

#SPACE

Mystery of Asteroid's Origin Busted

Asteroid 2016 HO3 has an orbit around the sun that keeps it as a constant companion of Earth



For the first time, scientists have traced an asteroid to its exact place of origin, a particular crater on the moon.

Unlike most near-Earth asteroids, which are thought to hail from the main asteroid belt between the orbits of Mars and Jupiter, asteroid 2016 HO3, also known as Kamo'oalewa, was likely blasted from the Giordano Bruno crater on the moon's far side and has been hurtling through space for several million years, according to a study in the journal *Nature Astronomy*.

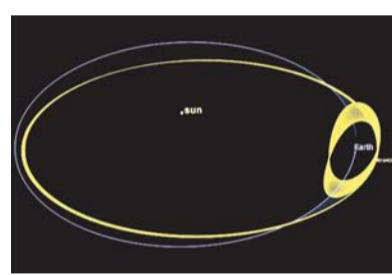
Selected as the target of China's Tianwen-2 mission, Kamo'oalewa has been in space for several million years as one of a few of Earth's co-orbital asteroids, meaning it travels around the sun on a similar orbit as Earth. Measuring between 150 and 190 feet in diameter, the asteroid is about half the size of the 'London Eye' Ferris wheel.

According to lead study author Yifei Jiao, a visiting scholar at the University of Arizona Lunar and Planetary Laboratory, who is also a doctoral student at Tsinghua University in Beijing, the report is the first account of a potentially hazardous near-Earth asteroid that has been linked to a specific crater on the moon.

Previous research, pointing to Kamo'oalewa likely originating from the moon, included its reflectance spectrum, which is more compatible with lunar materials rather than the general population of near-Earth asteroids, and its low orbital velocity relative to Earth, suggesting that it originated close to the Earth-moon system. However, scientists had not succeeded in pinpointing its likely point of origin until now.

To shed light on the mystery, the research team used impact and dynamical modelling.

According to the simulations, it would have required an impactor of at least 1 kilometer (0.6 mile) in diameter to launch a large fragment like Kamo'oalewa beyond the moon's gravitational pull. According to the group's model, the impact would have dug up Kamo'oalewa from deep beneath the moon's surface, leaving behind an impact crater larger than 10 to



20 kilometers (6-12 miles) in diameter. Additionally, the crater would have to be younger than the average lifetime of craters from impacts, which spans about 10 million to 100 million years, a very short and recent period in the history of the solar system.

While the lunar surface is riddled with thousands of craters of different sizes, spanning the moon's 4.5 billion year history, only Giordano Bruno, with its 14-mile diameter and estimated 4 million years of age fits the bill in terms of size and age, making it the most probable source of Kamo'oalewa's origin. The team also showed that this scenario is feasible from an impact dynamics perspective.

The discovery comes on the heels of two previous studies, led by the Arizona Lunar and Planetary Laboratory. In 2021, a team obtained the first evidence suggesting that Kamo'oalewa was different from typical near-Earth asteroids and likely a fragment of the moon. Another team then concluded that there were indeed orbital pathways, albeit rare, for lunar crater fragments to reach an unusual orbit like Kamo'oalewa's.

"This was a surprise, and many were skeptical that it could come from the moon," says co-author and Lunar and Planetary Laboratory professor Erik Asphaug. "For 50 years, we have been studying rocks, collected by astronauts on the surface of the moon, as well as hundreds of small lunar meteorites, that were ejected randomly by asteroid impacts from all over the moon that ended up on Earth. Kamo'oalewa is kind of a missing link that connects the two."

According to co-author and Planetary Sciences professor Renu Malhotra, the findings open up a source of near-Earth asteroids that has not been seriously studied until now, and they have revealed previously unknown orbital pathways for the transport of rocks from and between planetary bodies.



Japanese Yen.



Workers cleaning argel bark in the lam district of eastern Nepal. Thousands of miles away, in Japan, the bark will be used to make yen notes.



Bamboo isn't just a source of paper. It's a wonder plant with applications that span construction, furniture, textiles, and even food! Let's delve into the many ways bamboo can be a useful addition to our homes and industries. In the earlier era, youngsters had the exposure in school, where the bamboo stick was used to administer punishment leading to sore hands or buttocks!

Bamboozled!!!

