

New Scientist

December 19, 2020 – January 1, 2021

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Astronomy

Life on Venus? We're still looking

Clara Sousa-Silva spent much of the year sitting on a huge secret. She spoke to Leah Crane about how it felt

ONE of the biggest news stories of 2020 was the apparent sighting of phosphine in Venus's atmosphere. On Earth, this gas is only produced by living organisms, and there seems to be no other way to make it on Venus, so this was interpreted as a sign that life may be floating in the Venusian clouds. *New Scientist* spoke with Clara Sousa-Silva at the Harvard-Smithsonian Center for Astrophysics, who was part of the team involved in the discovery.



Clara Sousa-Silva

Leah Crane: How did you get involved with this team?

Clara Sousa-Silva: At the end of 2018, I had just submitted a paper on phosphine with a body of evidence that it was associated with biology and was potentially detectable on exoplanets. A few months after that, Jane [Greaves at Cardiff University, UK, the leader

of the collaboration] reached out to say: "Hey, we think we found it on Venus."

How did you react?

I did freak out a little bit, but primarily I was very cautious. I did want to find phosphine, I did expect it to be found eventually, but I didn't have any hopes that it would happen in my lifetime.

You and your colleagues made an enormous list of the possible ways phosphine could be made on Venus if it wasn't coming from living things. What was it like figuring out that none of them could explain the observations?

You make this list so long, you think surely you're going to run out of things to consider. And yet it's so hard to prove a negative, to prove that nothing but life could have created this gas. You're searching in this dark space of possibilities, trying to shine a light in every corner and hoping

that you're able to light up everything, but you can't tell when the room ends.

What was the public reaction like for you, after keeping this a secret for so long?

I went through stages of thinking that this would be a really big deal, and then

2020 in pictures

SpaceX makes history with crewed flight

On 30 May, SpaceX used its Crew Dragon capsule atop a Falcon 9 rocket to launch two NASA astronauts, Bob Behnken (pictured just after returning to Earth) and Doug Hurley to the International Space Station. This was the first time a private company had carried humans into orbit. The pair spent 64 days in space and both arrived back safely.

The successful mission marked a return to human space flight for the US, which hadn't launched any crew into orbit with home-grown craft since the space shuttle programme came to an end in 2011, instead having to purchase rides aboard Russian Soyuz spacecraft.

NASA/BILL INGALLS VIA REUTERS

Energy

A sign of progress for nuclear fusion

Efforts to develop a clean source of power advanced despite the coronavirus pandemic

Progress on nuclear fusion, which attempts to produce energy in the same way as the sun, made some important headway this year.

The world's biggest nuclear fusion power project, ITER in southern France, began its "assembly phase" on 28 July. The milestone was welcomed by world leaders, including the then Japanese prime minister Shinzo Abe, who said it will help bring about a "sustainable, carbon-free society".

But that green society is still a way off. Assembly is scheduled to take around four more years, followed by two decades of experiments. ITER's commercial fusion power plant isn't expected until 2054.

Smaller fusion projects had mixed fortunes. There had been plans for the Joint European Torus, a European project at Culham in Oxfordshire, UK, to run the first fusion test of its kind since 1997, using the hydrogen isotopes deuterium and tritium.

The experiment was delayed from November 2020 until May to August next year as a result of the coronavirus pandemic.

However, a separate, newly built tokamak – the chamber where fusion reactions take place – tested its first plasma at Culham on 29 October, and on 2 December, the UK Atomic Energy Authority launched a search for a site to build the world's first prototype nuclear fusion power station by 2040. **Adam Vaughan**



thinking: “Clara, it’s a big deal for you, but the world is a big place. This is not a priority for people. There’s a pandemic, there are elections and revolutions, California is on fire.” And then it turned out it was a very big deal that lots of people were excited about.

Other research is now questioning your results. Is that dispiriting?

I’m glad we’re not doing this alone any more and there are so many people using disparate analyses to look at the same data. It’s exactly how science is supposed to work. This is all positive, but right now my main feeling is impatience: I want to know the truth, and I want to know it right now! But that’s not how it works.

How will you feel if it turns out that phosphine isn’t in Venus’s atmosphere after all?

Even if it’s not there, at least people know about phosphine and they will consider it as a potential sign of life. I hope this will be an era of thinking about more molecules that could be associated with life – not just the obvious ones associated with life that’s familiar and pleasant, but also life that’s different from us, that we avoid, that smells bad or lives somewhere horrible.

What will you be working on in 2021?

We’re working on getting more data that will tell us if phosphine is there, and where and how variable it is. These questions will be answered in the near future. ■



Leah Crane is *New Scientist’s* space and physics reporter, based in Chicago

Economics

A time for universal basic income?

Once a fringe prospect, the idea of paying everyone regular sums is growing in popularity

With the coronavirus pandemic causing a sharp rise in unemployment, one idea is rapidly growing in popularity: universal basic income (UBI), in which the government pays people a regular sum, no strings attached.

A Finnish study published in May (although carried out in 2017 and 2018) with 2000 unemployed people found that UBI boosted recipients’ financial well-being, mental health and cognitive

functioning, and also modestly improved employment rates.

People who received €560 per month, rather than regular unemployment benefits, reported higher levels of confidence in being able to control their future. The researchers involved say that regular guaranteed payments could alleviate stress in periods of uncertainty, such as the pandemic.

Elsewhere, the idea is also gaining traction. A recent analysis

suggests that giving all Australians earning less than \$180,000 annually a payment of \$18,500 a year would reduce wealth inequality by 20 per cent. The study’s authors estimate that UBI would cut poverty by 1.9 per cent, lifting half a million Australians above the poverty line.

Meanwhile, in the US, 25 cities are launching pilot UBI initiatives across the country to support low-income families, funded by philanthropic donations. **Donna Lu**