomer, an anthropologist, a physicist and lawyer, a couple of philosophers, a neuroscientist, and a historian. It grew a bit over time — another artist joined here, an astrobiologist there, and so on. Daniela even added a poet late in the planning stages. Most of the team members are in academia or are academia-adjacent. Daniela and the project's teams also worked with scientific and industry experts, coordinating and collaborating with the SETI Institute, the

Breakthrough Listen Initiative, and the European Space Agency (ESA) to ensure that this project is both well-supported by the available science and logistically feasible. One of the objectives of the project is to foster collaboration among people with different specialties. Typically, ESA teams would likely not directly collaborate with radio astronomers from Breakthrough Listen or the SETI Institute, yet, through this art project, Daniela has managed to create these special, improbable connections.

In addition to connections across specialties, she has also connected experts across the globe. The project's various team members reside in many different places, and team meetings were necessarily remote. In a typical advisory meeting, a team member would deliver a small presentation to the group, followed by an open-ended discussion. Our talks spanned topics from the artistic to the scientific to the philosophical to the social as we attempted to think through many of the important details and implications of the project. Another purpose of the Advisory Team was to brainstorm ideas for the details of a simulated extraterrestrial message. We sought to properly understand both the levity and the gravity of this kind of endeavor. We also considered larger questions surrounding contact with ETI and thought about the potential for the unification of humanity — not for any direct or functional purpose, but instead for open-ended exploration of how our species is situated in relation to the cosmos, and in relation to other species, to our planet, to one another, and to our future.

A small sampling of our specific discussion topics includes the following: neuroscientific distinctions between information and communication, the meaning of the word 'world', moths who can hear more than any other species (but who cannot hear us), the *Epic of Gilgamesh* and parables of flooding, connection in the absence of communication, SETI themes in the Muslim world, mycelium and mass communication, science fiction influences, common cognitive biases, the Anthropocene, the prospect of sapiezoic eras, the effects of extraterrestrial events on refugees and war-torn regions, and the role of humility in communication and understanding.

Those informal meetings concluded in December of 2022. The team for Outreach and Educational Activities was formed in November 2022, meeting twice a month. That team comprises various experts in SETI science, art, industry, public outreach, and the like. Other teams working on the project include the Scientific Team, the Website Team, and

the Message Team (with some overlap in membership across teams). In December 2022, the Message Team started their weekly meetings — its most important task of course being the careful composition of the message itself. The Scientific Team then ran tests in March of 2023 to ensure the technological feasibility of the performance.

It may be important to know that, as I write this, I am completely unaware of the details of the message itself. I am not on the team that composed it, and I am looking forward not only to finding out what others think about it but also to finding out what I myself think about the message. So, who am I? My name is Chelsea Haramia. I am the author of the article you are reading now and a member of the *A Sign in Space* Advisory Team. I am an American philosopher who is currently living and working abroad, and I'm here to provide some thoughts on the project.

4. INTERMISSION

My first thought is that it is highly important to specify at the outset that the members of *A Sign in Space* are aware that attempting anything at the global-level involves all sorts of hurdles and many potential pitfalls. The specters of bias, privilege, ignorance, exclusion, inaccuracy, and unintentional have harm loomed large in our discussions. They were present from the very first meetings, and their concomitant concerns were raised and evaluated well before the Message Team contrived the message itself. Of course, carrying the potential for hurdles and pitfalls does not automatically render a project worthless. Nonetheless, we understood that this potential should motivate us to proceed as carefully as possible.

While many people might enjoy, be inspired by, or find amusing the performance we are offering, many others might be rightly put off by it or unable to participate due to unfortunately exclusive factors — for example, our choice of English language here, our predominantly Eurocentric backgrounds, or our collaboration with Western scientific institutions built upon settler ideologies. And, at the same time, some people will be bothered or even outraged that we think it is important to acknowledge the privilege and injustice on which virtually all major projects are built, including ours. We believe nonetheless that this privilege is worth acknowledging. We recognize that all ostensibly global projects will be necessarily limited in terms of how well they speak to or for the whole of humanity and our planet, and we recognize that we are speaking in regrettably exclusive ways. Our goal is to promote inclusivity within our means while at the same time acknowledging that full inclusivity is out of reach. But we can hope to close some of the distance. Being closer to an unreachable goal is better than being farther away from it. That a good goal is unreachable does not mean that it is not worth pursuing.

