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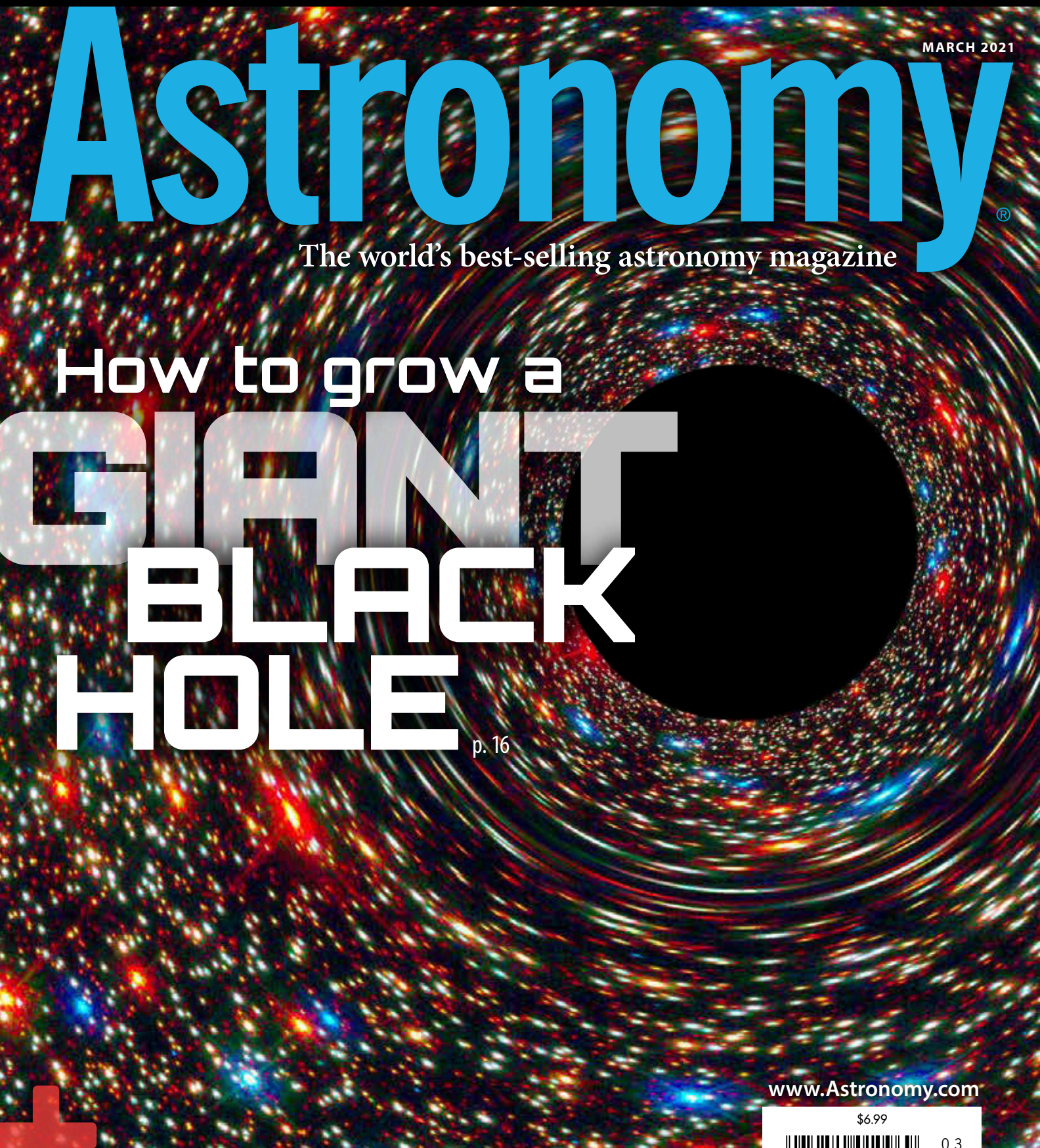

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ARECIBO COLLAPSES AFTER CABLE FAILURES

Astronomers are mourning the loss of the iconic radio telescope and paying tribute to its legacy.

BEYOND REPAIR. This image, taken the day after the main cable break, shows additional damage to Arecibo's reflector dish, enlarging the gash left by the previous auxiliary cable failure. Both cables that failed were anchored to the facility's southeast observing tower (at left).
UNIVERSITY OF CENTRAL FLORIDA

After 57 years of cutting-edge research and pop culture fame that inspired generations of scientists, the legendary Arecibo radio telescope in Puerto Rico was destroyed on December 1 when its receiving platform collapsed and came crashing down onto the dish below.

