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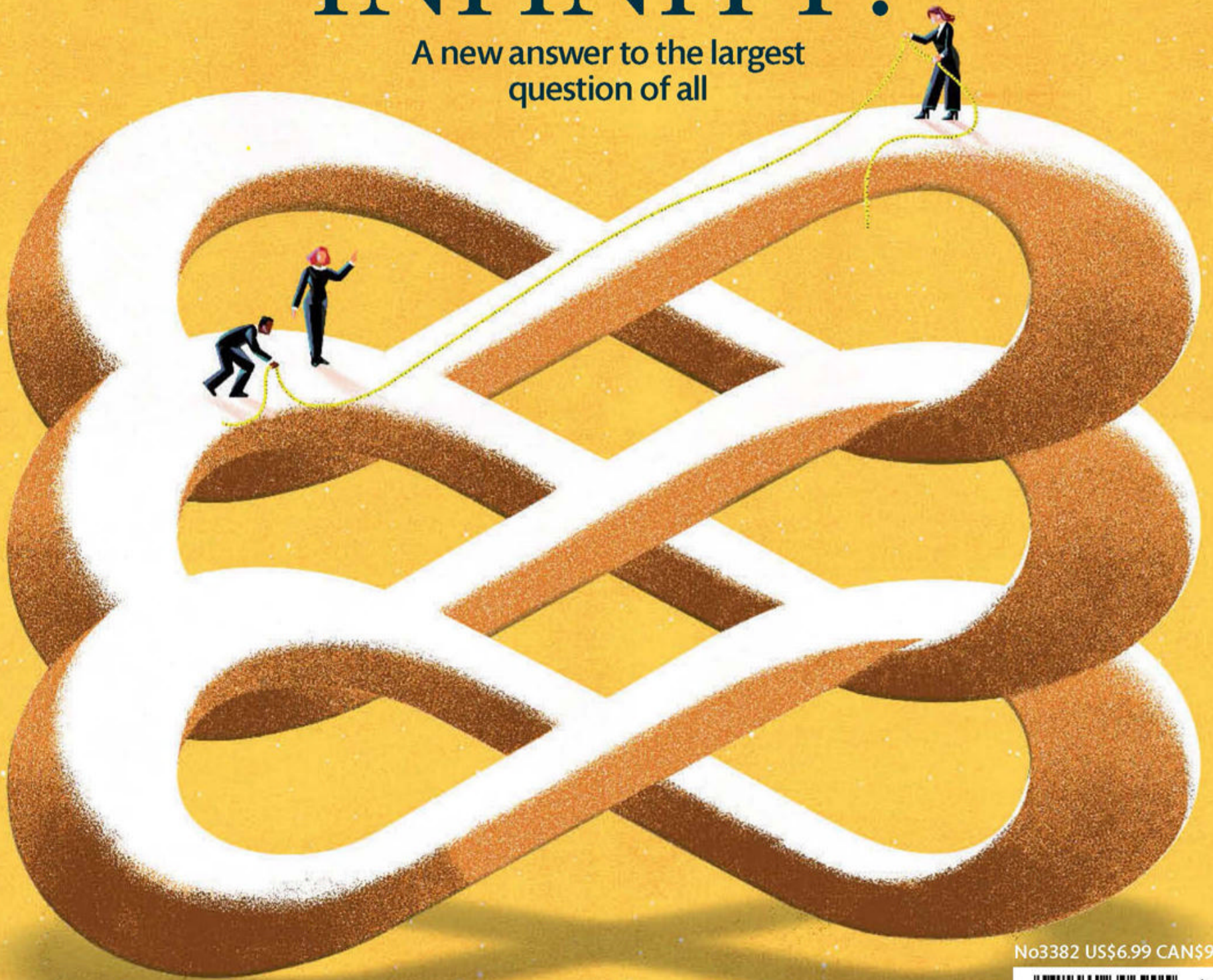
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Alien life

The plan to challenge aliens to a very slow game of chess

Matthew Sparkes

A GROUP of scientists has designed a new message to beam across the galaxy in the hope of striking up a conversation with an alien civilisation. The team says starting a game of chess would be a logical next step if we get a reply, but communicating a move in the game would take tens or hundreds of thousands of years.

There are many active projects searching for extraterrestrial intelligence, but there have also been some attempts to message one, even leading to the creation of a non-profit organisation called Messaging Extraterrestrial Intelligence (METI). In 1974, the Arecibo radio telescope sent a 1679-bit message towards globular star cluster M13, which sits 25,000 light years from Earth. Pioneer and Voyager spacecraft also took discs with information about humans outside our solar system.

Jonathan Jiang at NASA's Jet Propulsion Laboratory, who co-authored the new Beacon in the Galaxy (BITG) message, says we now have the technology to provide more detail. BITG includes Earth's location within the galaxy,

relative to clusters of stars, as well as information on the time the message was sent relative to the birth of the universe. In all, the message contains 204,000 bits, more than 121 times as much data as the Arecibo transmission (arxiv.org/abs/2203.04288).