At the same time, there are a couple of important ways in which the members of *A Sign in Space* are not privileged. We are not wealthy, well-connected entrepreneurs. We are a collection of individuals who have demonstrated long-term commitments to the field of

space exploration. We participate not because we share a desire for financial profit or other such motivation. Instead, we participate because Daniela's artistic vision resonates well with our own work and ideas. The large networks and connections needed to execute this project were not simply paid for, rather, they were built, piece by piece, from the ground up, through collaboration and effort. Again, this project is the product of Daniela's long-term work exploring the overlap between artistic and radio technologies, and it took time, receptivity, sensitivity to other fields, and the development of new communities to build the global event on offer here and now. This project is empowered by diversity, interconnection, inventiveness, and a community of contributors who are cautiously hopeful for our planet's future. Though it would be impossible to somehow include everyone on the planet in this project, those who are included in the project are inspired by ideals of unity and genuine improvement for all.

5. THE AUDIENCE

Our audience is humans. Humans' speculations about aliens reliably tell us more about ourselves than they do about aliens themselves. Whatever aliens are and however they exist, we as a scientific species are not in a position to access that information at this time. But we do have access to mountains of information regarding humans, and we are quite interested in ourselves. We often speak with certainty about humanity, or we take assumptions about humanity for granted as if they are certainly true. For example, in the previous sentence, I referred to all humans with the word "humanity," assuming that humans are or can be a single entity. This is an assumption worth analyzing, and there are reasons to reconsider the idea that humanity is a monolithic whole as opposed to a collection of dissimilar groups and individuals. At the same time, it is possible that we could be properly unified, and that there is value in promoting the idea that we can be unified. This is true, in part, because the concept of "humanity" can be — and all too often has been — wielded by bad actors to justify atrocities, as evidenced by the role that dehumanization has played in historical and contemporary instances of oppression and violence. Powerful people's and institutions' perpetuating the myth that certain groups of humans are less-than-human is unfortunately very common. Inciting discussions of extraterrestrial aliens could feel very personal and very threatening to individuals and groups who have been mistreated or excluded because of their deviance from some dominant standard that arises from prejudiced assumptions about who qualifies as human.

But of course, each human being is unique, and each carries the ability to help or to harm. The variability among humans should be recognized as a phenomenon in itself. Notably, not all humans will make good faith efforts to seriously consider the prospect of our being contacted by extraterrestrial life. There are those who may prefer to seize on the sensational to manipulate or denigrate or simply to troll. Some goals are bad, and some people will pursue bad goals. There are also good goals to have and people who aim at them and miss. There are many ways to replicate or reinforce bias, to undermine

legitimate expertise, and to disrupt good-faith efforts to be knowledgeable and understood. There are many reasons to embrace uncertainty and doubt, to accept limitations, and to be cautious about where one places one's trust. And there are also many humans who are capable of generating a remarkable amount of goodness, selflessness, respect, community, and love. At the end of the day, questions about aliens usually bottom out at questions about humans, and there is so much that we don't know, and so few questions we can answer with certainty. There is so much to be afraid of, and, yet, so much to hope for.

With hope and caution, we proceeded with an artistic simulation of something humans have so often discussed — something that reflects directly back to us — and, we hope, something that even allows us to speculate and contemplate in ways that are new and unique.

6. THE THEATRICAL PERFORMANCE

There are many ways we might receive a signal from alien others, including ways that we currently cannot conceive of. Scientists today are looking for what we know is possible while acknowledging that this is only one subset of what might be out there. SETI practitioners across the globe currently use both optical and radio telescopes to scan the cosmos for signs of extraterrestrial technology. As mentioned, our Artistic Director is a licensed radio operator, and she chose to develop a radio signal that can be detected by radio telescopes. These kinds of signals can conceivably travel great distances through interstellar space — indeed, we humans have sent out such signals ourselves, both intentionally and unintentionally.

In fact, certain recent signals are intentional messages sent as a part of the activity known as METI, or Messaging ExtraTerrestrial Intelligence. It may be useful to distinguish our project here from METI projects. METI signals are sent away from Earth in an explicit attempt to alert extraterrestrial others to our presence — a kind of cosmic beacon. Setting aside the controversies surrounding METI, it is important to know that our signal is virtually the opposite of METI signals. With METI, humans are the senders, and aliens are the intended recipients. However, the team at *A Sign in Space* are sending a signal from space to Earth. We humans are the intended recipients, and we are merely imagining an extraterrestrial source of the signal, though of course the true source is here on Earth.

The radio signal from *A Sign in Space* will travel to Earth in a way that mimics what we imagine a radio signal from an extraterrestrial source might do as it travels to Earth. Since we are using a Mars satellite to redirect the signal back to our planet, we must transmit at a specific time of this year (2023) in order to ensure that the two planets are properly aligned. One of the first times at which humans intentionally sent out such a signal was in 1974 to mark major improvements to the now-defunct Arecibo Telescope in Puerto Rico. The signal is known as the “Arecibo Message” and was sent in binary code.

