INSTITUTE OF ASTRONOMY
PUBLIC OPEN EVENING

— 1 February 2023 —

Will an AI be the first to discover alien life?

SETI, the search for extraterrestrial intelligence, looks for signs of technologically advanced civilizations by identifying artificial-looking electromagnetic radiation signals.

For decades hardly any data was available to SETI, but in 2015 a project to search one million stars for signs of intelligent life was funded. This project uses telescopes to look for radio emission in the vicinity of stars and see if the radiation changes steadily in frequency, as would happen if an alien transmitter was on a planet moving relative to Earth.

Thanks to this project a wealth of data was generated, too much for humans to go through manually. “The biggest challenge for us in looking for SETI signals is not at this point getting the data,” says Dr Sofia Z. Sheikh, an astronomer at the SETI Institute. “The difficult part is differentiating signals from human or Earth technology from the kind of signals we’d be looking for from technology somewhere else out in the Galaxy.”

While algorithms could search the dataset quickly for signals matching those expected by astronomers, this method could overlook potentially interesting signals that are slightly different to those expected. Instead, astronomers intend to use machine learning. This will involve providing AI with large amounts of data so it can learn to recognise certain features. Machine-learning algorithms would learn to filter out signals caused by interference from Earth and spot candidate extraterrestrial signals. They could also be used on archive SETI data to find signals that were previously overlooked by earlier methods.

However, despite these advances, SETI will most likely continue to use a combination of both classical and machine learning approaches to sort data.

“The machines can’t do it all, yet,” says Dr Dan Werthimer, a SETI scientist at the University of California, Berkeley.

TONIGHT'S SPEAKER

Stepanie Monty
Galactic Archeology

Our weekly welcome

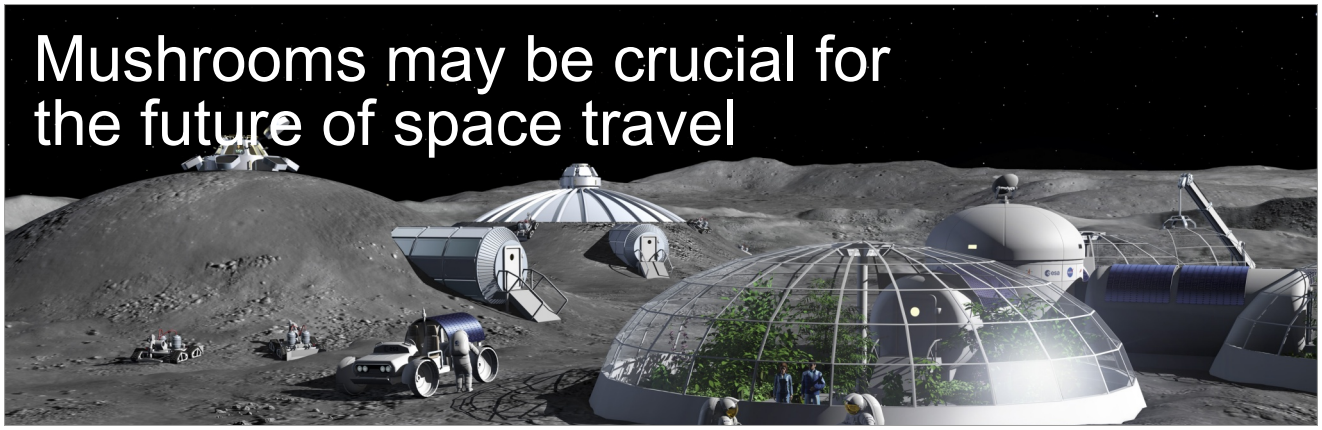
WELCOME to our weekly public open evenings for the 2022/23 season. Each night there will be a half-hour talk which begins promptly at 7.15pm. Please note that the talk will be recorded and archived for online streaming.

The talk is followed by an opportunity to observe if (and only if!) the weather is clear. The IoA’s historical Northumberland and Thorrowgood telescopes, along with our modern 16-inch telescope, will be open for observations. In addition, the Cambridge Astronomical Association will provide a floorshow outdoors on the Observatory lawns, relaying live images from their telescopes and providing a commentary. If we’re unlucky and it’s cloudy, we’ll offer you a conciliatory cup of tea after the talk (with perhaps some more astro-information in the lecture theatre for those who want to stay on).

News stories written by Natasha Goodman. If you have any questions, suggestions or comments about the IoA Open Evenings please contact Matt Bothwell at bothwell@ast.cam.ac.uk.

The talk schedule for this term can be viewed at: www.public.ast.cam.ac.uk

Mushrooms may be crucial for the future of space travel



In order to become an interplanetary species, we will first need to build structures that allow for humans to live on other worlds - rather than simply visiting them.

Scientists are currently exploring the possibility of using fungus to grow the building blocks for these structures on site, providing suitable and affordable bases on the Moon and beyond. A project is set for two years from now to test whether mushrooms and other fungi could play a crucial role in helping humanity construct the first off-planet habitats on the Moon - and possibly beyond.

Architect Chris Maurer and his team have been working with NASA and MIT to grow and build with myco-materials (materials derived from mushrooms and other fungal substances) on Earth in preparation. By compressing and baking mycelium - (the root-like structure from which mushrooms grow) - Maurer and his team can create building blocks which are strengthened by encasing them in plastic. The plastic enhancement allows the blocks to be used in the construction of airtight structures.

This has yet to be tested in space, but researchers are confident that the combination of myco-materials and plastic will provide the structural integrity needed, as well as making structures fire-resistant and insulating. An approach like this would also resolve the matter of cost. Instead of transporting heavy and bulky material, scientists could send up lightweight spores that would then grow into the materials needed for construction.

If the planned 2025 project is successful, Moon bases may soon become a reality.

Colliding galaxy clusters form 'flaming cosmic narwhal'

Hundreds of millions of light years away, at least three galaxy clusters are colliding with each other to form a single colossal cluster known as Abell 2256. The horn-like appearance of its jets and glowing tufts have led to astronomers referring to it as the "flaming cosmic narwhal".

To unravel the mess of this chaotic mega-cluster, astronomers used six of the most powerful observatories. Different observatories can make observations in different wavelengths, allowing for different parts of the narwhal's structure to be captured. The hot gas, which appears bright blue in the above image, was imaged by two x-ray observatories. Meanwhile, the stars that appear yellow and white in the image were captured in infrared and visible light. Another observatory caught the radio waves which appear in red. The narrow jets were emitted by supermassive black holes at the centers of galaxies, whereas the swirls come from jet material colliding with nearby gas. The red glowing tufts are most likely a result of shock waves formed during the cosmic collision.

Thanks to the combined power of the six observatories, the flaming cosmic narwhal can be seen with incredible detail. Yet there are still questions about the cluster that remain unanswered. Near the center is a faint halo of radio waves that have yet to be explained, and the cluster contains more galaxies that emit radio waves than expected.

Researchers are still working with the large amounts of data available as they figure out the details of how such colossal clusters like this are formed.

Joke of the Week

There was an old lady called Wright, who could travel much faster than light.
She departed one day
In a relative way
And returned on the previous night!