

E.T.s may be headed toward Earth, but are we ready for them?

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Distance may be our biggest challenge when it comes to communicating with other intelligent civilizations. The closest star is over 12 light years away, which means messages planets hosting life could take decades to exchange. Credit: Fatinha Ramos for USC Dornsife Magazine

Twenty years from now we might get a call from aliens. In 2017, a

powerful radio transmission was aimed at exoplanet GJ 273b, thought to be able to support life. Its message, sent by the alien-hunting group Messaging Extraterrestrial Intelligence International, contained instructions on how to understand Earthling math, music and time. If it lands on intelligent alien ears once it arrives in about a decade, E.T. now has our number.

Of course, a cosmic call might come much sooner. Space transmissions hoping to attract an alien response have been going out since 1962, when Soviet scientists sent a message in Morse code to the planet Venus in the first attempt at interplanetary communication.

Even if our calls generate no response, it seems increasingly likely humanity will stumble upon life somewhere in the universe one of these days. NASA's James Webb Space Telescope, the most powerful telescope ever sent into the cosmos, is scheduled to launch this winter and will enable scientists to examine thousands of distant planets for "biosignatures"—clues that a planet's atmosphere has been influenced by life.

Concerns over decades of unidentified aerial phenomena (UAP)—known more commonly as unidentified flying objects (UFOs)—in our atmosphere, many sighted by military personnel, have recently prompted politicians on both sides of the aisle to push for an official agency to handle UAP investigations.

But are we prepared for an encounter of the "Third Kind"?

The prospect of meeting another civilization raises questions both captivating and concerning. How do we even communicate with an alien species, especially one that may not use language in a form we can recognize and decipher? Will a meeting prompt mass hysteria? And what about strange alien diseases? And how might it affect our views about

religion? USC Dornsife scholars weigh in on what to expect when we first meet extraterrestrials.

Across the universe

Humans eager to make friends in other [star systems](#) might be disappointed to learn that any developing relationship will likely resemble a phenomenally slow pen pal correspondence, rather than one conducted at the speed of text or email—never mind light. There's considerable distance between us and, for instance, GJ 273b: 12.36 light-years to be precise.

At that distance, it will take a dozen years for our message to arrive and then another dozen for us to receive the return message. It would be 2041, at the earliest, by the time we get a reply.

And, GJ 273b is one of the closer exoplanets (a planet that orbits a star other than the sun). There are only 12 stars within 10 years of Earth around which exoplanets could circle. That means any exchange of information would take place across at least 20 years and more likely many decades.

Although we typically associate aliens with the acceleration of technology, an actual encounter could, counterintuitively, serve to slow our pace of modern communication—and that could be to our benefit, according to University Professor Emeritus and Professor Emeritus of Computer Science, Biomedical Engineering, Electrical Engineering, Biological Sciences and Psychology Michael Arbib.

In his 1979 paper, "[Minds and Millennia: The Psychology of Interstellar Communication](#)," Arbib wrote "... the leisurely pace of interstellar communication gives us time to assimilate the messages that we receive ... it will require the wisdom of many humans to transform the

interstellar message into prescriptions for courses of action."

Curiosity will clearly need to be tempered with caution: Alien civilizations may view us as a resource to conquer—or a food supply—rather than an ally.

"One issue will be whether we even want to communicate and give away our location without first ascertaining their culture," says Vahé Perroomian, professor (teaching) of physics and astronomy.

Richard Jones, lecturer of English as a second language at the USC American Language Institute, has extensive experience in teaching people from very different cultures and linguistic backgrounds how to overcome the obstacles to effective communication. Drawing on that expertise, he has some suggestions on how to best communicate with aliens.

Our radio messages are a good first step at contact and—very importantly—would hopefully allay predation, he argues.

"Transmissions that include mathematical data and music are an excellent idea," he says. "Alien life that lies within our conception of 'intelligence' would hopefully be able to understand the relationships contained here, and that these messages come from another intelligent species."

Lost and found in translation

Once contact was established, the next challenge would lie in making good conversation. Jones has a few suggestions for how to begin.

"'Human' and 'be' would be the first words I would suggest learning how to express," he says. "Then in turn, we could try to learn how they refer

to themselves and how they express that they exist—how would they convey the equivalent of the English sentence: "I am human."