That message attempted to convey certain Earthly facts, including information about our Solar System, our DNA, and some biochemicals of life on Earth. It was not so much a serious attempt at actual communication as it was a symbolic gesture of our upgraded communication capabilities. If you look up an image of the message without knowing these details, you'll likely have difficulty comprehending what it was intended to convey. It was evident to researchers at the time that the message is not easily understood. One of the take-home worries from the Arecibo Message is not only that of comprehension but also of anthropocentric and cultural biases in messaging. SETI practitioners have long been aware that these are major issues that must be addressed in any cosmic communication.

From the very beginning of our project, Daniela and her teams hoped to make some progress addressing these problems. The aim was to create a message that — to the best of our current abilities — avoids anthropocentrism and cultural bias. While it would have been impossible for us to construct a message uninfluenced by any individual or cultural perspectives whatsoever, the goal was to make the content as neutral as possible. There will nonetheless be legitimate questions about the degree of neutrality in the message, and we welcome those critiques as well as all such good-faith responses. One obvious drawback of this article is that it could skew readers' thoughts about the message. At the same time, we feel that it is very important to provide a good background on the intentions, plans, and hopes that went on behind the scenes of this artistic endeavor. This project is a process. We do not presume to have constructed a perfectly impartial message; instead, we have put out into the world an exercise in exploring, creating, recreating, and understanding meaning in that which is constructed, mysterious, and potentially profound.

7. TRANSFORMATIVE EXPERIENCES

The possibility of profound change accompanies many humans' speculations about the discovery of extraterrestrial others. While the details of a confirmed detection are necessarily speculative and mystifying at this time, many people believe that scientific confirmation of aliens — if we ever achieve this — will be significant. Someday, we could make the leap to a new and unprecedented level of understanding about our place in relation to the cosmos. We imagine such a future because we know that this extraterrestrial evidence is the kind of thing that we human beings, with our perceptual abilities, could discover. And the team at *A Sign in Space* are imagining a specific kind of discovery. We are projecting the experience of recognizing a piece of alien technology, and of recognizing the possibility that it's a message.

What would it be like to receive a message from aliens? What would *you*, individually, experience if this were to happen? These are special questions to ask, and this is different from asking questions about the content of the message or the nature of the aliens themselves. It isn't really about the stuff we can point to or what that stuff tells us about outer space. It is instead a human question. Humans are experiencers. What will it be like to be you, a human being, experiencing a piece of potentially communicative technology from elsewhere in space? And will that experience transform us here on Earth? I don't mean will it transform our surroundings in some way — though that is an obviously important question that is often considered — I mean, *will it transform our way of experiencing both ourselves and the world*?

All transformations involve change, but not all changes are transformative. For example, taking off pajamas and putting on work clothes is a kind of change, but it is not particularly transformative. On the other hand, quitting a job to embark on a new career is the kind of change that has the power to be transformative. Transformative experiences will change something that is fundamental, and, as philosopher L.A. Paul maintains, they can make it difficult for us to properly anticipate whom we will become.

They are a departure from what had previously been established, and they signal the arrival of something deeply new. Perhaps there is even more to it than that.

Experiences can give us new knowledge. Transformative experiences, however, can give us new knowledge that changes how we experience being who we are. This can happen to individuals in a number of ways. Having a child, joining a monastery, fighting in a war, moving to a new country, being imprisoned, losing a loved one; all of these events and more can not only give one radically new experiences but can also transform how one experiences being oneself. But such experiences do not change every individual who undergoes a transformation in the exact same way. The specific changes that come with, say, having a child, can vary greatly from person to person, even if each person in question is ultimately transformed by the experience. In the same way, if the discovery of aliens is transformative to many or most individual humans, the experience itself will still vary from person to person. This is something to embrace. And the theatrical performance we offer is an opportunity for you, personally, to feel in an imagined way the impact of a potential discovery — to stop for a moment and consider the possibilities for yourself, your inner world, and the world you share with others.

Perhaps transformative experiences can also happen at the collective level. Imagine an entire community's undergoing a fundamental change, say, a sudden and radical increase in access to political rights, or, less fortunately, an invasion of their land and homes by malicious enemy forces. These things could change not only what those members experience but also how they experience being members of that collective. It's possible we might even be capable of global transformative experiences as members of collective humanity, as some might argue the COVID-19 pandemic has created. And it seems possible that the discovery of extraterrestrial others could foment a collective global transformation, at least under certain circumstances. This is something else we hope our audience will consider.