The team says that aiming the message at a star cluster between

about 6 and 20 light years from the centre of the Milky Way would give the best chance of a reply. Jiang says there are no plans to send the message, but the team hopes the proposal will encourage global discussion about how we eventually reveal ourselves to galactic neighbours. "In recent years, we have found thousands of exoplanets, compared to 1974, when we did not know if there were planets outside our solar system," he says.

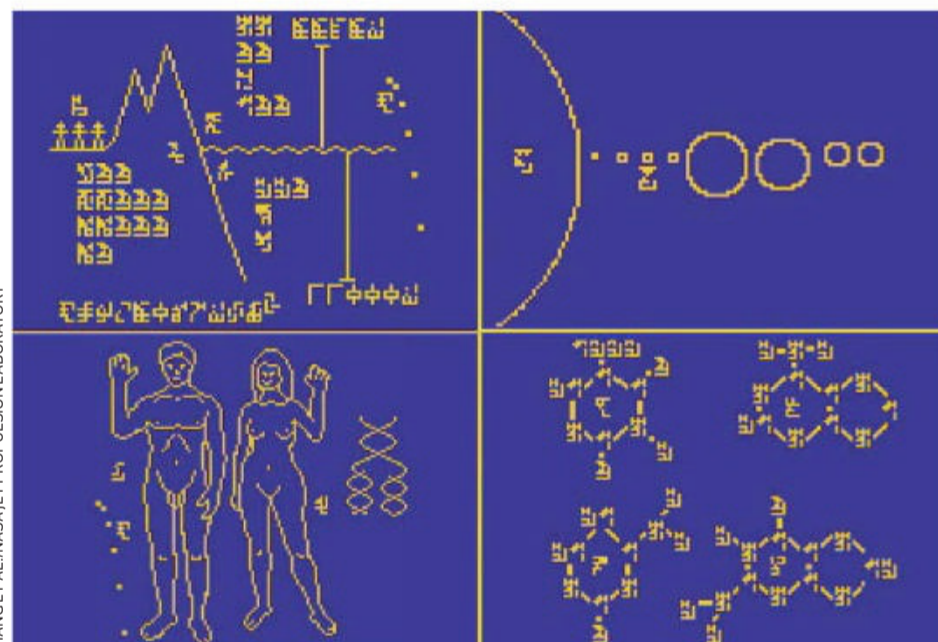
Philip Rosen, a retired engineer and co-author of the paper, says that if we receive a reply, sending the rules of chess and beginning a game could "provide insights into thought processes of logic, strategy and planning" of the civilisation.

Anders Sandberg at the University of Oxford says that previous attempts to message aliens have been few and far between because of the "giggle factor" around the idea in scientific circles, challenges in sending a strong enough signal and also because of "vigorous debate" about whether it is wise to do so. "Some people think that it's really risky to say where we are because that gives an address to where to send the war fleet."

He believes the risk is negligible, but says it would be wise for humans to "become better at making joint decisions as an entire species" before attempting galactic communication.

Douglas Vakoch at METI says the message has merit, but a variety of transmissions should be sent, because some approaches may be impenetrable for an alien species. ■

Details of the message that scientists could send into space



JIANG ET AL./NASA JET PROPULSION LABORATORY

Animals

Male crossbills grow redder feathers when they exercise

IN A kind of post-workout glow, male crossbills that work harder when flying grow redder plumage.

Many animals acquire their bright colours from compounds in their diet. Male common crossbills (*Loxia curvirostra*) take in yellow carotenoid pigments from their food and convert the pigments into vibrant, red ketocarotenoids, which are stored in the feathers.

But research in the 1950s

showed that male crossbills kept in cages began growing only yellow feathers when they moulted. This, plus more recent research suggesting that yellow-to-red carotenoid conversion may occur in the inner membrane of a cell's energy-generating mitochondria, made Carlos Alonso-Alvarez at the Spanish National Research Council in Madrid and his colleagues wonder if red feathers were partially a result of exercise.

The team captured 295 male crossbills in central Spain and measured their colour, size and weight. To make flight a bit more

metabolically taxing, the researchers clipped some wing feathers from half the crossbills. They also plucked feathers from all of the males' rumps and released them back into the wild.

When a few dozen of the birds were recaptured in the following

months, they had regrown their rump plumage – and the feathers growing back on the clipped birds were redder than those on their unclipped counterparts. The clipped birds also lost weight, which the researchers attribute to the added strain of flying while missing some important feathers ([bioRxiv, doi.org/hpnd](https://doi.org/10.1101/2022.03.01.498888)).

This suggests exercise affects feather colour. Red feathers may be a signal that depends "on the quality of the individual, but independent of resources and cost of production", says Alonso-Alvarez. ■

Jake Buehler



WILDLIFE/ALAMY

A male common crossbill (*Loxia curvirostra*) with bright red feathers