Ideally, says Jones, if extraterrestrials are able to travel to us, we would do some sort of exchange program where they could observe us and we could observe them in their daily life. "On the basis of this mutual observation, we might be able to construct a number of ideas about what type of words to teach and learn," he says.

For an example of how an in-person encounter between an alien and a linguist would likely go down, readers could try watching the movie *Arrival*, says Zuzanna Fuchs, assistant professor of linguistics. The 2016 sci-fi thriller follows linguistics professor Louise Banks as she attempts to communicate with extraterrestrials, using a whiteboard to write messages to squid-like aliens floating in tanks.

However, Earthling linguistics may be limited in its relevance. "Many of the tricks and patterns we usually use to help us quickly build our knowledge of a new language in linguistic fieldwork are based on our general understanding of how [human languages](#) typically work. The twist is that these patterns would probably be inapplicable to alien language," says Fuchs.

There is also the possibility that aliens may communicate in other vastly different ways from humans, rendering spoken language less helpful.

"It might be possible that alien life forms transmit thoughts via touch or other non-verbal means," Jones says. "Communication between insects—such as the dancing of bees—is sometimes described as language." In that case, first contact might call for a collaboration between a linguist and an entomologist.

Intergalactic germs?

Face-to-face meetings with another species may inspire dreams of intergalactic knowledge sharing—but also nightmares of intergalactic germ sharing. Our own history warns us about the consequences of encounters between isolated civilizations.

When Europeans reached the Americas and first made contact with indigenous communities, they brought with them smallpox, measles and other diseases to which Native Americans had no natural immunity. An estimated [90% of the original inhabitants of North America died](#) from devastating outbreaks of these illnesses.

Of course, any risk of infection from [outer space](#) depends on whether alien germs contain even remotely similar molecules to our own. So far, scientists think it's likely there is some shared chemistry between life on Earth and life out in the galaxy. Amino acids and peptides, our familiar precursors to life, have been found on asteroids. Many planets host water, which is where scientists believe life first began on Earth.

In fact, the more immediate risk might lie not in what space brings to humans, but in what we take with us from Earth as we venture into space—and then bring back home later in a changed form.

"Every time we go into space, we bring microorganisms with us. Many of them are highly adaptable, like bacteria, and are some of the oldest organisms to survive on Earth," says Raffaella Ghittoni, associate professor (teaching) of biology. "These microorganisms could change and adapt in space to things like radiation and then, through another space mission, could return with those changes and become more virulent or more infectious."

Can Klingons take communion?

When, or if, we encounter aliens we can probably expect a profound reassessment of religious faith. A 2021 study from the Pew Research Center found that highly religious adults are much more skeptical about the possibility of extraterrestrial life compared with those who are less religious. An alien encounter could throw long-cherished beliefs into question—or appear to confirm them.

Events like solar eclipses are already interpreted by some evangelical Christians as signs of the coming "rapture," a biblical prediction of fiery end times. The landing of a UFO would likely accelerate such apocryphal fears.

However, belief that extraterrestrials signal the end of the world would hopefully be the position of a small minority within religious groups, says the Rev. Dorian Llywelyn, president of the Institute for Advanced Catholic Studies at USC Dornsife. There's wiggle room for the existence of extraterrestrials in many religious texts, after all. Judaism's Talmud describes God traveling among 18,000 worlds. Both Buddhism and Hinduism hint at the existence of other, populated celestial realms.

Alien arrival is actually more likely to trigger debate than terror among the faithful, says Llywelyn. Catholics, for example, may find that figuring out how to fit Klingons into Christianity adds a new level to a centuries-long theological discussion around who and what can be "saved": only Christians, only humans or the entire physical world—including, presumably, Klingons.

A valuable lesson

Proof of life beyond planet Earth is sure to restructure our own sense of self and our place in the cosmos. In that moment, spiritual faith may actually work well alongside scientific inquiry, as a guide for making sense of something we don't yet understand.

Whether the life we encounter is a race of galaxy-hopping star people or a small microbe inching across the surface of an exoplanet, it will all require profound self-reflection by us Earthlings. That's a good thing, says Perroomian.

"For millennia, humans have argued that the Earth is special," he says. "At first, we thought it was the center of the universe, then the center of our galaxy, and even when that was disproven, we still think of Earth as special for being the only location in the universe where life exists.

"Finally dispelling this notion will be a very valuable lesson for humanity."

Provided by University of Southern California

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