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Q&A: Was that a weird rock or an alien spacecraft?

Harvard astrophysicist Avi Loeb isn't giving up on the idea that the first recorded interstellar object may have come from another civilization.

By **Steve Nadis** Updated January 18, 2021, 2:00 a.m.



In a new book, Harvard professor Avi Loeb makes the case that an object seen in our solar system in 2017 could have been the creation of a faraway culture. GETTY IMAGES NORTH AMERICA

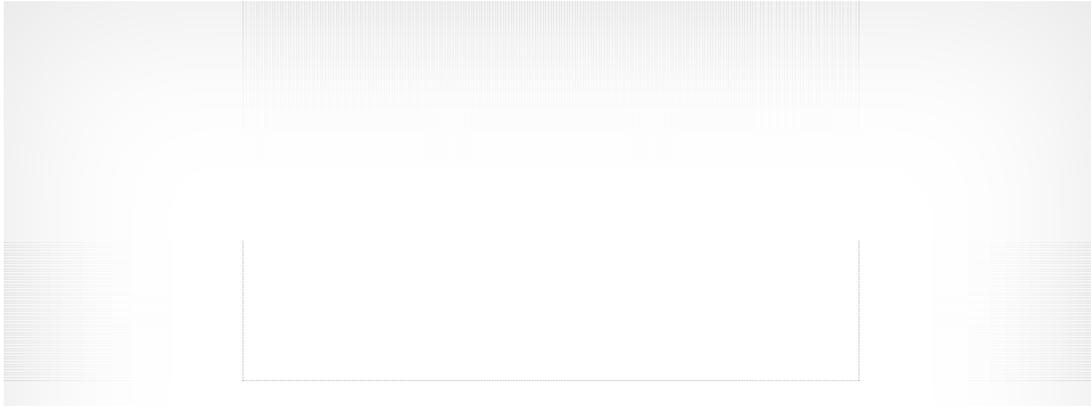
Galileo Galilei was kept under house arrest during the last decade of his life for espousing the heretical view that the earth moves around the sun. Almost 400 years later, Harvard astrophysicist Avi Loeb believes that close-mindedness still threatens science.

In 2018, Loeb and a colleague advanced a heresy of their own. They said that an object dubbed ‘Oumuamua — discovered in 2017 flying through our solar system so fast it must have come from elsewhere — may have been made by an alien civilization. Loeb explores that possibility in his new book being released next Tuesday, “Extraterrestrial: The First Sign of Intelligent Life Beyond Earth,” and he has the credentials to back up what many peers regard as a fringy proposition. The author of more than 800 scientific papers, Loeb directs Harvard’s Institute for Theory and Computation and is the founder of Harvard’s Black Hole Initiative.

‘Oumuamua, which slingshotted around the sun and headed out of the solar system at nearly 200,000 miles per hour, was the first object from outside our solar system to be observed from Earth. Astronomers gave it a name that means “[a messenger from afar arriving first](#)” in Hawaiian. (It’s [pronounced](#) OH’-mooah-mooah.)

Most astronomers say that it was just a rock, and that space is probably full of things like it that just hadn’t been detected before. “I think it’s good to keep an open mind, as Avi does, because one day we will detect alien technology, somewhere, somehow,” UCLA astronomer David Jewitt says. “Just not this time.”

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“Extraordinary claims require extraordinary evidence,” University of Toronto astrophysicist Scott Tremaine says, “and because ‘Oumuamua has left the solar system, we can’t gather any more evidence about its properties.”

Nonetheless, Loeb argues that “the simplest explanation” for ‘Oumuamua’s peculiarities “is that the object was created by an intelligent civilization not of this earth.”

This conversation with him has been edited and condensed.

What features of ‘Oumuamua make you think it may be the product of alien technology?

Its geometry is extreme. The evidence indicates that it is exceedingly flat — shaped like a disk or a pancake.

‘Oumuamua also had excess acceleration that couldn’t have come from gravity alone. And there was no evidence of a “cometary tail” [of vaporized material] that would give it a rocket-like push. So a colleague and I suggested it might be an ultrathin spacecraft called a lightsail: so thin, and with such a high area-to-mass ratio, that it could be pushed by the sun.

Do you think ‘Oumuamua could be a natural object, as an international team of [14 scientists concluded in a 2019 Nature paper?](#)

It doesn't look like any asteroid or comet we've seen before. One proposal is that 'Oumuamua is made of pure hydrogen ice, but my colleagues and I showed that doesn't work because the ice would have evaporated during its long journey from another star system. Others suggest that 'Oumuamua is a clump of accumulated dust, but I doubt such a "dust bunny" could survive a millions-of-years-long journey. And still others have said it could be a piece of planetary shrapnel ejected during an interaction with another star, but then it's hard to account for the pancake shape.

Putting all of this together makes it very puzzling. If 'Oumuamua were a lightsail, artificially made, some of these puzzling properties would make sense. I'm just saying it's a possibility that should be investigated. I'm not saying the hypothesis is right.

So what do others say in response? Some say: "Forget about it. We know it's not artificial. So don't speak about it and just shut up."



An artist's rendering of 'Oumuamua for the European Southern Observatory. Based on data gathered from observatories around the world, it seems to be dark red, elongated, and metallic or rocky. M. KORNMESSE

With 'Oumuamua moving away from us at high velocity, how can we follow up on your hypothesis?

We have to be better prepared next time. A second interstellar visitor, Comet Borisov, was spotted in 2019. It looked and behaved like a comet from the beginning. Someone asked me: Since the second such object looks like a comet, doesn't that change your opinion of 'Oumuamua? Well, when I met my wife on our first date, I thought she was special. The fact that I've met other people since hasn't changed my opinion.

The LSST, a new telescope expected to start up in 2023, should detect about one interstellar object a month. If we can detect one early enough — when it's still approaching us rather than moving away like 'Oumuamua was — we could send a rocket nearby and take a photograph. Then we'll have a much better idea of its

true nature. There's nothing more convincing than a picture.

Federal funding of the search for extraterrestrial intelligence has been virtually nonexistent since 1993. What should we be doing to find out whether there is intelligent life out there?

The US spends roughly \$100 million a year on the search for primitive life, and I think at least 10 percent of that money should go toward the search for intelligent life. We shouldn't spend equal amounts, because the odds of finding signs of intelligence are lower.

Yet venture capital companies put money into risky propositions, knowing that

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that support blue-sky thinking. Our scientific establishment should do the same.

But now, when you send a proposal to NASA, you have to tell them what you'll discover in year one, year two, and year three. That makes no sense to me. If you know what you'll discover in advance, you're unlikely to find anything unexpected.

We need a different attitude that rewards creativity and innovation instead of suppressing it.

Steve Nadis is a writer living in Cambridge and a contributing editor to Discover Magazine.