#ALTERNATIVES



Bamboo House



Dr. Goutam Sen
CTVS Surgeon
Traveller Storyteller

The Japanese are incredible people. They are one nation, who have risen to high levels of humanity from their depths of degradation in the last seven decades. They are now admired for their discipline, culture and among other assets for their amazing tenacity to find solutions for problems. Recently, the Federal bank in Japan realised that they were falling short of currency notes. It was due to shortage of a particular type of paper, which is required to create currency notes. There are only few manufacturers in the world who supply this paper. The paper has to be durable, easy to print on, even washable and biodegradable.

In search of such an ideal material, many nations have made compromises and now use plastic-based paper. Japan, however, continues to maintain that plastic is not suitable for currency notes. In the search for suitable material, they have now focused their search on a certain 'bamboo plant,' grown in the foothills of the Himalayas in Nepal.

"As a Nepali," said Shrestha, who is fluent in Japanese, "I feel proud of managing raw materials to print the currency of rich countries like Japan. That's a great moment for me."

It is an important moment for the yen, too. Every 20 years, the world's third-most-traded currency goes in for a "redesign." The current notes were first printed in 2004, their replacements will hit cashiers in July.

The Japanese love their beautiful bills, with their elegant, understated designs in moiré

printed on tough, off-white plant fiber instead of cotton or polymer.

Bamboo isn't just a source of paper. It's a wonder plant with applications that span construction, furniture, textiles, and even food! Let's delve into the many ways bamboo can be a useful addition to our homes and industries. In the earlier era, youngsters had the exposure in school, where the bamboo stick was used to administer punishment leading to sore hands or buttocks!

Bamboo is extremely strong and has the additional advantage of being light-weight. This makes it a viable alternative to traditional timber. In many parts of Asia, and particularly in the northeast of India, bamboo has been used for centuries to build houses, bridges, and scaffolding. It is flexible and so can be given any configuration. This allows for creative architectural designs. Because of its natural pest resistance, it is a durable choice. In earthquake-prone areas, bamboo's flexibility is particularly advantageous as it can withstand tremors better than rigid concrete structures.

- **Walls and Roofs:** Split bamboo can be woven into panels for walls while its hollow culms can be used as support beams for roofs.
- **Flooring:** Bamboo flooring offers a beautiful and eco-friendly alternative to hardwood. It's naturally hard-wearing and can be stained or finished to match any decor.
- **Furniture:** From sleek modern furniture to classic Asian-inspired pieces, bamboo offers a lightweight yet sturdy option. It can be bent and shaped to create unique designs for chairs, tables, and even beds.
- **Furnishing Your Home with Natural Beauty:** Bamboo brings a touch of nature, indoors, in the form of furniture, but its uses extend far beyond.
- **Kitchenware:** Utensils, cutting boards, and even bowls

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- **Textiles:** Bamboo fibers can be woven into soft, breathable fabrics for sheets, towels, and even clothing. These fabrics are naturally hypoallergenic and moisture-wicking (although not as good as cotton), making them ideal for sensitive skin and hot climates.
- **Accessories:** From decorative baskets and blinds to light fixtures and picture frames, bamboo's natural beauty adds warmth and texture to any room.
- **Construction Industry:** Bamboo composites can be used for building materials like plywood and even scaffolding, reducing reliance on deforestation for traditional wood sources. The advantage is that the length can be considered and can be easily extended by joining the poles together.

- **Biofuel Production:** Bamboo can be a source of clean, renewable biofuel, helping to reduce dependence on fossil fuels. Bamboo has desirable fuel characteristics similar to other woody crops as a high promise energy crop resource for biofuels, a secure and stable supply is required. Efficient cultivation and harvesting operations are needed to ensure that the availability of this biomass is sufficient to meet the demand for biofuel production.
- **Paper Production:** As the case of Japan suggests, bamboo is a viable alternative for paper production, particularly for high-quality paper like currency notes. Although it's possible to use bamboo canes for pulp, it's very difficult because the fibers are tough and require a long fermentation period. A simpler method is to use the sheaths from new bam-

boo culms, which have a similar texture to dry corn husk. Bamboo toilet paper is considered more expensive than traditional toilet paper due to higher production costs and smaller economies of scale. However, the price difference is minimal, when considering its environmental benefits and long-term cost savings. Both bamboo pulp and wood pulp are mixed to make cable paper, cement bag paper, or insulation paper.

Bamboo shoots can be prepared by peeling, boiling, and slicing, and then added to recipes. They are sold in various processed shapes and are available in fresh, dried, and canned versions. Pickled bamboo shoots are used in a number of different cuisines.

Bamboo needs to be engineered to become solid, a plank is made up of several layers laminated together. Over time, those laminations weaken, which threatens the integrity of the plank. A chain is only as strong as its weakest link, and the same is true for a piece of bamboo furniture.

