

# Preparing for alien life

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There may be a trillion planets in our galaxy, the Milky Way, one-fifth of which may be Earth-like. Credit: Serge Brunier

*At a recent event sponsored by NASA and the Library of Congress, a group of scientists and scholars explored how we might prepare for the inevitable discovery of life beyond Earth.*

In 1960, the astronomer Francis Drake pointed a radio telescope located in Green Bank, West Virginia, toward two Sun-like stars 11 light years away. His hope: to pick up a signal that would prove [intelligent life](#)

might be out there. Fifty years have gone by since [Drake's pioneering SETI experiment](#), and we've yet to hear from the aliens.

But thanks to a host of discoveries, the idea that life might exist beyond Earth now seems more plausible than ever. For one, we've learned that life can thrive in the most extreme environments here on Earth—from deep-sea methane seep and Antarctic sea ice to acidic rivers and our driest deserts.

We've also found that liquid water isn't unique to our planet. Saturn's moon Enceladus and Jupiter's moons Ganymede and Europa harbor large oceans beneath their icy surfaces. Even Saturn's largest moon, Titan, could spawn some kind of life in its lakes and rivers of methane-ethane.

And then there's the discovery of exoplanets, with more than 1800 alien worlds beyond our Solar System identified so far. In fact, astronomers estimate there may be a trillion planets in our galaxy alone, one-fifth of which may be Earth-like. As Carl Sagan famously said: "The Universe is a pretty big place. If it's just us, seems like an awful waste of space."

Now some scientists believe the hunt for life beyond Earth may well pay off in our lifetimes. "There have been 10,000 generations of humans before us. Ours could be the first to know," said SETI astronomer Seth Shostak.

But what happens once we do? How would we handle the discovery? And what would be its impact on society?

This was the focus of a conference organized last September by the NASA Astrobiology Institute and the Library of Congress. For two days, a group of scientists, historians, philosophers and theologians from around the world explored how we might prepare for the inevitable discovery of life—microbial or intelligent—elsewhere in our Universe.

The symposium was hosted by Steven J. Dick, the second annual Chair in Astrobiology at the Library of Congress. The video presentations can be viewed [here](#).

## **"Three Horse Races"**

Of course, the impact of discovery will depend on the specific scenario. In a talk titled "Current Approaches to Finding Life Beyond Earth, and What Happens If We Do," Shostak described three ways—or three "horse races"—for finding life in space.

First, we could find it nearby, in our Solar System. NASA's Curiosity Rover is currently surveying the Martian surface for signs of past or present life. And Europa Clipper, a mission to Jupiter's icy moon, is now under consideration.

Second, we could "sniff it out" of the atmosphere of an exoplanet, using telescopes to look for gases such as methane and oxygen that might hint at a biosphere. The James Webb Space Telescope, to be launched in 2018, will be able to carry out that kind of work.



This artist's concept illustrates the idea that rocky, terrestrial worlds like the inner planets in our Solar System may be plentiful, and diverse, in the Universe.  
Credit: NASA/JPL–Caltech

And of course we can pursue the kind of SETI work pioneered by Frank Drake, and keep listening for radio signals among the stars.

Finding life in our Solar System, which likely would be microbial, might not have as great an impact as hearing from an intelligent civilization far away. We'd have to worry about issues like contamination. We might also discover some alternative biochemistry, perhaps uncovering new insights about the nature of life. But that kind of discovery wouldn't affect us as much as the prospect of communicating with intelligent life.

Then again it'd take hundreds, if not thousands of years for a signal to travel back and forth, Shostak pointed out. So that third scenario would only teach us a very few things right away, such as their location or what kind of star they orbit.

However, picking a signal might have other tantalizing implications about the nature of alien intelligence.

