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“Contact with intelligent aliens would have dramatic implications for the psyche of the human species”

Harvard astrophysicist **Avi Loeb** has drawn criticism for suggesting that 'Oumuamua, a weird object that passed through our solar system, could be an alien spacecraft. But scientists must keep an open mind, he tells Leah Crane



IN 2017, something strange came hurtling through our cosmic neighbourhood. Astronomers only spotted it once it was already on its way out, so they didn't get a proper look. But from the few observations we did get, it was clear that the object wasn't from around here – its trajectory indicated that it came from another star system. It was dubbed 'Oumuamua, which means "scout" in Hawaiian, and categorised as the first interstellar object we have ever seen in our cosmic neighbourhood.

Not long after 'Oumuamua was spotted, Avi Loeb, an astrophysicist at Harvard University, made waves by proposing that it may be a piece of alien technology. "Oumuamua may be a fully operational probe sent *intentionally* to Earth vicinity by an alien civilization," Loeb wrote in a pre-print paper.

It is certainly weird. Observations suggested it is likely to be either flat or cigar-shaped, tumbling end over end every 7 hours or so and accelerating at a pace seemingly greater than could be accounted for by gravitational forces

alone. Loeb's colleagues have since come up with various natural explanations for what we glimpsed of 'Oumuamua's features, including the idea that it is some sort of giant fractal snowflake. But he is adamant we should at least be open to the possibility that it could be evidence of the existence of extraterrestrial civilisations.

Loeb has now written a book about it called *Extraterrestrial: The first sign of intelligent life beyond Earth*. Here, he tells *New Scientist* about the possibility of advanced alien life and how humans might respond to it.

Leah Crane: You say in your new book that this is your favourite question, so it seems a good place to start – are we alone?

Avi Loeb: Out of modesty, I would say no, because we know that over half of the sun-like stars have a planet of the size of the Earth, roughly the same distance from the star as the Earth is from the sun. If you arrange for similar circumstances, you are likely to get a similar outcome. So, out of modesty, I would say we're

probably typical, just like ants on a sidewalk. As far as I'm concerned, we would be likely to find evidence if we were to search, but if we assume that we will never find anything, obviously we will never discover it.

Do you think we have already seen evidence of alien life and we just haven't been able to understand?

Well, it is possible. There are many stories in the history of science that show that astronomers are very often misguided and overlook observations that they do not understand or that are not in fashionable areas of astronomy. Even though the data might have showed up in papers, in images, people just didn't pay attention, didn't try to explain it. And history repeats itself.

It sounds like the upshot is that there are so many things we have missed, either wilfully or not, that we now know are real, and the same could be true for extraterrestrial life.

Very often prophecies are self-fulfilling – ➤

if you put blinders on and you are not checking whether your prejudice is correct or not, you will never discover you are wrong. If you are not judging your convictions by experimental data, by evidence, then you can feel very comfortable.

I remember attending a seminar at Harvard about 'Oumuamua and a colleague of mine was commenting to me: "This object 'Oumuamua is so weird, I wish it never existed." I was appalled by this because it is completely contradictory to the nature of science, where you're supposed to search for anomalies because that's the only way in which you make discoveries. If everything conforms with what you thought, if the future is the same as the past, then, frankly, I would retire very early. You don't learn anything new.

'Oumuamua was something new. Can you tell me about what you think it could be?

You have a pancake-shaped object that appeared to be at the shiny end of all the objects that we usually see from the solar system. Also, the speed of 'Oumuamua is the same as the bulk flow of the galaxy, the speed at which the Milky Way is moving through intergalactic space, almost as if the object was sitting still in the galaxy and we just hurtled through it. It could be artificial, but we know we didn't launch it because it passed by us only for a few months and there was no mission – and we couldn't even launch it at the speed that it was passing by. So, who produced it?

The most important message that I'm trying to convey is that we should be open-minded to the possibility that we might see a message in a bottle. As you walk down the beach, you see mostly seashells that are naturally produced, but every now and then you stumble across a plastic bottle that is artificial. We should be open-minded to the possibility that we'll see something artificial in space. We sent out some space junk, and we sent out Voyager 1 and Voyager 2 and New Horizons, so it's possible other intelligent civilisations have too.

The public response to the idea that 'Oumuamua could be a piece of alien technology has been extremely sceptical. Some of your colleagues



STRIAPP VIA GETTY IMAGES

The new Five-hundred-metre Aperture Spherical Radio Telescope (FAST) in China will listen for signals from intelligent aliens

have even said that such speculation is irresponsible. How do you respond to that?