On the one hand, personally transformative experiences will change not only something fundamental about the person but also how the person experiences being who they are. On the other hand, collectively transformative experiences create change in how members of the collective experience being members of that collective. If the collective in question is humanity itself, then it is clear how a confirmed detection might cause

such a change. Humanity would no longer be a species who is ignorant and wondering. Discovering complex life beyond Earth would give us the experience of confirming something we've long wondered about the cosmos — and it's something big: that we're not alone. This knowledge could change how we experience being humans because it could change how we understand ourselves in relation to the rest of the cosmos. Such an experience would give humans new and unique knowledge. We would experience what it's like to know — not merely to suspect or assume — but to know that there is more out there. We'd have new beliefs, new hopes, new fears, and new questions. If our understanding of how we stand in relation to the cosmos shifts dramatically, what it means to be human could effectively change in light of this new knowledge.

And this change, if it happened, would come from the collection of billions of individual humans experiencing something radically new. It would be, literally and metaphorically, an alien experience. It would involve both direct evidence of another world and an utterly new mental event — your own and others' experience of knowing about the existence of alien others. While we have yet to achieve this scientifically, we are now accessing that possibility through art.

8. ARTISTIC OUTPUT

The output we hope to achieve from this project is primarily the meaning and meanings of it. The audience is therefore crucial. The global response that could arise as people try to interpret the message is one facet of this. It is this possibility — that people may take this opportunity to think and wonder across cultures, and to attempt to do so in non-anthropocentric ways, because they understand that they are thinking beyond the human — that makes space, within the core of this project, for the consideration of the unification of humanity itself. Of course, we cannot simply assume that humanity would unite in such circumstances. But likewise, we cannot and should not assume that humanity is destined to fracture or react in bad character in the face of such a profound discovery. We can imagine that the future after discovery is not already carved out for us precisely because radical transformations offer the possibility of futures about which we cannot make many, if any, justified assumptions here and now. We can hope to find out who we will become, and we can trust that we are capable of changing in exceptional ways. Furthermore, because the focus of this art project is on scientific evidence and scientific processes, this event could provide useful insights for scientists, and that is something for the general public to consider as well. SETI researchers in particular often work from and with speculative scenarios. Because we are staging a plausible scientific event about a speculative scenario, this project also offers the opportunity to think specifically about the important role of science in events the impact of which extends well beyond academia and the sciences.

There are clearly many avenues of thought for the audience to explore or follow, and the many potential interpretations and impacts of the message embedded in this scientific and artistic simulation are all viable paths. The meaning, therefore, is in the method. The audience is not a passive recipient of a predetermined interpretation of the signal. And this is usual rather than unusual. Meaning, while often real, is rarely static. Likewise, the meaning of our message is not set or static. The power that individuals have to shift and shape meaning, and the way that both shared and divergent understandings can

manifest from the same message, are things that we might embrace.

The lack of clear answers can be frustrating for some, but the opportunity to promote curiosity, humility, exploration, honest self-reflection, and outright wonder can help to mitigate that frustration. Even when there are definitive answers, we are often not in a position to know what they are with deep certainty. Trust and interdependence are inescapable attributes of every human's existence, as is vulnerability. The process is part of the goal, and the process we have adopted allows for anyone's expansive imagination to consider what might follow from a truly unique experience. We may share those considerations, and we may also follow those thoughts into past histories and project them into imagined futures. In this way, one may even come to greater realizations about oneself, about ourselves, and about everyone's place in relation to the mysteries that surround us.

ABOUT THE AUTHORS

The Author of this text - Chelsea Haramia

Chelsea Haramia is an Associate Professor of Philosophy at Spring Hill College and a Senior Research Fellow at the University of Bonn, Germany.

She is the author of several articles and book chapters on space ethics and the search for extraterrestrial intelligence, and she is currently conducting research for a collaborative project between the Universities of Bonn and Cambridge titled *Desirable Digitalisation: Rethinking AI for Just and Sustainable Futures*.

The Project Founder & Artistic Director - Daniela de Paulis

Daniela de Paulis is a former contemporary dancer and a media artist exhibiting internationally. She is also a member of the IAA SETI (Search for Extraterrestrial Intelligence) Permanent Committee and a licensed radio operator. Her artistic practice is informed by Space in its widest meaning. Since 2009 she has been implementing radio technologies and philosophies in her art projects.

She is currently Artist in Residence at the SETI Institute and Artist in Residence at the Green Bank Observatory in West Virginia, with the support of the Baruch Blumberg Fellowship in Astrobiology.

In 2009 she developed the Visual Moonbounce technology, in collaboration with international radio operators, and over the past fourteen years she has been creating a series of innovative projects combining radio technologies with live performance art and neuroscience. In addition to her artistic practice, she has published her work with the Leonardo MIT Journal, Routledge, Springer, Oxford University Press, Cambridge University Press and RIXC.

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