## **Alien Minds & Artificial Intelligence**

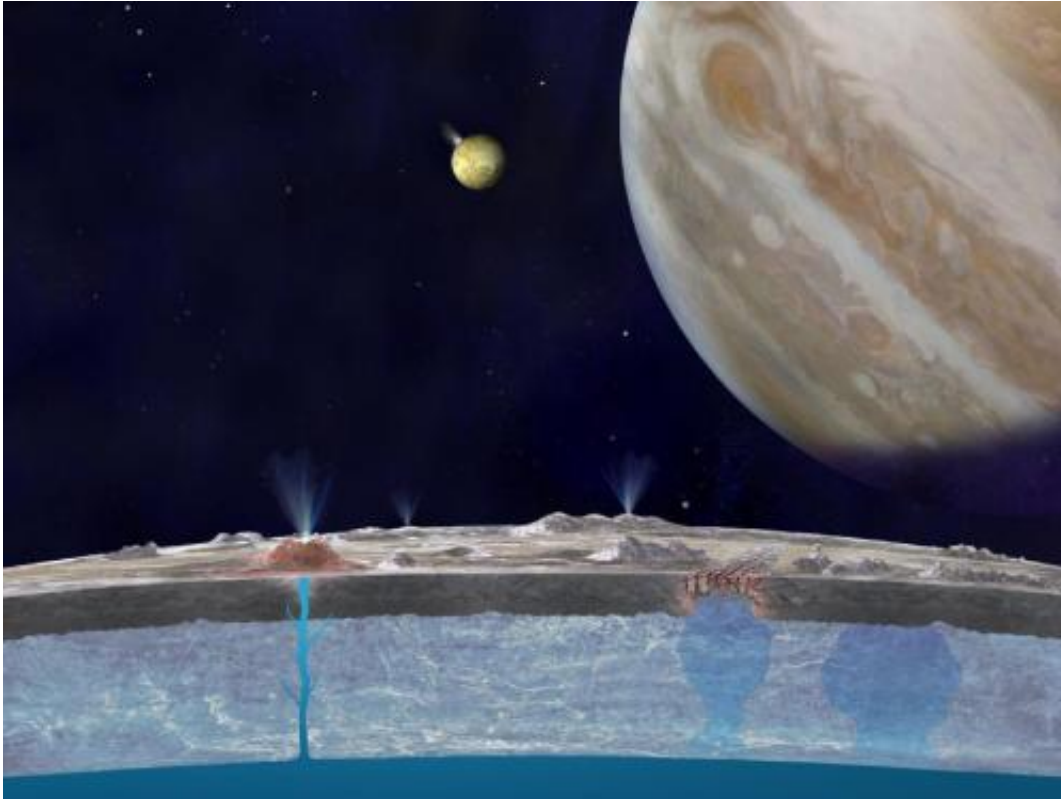
Several researchers, including Shostak, put forward the following premise: "That once a society creates the technology that could put them in touch with the cosmos, they are only a few hundred years away from changing their paradigm from biology to artificial intelligence."

The idea is based on the so-called "time scale argument" or "short window observation." Many researchers predict we'll have developed a strong artificial intelligence by 2050 here on Earth—about a hundred years after the invention of computers, or a hundred and fifty years after the invention of radio communication.

"The point is that, going from inventing radios to inventing thinking machines is very short—a few centuries at most," Shostak said. "The dominant intelligence in the cosmos may well be non-biological."

In a talk titled "Alien Minds," Susan Schneider, a philosophy professor at the University of Connecticut, explored that idea further. The concept of "whole brain emulation" is becoming increasingly popular among certain researchers, she explained. So are other far-fetched sounding ideas like "mind uploading" and "immortality." So, to her, a civilization capable of radio communication would likely be "super-intelligent" by the time we hear from them.

She also argued that alien super-intelligence would be conscious in principle, since the neural code is akin to a computational code, and thoughts could well be embedded in a silicon-based substrate. A silicon-based intelligence would also have tremendous implications for long distance space travel.



This illustration of Europa (foreground), Jupiter (right) and Io (middle) is an artist's concept. Credit: NASA/JPL-Caltech

But again, a recurring theme throughout the conference was to be aware of our anthropocentric tendencies. There's been a huge gap between microbial life and intelligent life on Earth, and even intelligent life has even evolved on a spectrum.

Lori Marino, a neuroscientist and current director of the Kimela Center for Animal Advocacy, argued as such in a talk titled "The Landscape of Intelligence." We have a lot to learn from other intelligent beings here on Earth (such as dolphins) before even thinking about communicating with aliens.

## **Philosophical Impact**

Ultimately, the greatest implications might be philosophical. Whether it turns out to be microbial, complex or intelligent, finding life elsewhere will raise intriguing questions about our place in the cosmos.

A couple of presentations, by theologian Robin Lovin and Vatican astronomer Guy Consolmagno, even addressed the potential impact on the world's religions.



According to the “short window observation” idea, a civilization capable of radio communication would likely have developed artificial intelligence by the time we hear from them.

But what if we don't find anything soon, or even at all?

The search itself can give us a sense of direction, and help us forge a planetary identity, argued the philosopher Clement Vidal in a talk titled "Silent Impact." And if we're truly alone, then we should start taking better care of life here on Earth, and contemplate our duty of colonization, he added.

In the meantime, astrobiology can help narrow the gap between the



sciences and humanities, as many presenters emphasized. And it can be a step toward integrating our knowledge across a wide range of disciplines.



The search itself can help us forge a planetary identity, said philosopher Clement Vidal. Credit: NASA

So, how do we prepare for something we know so little about? We do so "by continuing to do good science, but also by realizing that science is not metaphysically neutral," concluded the conference host Steven Dick.

He added: "We prepare by continuing to question our assumptions about the nature of [life](#) and intelligence."

*This story is republished courtesy of NASA's Astrobiology Magazine. Explore the Earth and beyond at [www.astrobio.net](http://www.astrobio.net) .*

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