It is easy to say it is irresponsible, let's not discuss it. You can make such a statement, but then look at the alternatives: let's look at the evidence and try to explain it. All the natural origins that were suggested are things that we have never seen before, so how can you argue that we should not contemplate one additional possibility that we have never seen before, which is a technological artefact? Why shouldn't that be part of the discussion if all the other possibilities are also things that we have never seen before?

So, you are saying that since it is definitely something weird, the alien hypothesis should at least be one among several options that we are contemplating?

Yes. I don't understand why this option should be out of the vocabulary of the mainstream. In physics right now, there are lots of speculative ideas that are considered part of the mainstream.

People can still stay in their comfort zone and just ignore the anomalies and say, "I don't want to contemplate an artificial origin", but I think that our duty as scientists is to say: "No, we want more evidence, more data on future detection of such objects."

Science should be done out of curiosity, not worrying about taking risks and making mistakes. We should be transparent about it and we should be guided just by evidence and not by prejudice. We should look at the details when we decide whether one interpretation is the correct one, because the devil is in the details and you can't just make blank statements one way or another just to be in your comfort zone.

Do you think that there is a sense of privilege in that? You are the head of your department and you are tenured, so you can take risks with your reputation that other researchers might not be able to for the sake of their livelihoods.

Well, you might think that, and certainly having tenure is a great advantage because it gives you the freedom to pursue directions that are not necessarily popular. Unfortunately,

"All the natural explanations suggested are things we've never seen before"



An artist's impression of 'Oumuamua, a mysterious visitor from another solar system

if you look at academia, almost all people that get tenure start to worry immediately afterwards about their image, and it is more about promoting themselves than understanding nature. They will not take risks. They will just make their voice sound louder and repeat things that are already known.

Physics, or science more generally, is a dialogue. We have to listen to what nature tells us. It is not a story about ourselves. It is not a monologue where we show how smart we are. It is a dialogue and we don't need to show how smart we are. If nature gives us enough clues, we just need to pay attention.

With 'Oumuamua, is it similar to the situation of a tree falling in the forest with no one around to hear it, in the sense that it could have been an artificial object but it was too far away to really know?

I heard it. If we walk on the beach and we find a plastic bottle, it means that there are lots more out there. Of course, we missed an opportunity here because we expected this to be a rock and it doesn't look like the typical rocks we have seen before. Let's admit that. Let's not ignore that. Let's embrace that and therefore search for more objects that look different than rocks. So, unless it is the only object ever to have made it into our solar system from another, and it just came at the right time, there must be a lot of them around.

So, it's not like a tree falling with no one around to hear it. It is more like we saw a log on the ground and now we can say trees fall all the time. Yes. We should be alert to what we are seeing out there.

There seems to be a difference between how we regard the search for advanced life in the universe versus primitive life, which seems to be a pretty widely accepted scientific goal. Why?

I think there is a psychological barrier. There are several aspects to it. First, the idea that there is advanced life out there touches us at a closer level. If there is something like us or that is even more intelligent, if we are not the smartest kid on the block, if there is something out there, it is a bit frightening and it threatens your ego in some way.

If we were contacted by an intelligent extraterrestrial civilisation right now, what do you think would happen?

I think it would have dramatic implications for the psyche of the human species. First of all, it depends what the nature of that information is. Does it indicate that, indeed, there is a superior intelligence out there that is much smarter than us? Because then we can learn something from it. If we import a technology here to Earth that represents an advance, it may be like copying in an exam,

but it could be very beneficial. That could be like a gold mine waiting for us to discover in the sky, if we learn about technologies that we don't possess yet.

Another type of information is if we see dead civilisations that do not exist anymore, we can figure out why they died and perhaps that will teach us a lesson to behave better, to be kinder to each other and to preserve the climate.

In your book, you make the argument that we may not be ready to deal with being visited by intelligent aliens. Can you explain?

One thing I can say by looking at the newspaper every morning is that we are not kind to each other. We do foolish things. We actually waste most of our energy and time and money on fighting each other and in directions that are not constructive.

But I do believe that space exploration offers a better future for humanity overall because it can unify us. If you go to Mars or you go to another star, there is no military threat to anywhere on Earth, so why worry about it? Let's come together. ■



Leah Crane is a reporter at *New Scientist*. You can sign up for her weekly newsletter about space here: [newscientist.com/sign-up/launchpad](https://www.newscientist.com/sign-up/launchpad)