

# Science Focus

“So long, and thanks for all the fish”

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AUGUST 2019

# CAN WE STOP IT?

(AND WHAT CAN WE LEARN FROM THE DINOSAURS' DEMISE?)

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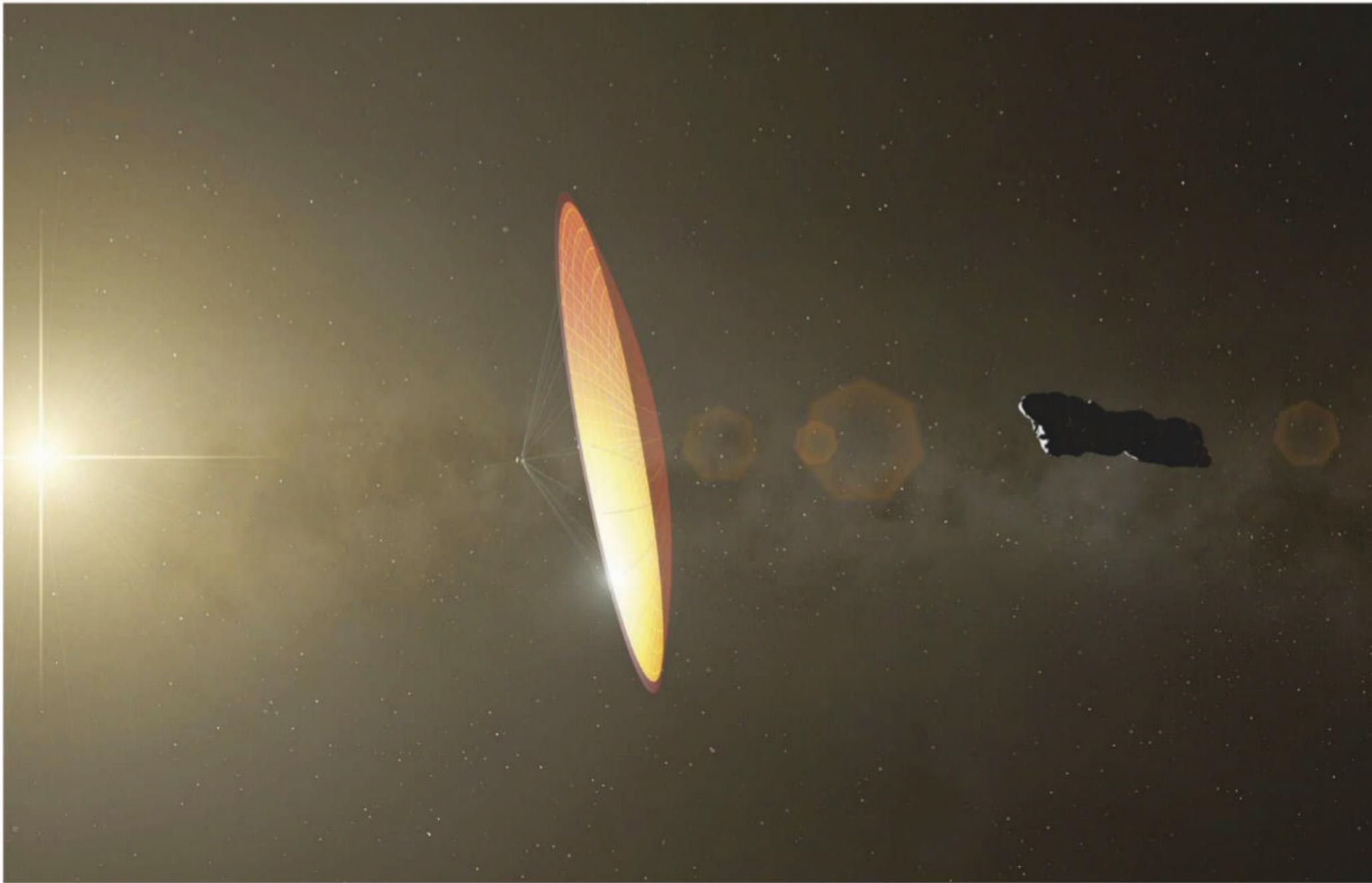
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Some people claimed that 'Oumuamua was a spacecraft powered by starlight – a solar sail

## ANALYSIS

# 'OUMUAMUA: WHY DID WE THINK IT WAS ALIENS?

New research says that our first interstellar guest was natural. So where did the alien hypothesis come from?