A weakened laminated plank affects the product's overall strength.

Since many countries harvest and manufacture bamboo in different ways, there are just as many different quality standards. Depending on what manufacturing process a company used, bamboo may contain volatile organic compounds (VOCs) or formaldehyde. The boric acid bath raw bamboo takes at the beginning of the manufacturing process increases the risk of formaldehyde exposure.

Bamboo has a soft surface and is not as hard as a laminate surface, making it easy to scratch, dent, and mark.

Bamboo is a plentiful resource that presents a variety of advantages.

- **Versatility**
- **Strength**
- **A grow quickly regenerates**
- **A typical harvest yields 15 times more material than trees located with a comparable area.**

However, there are several disadvantages.

- **Once grown in a particular area, it is hard to get rid of because of its long roots. It needs huge quantities of water to thrive.**
- **It requires manufacturing before it is considered solid.**
- **Since many countries manufacture and export bamboo, there are no standards regarding quality.**
- **There is the risk of exposure to formaldehyde or other VOCs.**
- **Dissimilar to wood, bamboo surfaces are soft, making it susceptible to scratches.**

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Star Wars Day

May 4th has become commonly known as Star Wars Day. And who could be surprised? The words, "May the 4th" seem to beg for the rest of the catchphrase to be uttered. Regardless of whether you prefer Star Wars or Star Trek, the influence of George Lucas' Star Wars on pop culture is undeniable. It seems that George Lucas had a knack of being able to connect with people in ways that others just could not. Let's face it! There really is a piece of work this man is responsible for that we cannot affix a quote to somewhere?



#BREAK-WITH-THE-PAST

Covid changed doctors' views of providing care

What changed with COVID? The authors found that labour rights and workers' protections were the chief reasons cited in 40% of articles during COVID, compared with only about 17%-19% for other diseases. Labour rights were cited the least often for HIV care, at 6.2%. Another significant issue cited during the COVID pandemic was the risk of infection posed to doctors and their families, with nearly 27% of papers discussing this risk, compared to 8.3% with influenza and 6.3% for SARS.

The unique circumstances arising from the COVID-19 pandemic altered a long-held convention that doctors provide care regardless of personal risk. In a study assessing doctors' tolerance for refusing care to COVID-19 patients, researchers identified a growing acceptance to withhold care because of safety concerns.

"All the papers throughout history have shown that physicians broadly believed that they should treat infectious disease patients," says Braylee Grisel, a fourth-year student at Duke University School of Medicine, and lead author of the study published in the journal *Clinical Infectious Diseases*.



"We figured our study would show the same thing, so, we were really surprised when we found that COVID-19 was so different than all these other outbreaks," Grisel says.

The researchers analyzed 187 published studies culled from thousands of sources, including academic papers, opinion pieces, policy statements, legal briefings, and news stories. Those selected for review met criteria for addressing the ethical dilemma posed by treating a novel infectious disease outbreak over the past 40 years.

Most articles, about 75%, advocated for the obligation to treat. But COVID-19 had the highest number of papers suggesting that it was ethically acceptable to refuse care, at 60%, while HIV had the least number endorsing refusal of care at 13.3%.

The trendline stayed relatively stable across outbreaks, occurring from the 1980s until the COVID-19 pandemic hit, with just 9% to 16% of articles arguing that refusing care was acceptable.

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"Some of these results may be because we had the unique opportunity to evaluate changing ethics while the pandemic was actively ongoing, as COVID-19 was the first modern outbreak to put a significant number of frontline providers at personal risk due to its respiratory transmission," says senior author Krista Haines, assistant professor in the Surgery and Population Health Sciences departments.

"There was a great deal of discussion among frontline providers and ethicists on how best to allocate scarce resources," the authors write. Patients, who refused vaccination were at a higher risk of complications while also putting other patients and providers at risk. Arguments were made based on reciprocity, medical triage, and personal responsibility to exclude patients, who refused vaccines from consideration when ventilators and other resources were limited.

"The study's findings provide insight regarding how care should be provided in future pandemics," Grisel says. What had been a fairly solid expectation that physicians were obligated to provide care despite the risks to themselves now appears to have softened. It is unclear how these results may change in the future when the pandemic is less of an active threat.

"This study really shows how outside pressures in the socio-political sphere influence and affect doctors and care providers," Braylee Grisel says. "In future pandemics, we may need to become more aware of how the risks and outside pressures of an active pandemic influence willingness to provide care."



