

EOS

VOL. 106 | NO. 11
NOV-DEC 2025

SCIENCE NEWS BY AGU

WHERE SCIENCE CONNECTS US

Studying the Where, When, and
Eye of Hurricanes Since Katrina

On the Tail of an
Interstellar Interloper

Machine Learning Simulates
1,000 Years of Climate

Encouraging Equality, Diversity,
and Inclusion at Conferences



AGU
ADVANCING EARTH
AND SPACE SCIENCES

ease. Meanwhile, regular health care services are often disrupted, so preventive care is limited.

Understanding these mechanisms is critical because current disaster response systems vastly underestimate the health burden of tropical storms, researchers have said. “We are still scratching the surface in terms of characterizing the health effects of hurricanes,” Kumar said.

“There is not a single disease that’s not touched upon by hurricanes.”

Huang said untangling the most significant contributors to increased risk following a cyclone is the next phase of his research. “I want to understand and investigate the candidates underlying this risk pattern,” he said.

As part of this process, Huang also aims to identify the reasons behind the elevated risk in some populations, such as working-age men. The research could help public health officials target interventions to high-risk populations and monitor cardiovascular health in the months following cyclones.

The Worsening Exposure to Storms

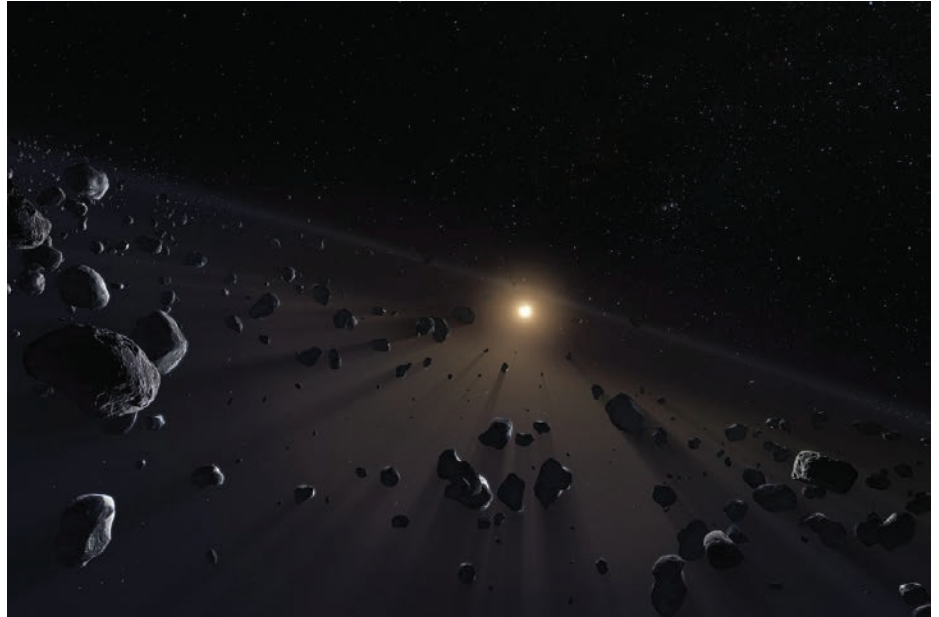
Answering the question of why more people suffer from heart problems after cyclones is becoming increasingly important to policymakers as more communities come under threat. Warmer oceans are fueling more intense storms with higher wind speeds and longer durations, while rising sea levels worsen storm surge flooding that can prolong recovery.

Climate change is also pushing tropical cyclones poleward into regions that have historically experienced few severe storms, such as eastern Canada and New Zealand.

“Places that historically experienced fewer cyclone events could have much higher risk,” Huang said, suggesting that such regions may be inadequately equipped to respond to major storms. “We need to focus on these regions to better prepare for the growing risk.”

By **Andrew Chapman** (@andrewchapman.bsky.social), Science Writer

A Survey of the Kuiper Belt Hints at an Unseen Planet



The Kuiper Belt is home to rocky, icy bodies left over from the formation of the solar system. Credit: ESO/M. Kornmesser, CC BY 4.0 (bit.ly/ccby4-0)

Scientists think they’ve uncovered evidence of a new planet, the first to be discovered in nearly 2 centuries.

Following an analysis of the orbits of bodies in the Kuiper Belt, a team has proposed that an unseen planet at least 25 times more massive than Pluto might reside there. These results were published in *Monthly Notices of the Royal Astronomical Society* (bit.ly/Kuiper-Belt-Planet).

The Kuiper Belt is a doughnut-shaped swath of space beginning just beyond the orbit of Neptune and extending to roughly 1,000 times the Earth-Sun distance. It’s home to untold numbers of icy, rocky objects, including Pluto and other so-called Kuiper Belt objects such as Arrokoth.

Everything in the Kuiper Belt can be thought of as cosmic debris, said Amir Siraj, an astrophysicist at Princeton University and the lead author of the new paper. “It represents some of the leftovers from the formation of our solar system.”

And most of those leftovers are small: Pluto is the most massive known Kuiper Belt object, and it’s just 0.2% the mass of Earth.

But over the past decade, scientists have hypothesized that something substan-

tially larger than Pluto might be lurking in the Kuiper Belt. Evidence of that unseen world—a so-called Planet Nine or Planet X—lies in the fact that six Kuiper Belt objects share curiously similar orbital parameters and are associated in physical space. A nearby, larger planet could have shepherded those bodies into alignment, researchers have proposed.