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Astronomers spotted 'Oumuamua in October 2017, as it was already on its way out of the Solar System, and scrambled to decipher its secrets before it sped out of sight. It was the first object ever detected to have come from outside of our Solar System. Was our interstellar visitor a comet or an asteroid – or maybe an extraterrestrial

spacecraft? Not long after, the SETI (Search for ExtraTerrestrial Intelligence) Institute's Breakthrough Listen project announced its plan to probe the mysterious object for radio signals, which could hint at alien life. But disappointingly for alien hunters, they came up empty-handed. Now, a year and a half later, the final nail has been driven into the 'alien hypothesis' coffin with a scientific paper titled *The Natural History Of 'Oumuamua*. "For all of the available observations that were made, the best answer that we have is that it was a natural object," says Dr Michele Bannister, one of the paper's authors.

And yet, the idea that aliens could be traversing our Solar System was always tenacious, mostly because 'Oumuamua was completely unlike anything we had seen before. For one thing, its brightness

The odd brightness variations of 'Oumuamua suggest that it could be cigar- or pancake-shaped



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## “The next time ‘Oumuamua comes, we might be able to have a spacecraft waiting to go visit it”

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varied by a factor of 10, like a slow-motion twinkle. This suggests it could be a cigar-shaped object, 10 times longer than it is wide, reflecting more or less light as it tumbles end over end. That’s the familiar image of ‘Oumuamua, but we don’t know for sure what it looks like. Even the most powerful of our telescopes couldn’t resolve its shape beyond a point of brightness. The same glimmer could easily be produced by a pancake shape. Either way, no comet or asteroid in the Solar System has such an extreme ratio of length to width.

Over the short time it was within sight of our telescopes, astronomers grappled with its identity. It looked like an asteroid. It showed no signs of cometary ‘outgassing’, which is the tail of evaporating gas that can be seen as the Sun melts a comet’s ice. But then it accelerated out of the Solar System, faster than could be accounted for by gravity. Various means of explaining this acceleration were floated, including a collision with another object and a combination of magnetism and solar winds, but the most outlandish theory was that it was an alien spacecraft.

In a paper published in the journal *Astrophysical Journal Letters*, Dr Shmuel Bialy and Prof Abraham Loeb, at Harvard University, laid out their logic to suggest that ‘Oumuamua could have been a solar sail of alien origin. Just as the wind filling a ship’s sail is made up of a huge number of air molecules, the tiny impact of each photon of starlight bouncing off a large, thin solar sail could theoretically add up to enough force to power a spacecraft. However, there is a key problem with this theory: the tumbling motion that revealed its extreme shape in the first

### TIMELINE

9.9.17

‘Oumuamua reached its closest point to the Sun, a distance of 38 million kilometres.

19.10.17

‘Oumuamua was discovered by the Pan-STARRS1 telescope in Hawaii.

20.11.17

In a paper published by the American Astronomical Society, ‘Oumuamua is confirmed to come from another solar system.

2.1.18

The Hubble Space Telescope captured the last observation of ‘Oumuamua before it passed out of sight.

place. To work effectively as a solar sail, a broad surface needs to be pointing at the Sun. “That hypothesis does not fit with the evidence,” says Bannister, though the reason for its unusual acceleration is still unclear.

So, if ‘Oumuamua is not an alien spacecraft, what is it? When taking into account all the evidence, Bannister says that it becomes clear that it is a planetesimal. “This is a little building block of a planet that started its life around another star and has travelled to us,” she says.

Even if it is a natural phenomenon, the chance to study the first ever object from outside the Solar System is exciting in its own right. “In many ways, this was the gravitational waves moment for people who study how solar systems form and evolve,” says Bannister.

Better yet, we could explore the Solar System’s next visitor in more detail after the launch of the European Space Agency’s Comet Interceptor mission in 2028. Comet Interceptor will park itself far from Earth, waiting to chase an interesting comet or interstellar object. “The next time ‘Oumuamua comes, we might be able to have a spacecraft waiting to go visit it,” says Bannister.

“I’m really, really excited by that. It’s going to be so much fun.”

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by **SARA RIGBY**  
Sara is the online assistant for BBC Science Focus. She has an MPhys in mathematical physics.