The authors note that the COVID pandemic had several unique characteristics that collectively altered the social contract between doctors and patients, potentially driving changes in treatment expectations. Such factors included:

- Shortages of resources available to care teams, including personal protective gear, hospital rooms, respirators, treatments, and vaccines.
- Polarizing misinformation about vaccines, effective treatments, and how the virus spread.
- Increased rates of reported mistreatment against staff from patients and their family members.

The authors note that the ongoing debate over whether vaccination status should be considered in the decision to treat a patient.

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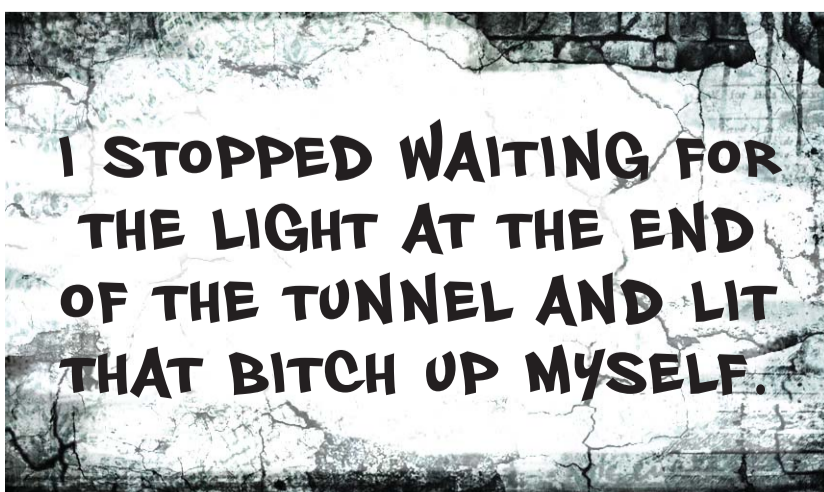
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THE WALL

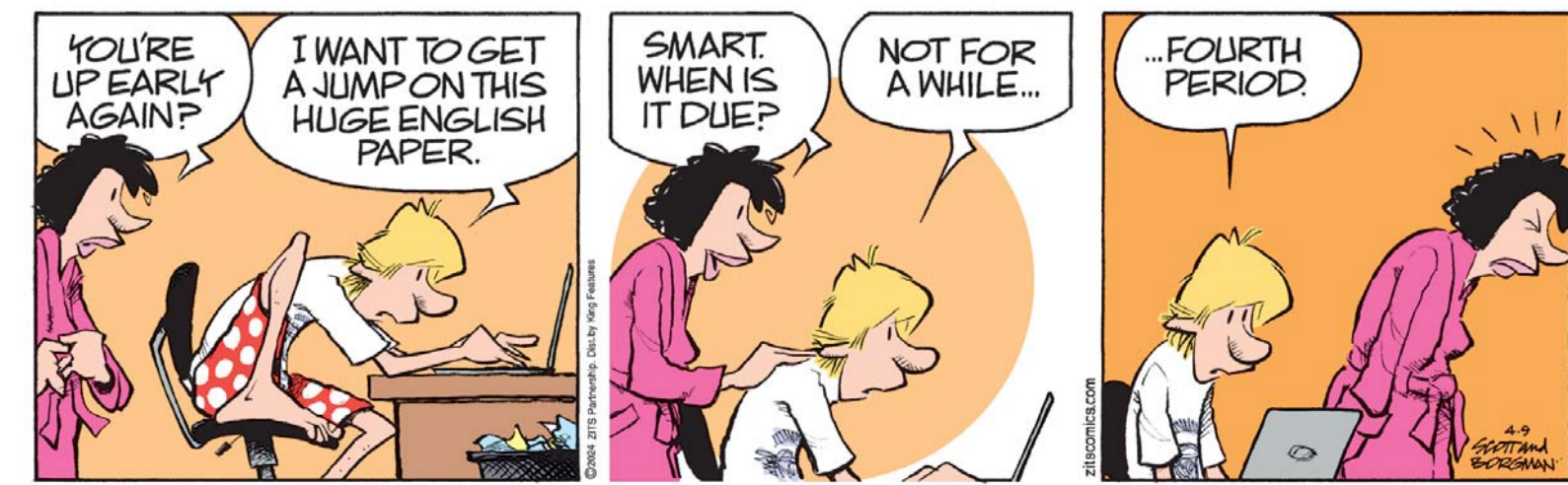


BABY BLUES



By Rick Kirkman & Jerry Scott

ZITS



By Jerry Scott & Jim Borgman