“Neptune has a really strong grasp on the outer solar system.”

Planes, Planes, Everywhere

Siraj and his colleagues recently took a different tack to look for a massive resident of the Kuiper Belt: They analyzed a much larger sample of Kuiper Belt objects and focused on their orbital planes. One might expect the average orbital plane of Kuiper Belt objects to be the same as the average orbital

plane of the planets in the solar system, said Siraj. But a planet-mass body in the Kuiper Belt would exert a strong enough gravitational tug on its neighboring Kuiper Belt objects to alter measurably the average orbital plane of the Kuiper Belt, at least in the vicinity of the planet. Siraj and his collaborators set out to see whether they could spot such a signal.

“This is really expected to be a game changer for research on the outer solar system.”

The researchers extracted information about the orbits of more than 150 Kuiper Belt objects from the JPL Small-Body Database managed by NASA’s Jet Propulsion Laboratory in Pasadena, Calif. Of the several thousand known Kuiper Belt objects, the team homed in on that subset because those objects aren’t gravitationally influenced by Neptune. Neptune is the playground bully of the outer solar system, and the orbits of many Kuiper Belt objects are believed to be literally shoved around by gravitational interactions with this ice giant. “Neptune has a really strong grasp on the outer solar system,” said Siraj.

The researchers calculated the average orbital plane of their sample of Kuiper Belt objects. At distances of 50–80 times the Earth–Sun distance, they recovered a plane consistent with that of the inner solar system. But farther out, at distances of 80–200 times the Earth–Sun distance, they found that their sample of Kuiper Belt objects formed a plane that was warped relative to that of the inner solar system. There was only a roughly 4% probability that that signal was spurious, they calculated.

Meet Planet Y

Siraj and his collaborators then modeled how planets of different masses at various orbital distances from the Sun would affect a simulated set of Kuiper Belt objects. “We tried all sorts of planets,” said Siraj.

By comparing those model results with the observational data, the researchers deduced that a planet 25–450 times more massive than Pluto with a semimajor axis in the range of 100–200 times the Earth–Sun distance was the most likely culprit.

There’s a fair bit of uncertainty in those numbers, but the team’s results make sense, said Kat Volk, a planetary scientist at the Planetary Science Institute in Tucson, Ariz., not involved in the research. “They did a pretty good job of bracketing what kind of object could be causing this signal.”

To differentiate their putative planet from Planet X, Siraj and his colleagues suggested a new name: Planet Y. It’s important to note that these two worlds, if they even exist, aren’t one and the same, said Siraj. “Planet X

refers to a distant, high-mass planet, while Planet Y denotes a closer-in, lower-mass planet.”

There’s hope that Planet Y will soon get its close-up. The Legacy Survey of Space and Time (LSST)—a 10-year survey of the night sky that will be conducted by the Vera C. Rubin Observatory in Chile—will be supremely good at detecting Kuiper Belt objects, said Volk, who is a member of the LSST Solar System Science Collaboration. “We’re going to be increasing the number of known objects by something like a factor of 5–10.”

It’s entirely possible that Planet Y itself could be spotted, said Volk. But even if it isn’t, simply observing so many more Kuiper Belt objects will better reveal the average orbital plane of the Kuiper Belt. That will, in turn, shed light on whether it’s necessary to think about a Planet Y at all.

Even if his team’s hypothesis is proven wrong, Siraj says he’s looking forward to the start of the LSST and its firehose of astronomical data. “This is really expected to be a game changer for research on the outer solar system.”

By **Katherine Kornei** (@KatherineKornei), Science Writer

Read the latest news at Eos.org



Call for Continental Scientific Drilling Proposals

The International Continental Scientific Drilling Program (ICDP) invites proposals for innovative drilling projects that address Earth’s history and global challenges.

Supported by 21 member countries and UNESCO, ICDP provides a platform to investigate key scientific and societal questions across its four core themes: Geodynamic Processes, Geohazards, Georesources, and Environmental Change. Proposals will be evaluated on scientific quality, global relevance, technical and financial feasibility, as well as inclusivity and contributions from early-career researchers.

ICDP applies a co-funding model, typically providing 5–70% of project costs. Since inception, ICDP has invested about US\$ 60 million in more than 60 projects, leveraging over US\$ 240 million from national agencies and other partners. Projects must align with the **ICDP Science Plan** and may also include land-sea drilling in cooperation with IODP.

The proposal system includes **Pre-Proposals**, **Workshop Proposals**, and **Full Proposals**, with the recent addition of the **Fast-track Full Proposal**.

The new Fast-track option allows researchers to bypass earlier stages in order to respond quickly to exceptional, high-impact opportunities requiring immediate support. Updated guidelines are available for resubmitting Pre-Proposals, and dedicated information can be found for geothermal and lacustrine drilling projects.

Proposals must be submitted by **January 15, 2026** to proposal.submission@icdp-online.org. The call is open to Principal Investigators from ICDP member countries, with international collaboration strongly encouraged. Member countries include Australia, Austria, Belgium, China, Estonia, Finland, France, Germany, Iceland, India, Italy, Japan, Netherlands, New Zealand, Norway, South Africa, Spain, Sweden, Switzerland, the United Kingdom, and the United States.

Further details, guidelines, and a video on proposal preparation are available on the ICDP website: www.icdp-online.org/proposals