A series of cable failures doomed the massive facility. First, on August 10, an auxiliary cable that helped suspend the 900-ton receiving platform slipped out of its socket on one of three support towers that surround the observatory, tearing a 100-foot (35 meters) gash in the dish.

Then, on November 6 — just days before repairs were set to begin — one of the main cables attached to that same support tower snapped, likely due to the increased load it was bearing.

That put the structure at risk of total collapse — and therefore beyond repair. Engineers from outside firms hired to work on Arecibo concluded that losing another cable would probably trigger a cascading catastrophic failure.

The U.S. National Science Foundation (NSF), which owns the facility, announced November 19 it would decommission the radio telescope, saying it could not be safely repaired without risking the lives of workers.

"I don't think anyone understood that, clearly, the cable had deteriorated much below just those broken wires," said Ashley Zauderer, NSF's Arecibo program officer, at a press conference.

But before demolition plans were finalized, the receiving platform collapsed on its own the morning of December 1. No one was injured, said NSF, but the observatory's education center took significant damage from falling cables.

The impact of the platform was heard and felt around the area. Drone footage

NASA/JPL-CALTECH

JUPITER'S LUMINESCENT MOON

As Europa orbits Jupiter, it endures constant radiation from its host planet's magnetic field. Night and day, energy rains onto Europa, making the moon's ice-and-salt surface glow in the dark. Researchers also believe the nightside glow holds clues to whether Europa could sustain life. To answer that question, scientists looked at the way organic material reacted to similar blasts of radiation in the lab and uncovered something unexpected: variation in how different ice-salt compositions glowed. This means that Europa likely glows brighter in some spots than others, which can be seen in this artist's illustration. – CAITLYN BUONGIORNO

showed the crumpled Gregorian dome, which housed the telescope's sensitive receiving equipment, and the remains of an access platform on a hillside where it crashed through the dish. Support cables were strewn across the valley.

A CRUSHING BLOW

Arecibo's loss left scientists reeling. "I'm pretty crushed," Scott Ransom, an astronomer at the National Radio Astronomy Observatory and member of the North American Nanohertz Observatory for Gravitational Waves (NANOGrav) project, tells *Astronomy*. NANOGrav uses Arecibo and the Green Bank Telescope (GBT) in West Virginia to search for signs of gravitational waves by looking for telltale disruptions in the timing of radio signals coming from pulsars.

"This is a huge blow to NANOGrav, as about one-half of our gravitational wave sensitivity comes from Arecibo," Ransom says. "And because it is so much more sensitive than GBT, it will be impossible to replicate the timing precision we get."

Plus, Arecibo had the unique capability to not only receive radio signals but also transmit them, notes Yvette Cendes, a radio astronomer at the Harvard–Smithsonian Center for Astrophysics. "So you're out of luck for radar mapping of planets and asteroids if that was your field," says Cendes.

Scientists around the world took to social media, using the hashtag #WhatAreciboMeansToMe, to share stories of how Arecibo had inspired them or affected their careers. Some of the most heartfelt tributes came from Puerto Rican researchers, including in fields extending well beyond astronomy.

"Every Puerto Rican learns about Arecibo Observatory," tweeted Vivian Irizarry Gatell, a hematology/oncology fellow at the University of Florida. "It showed me that I could be a great scientist like my ancestors. … [Its loss] is a tragedy for STEM in Puerto Rico." – M.Z.

AFTER THE FALL. The steel carcass of the receiving platform and an access platform lie in a tangled heap across the remains of the reflector dish. UCF

QUICK TAKES

STAYING HYDRATED

The Stratospheric Observatory for Infrared Astronomy — NASA's Boeing 747-borne infrared telescope — has found traces of water ice on the Moon's sunlit surface. Researchers suspect micrometeorite fragments in the lunar soil protect the ice from turning to gas in sunlight.

BIRTH OF THE BULGE

A survey of the Milky Way's central bulge by the Cerro Tololo Inter-American Observatory in Chile found that most of its stars were born in a single burst of star formation more than 10 billion years ago — not in several spurts, as previously suggested.

NIGHT LIGHTS

In Tucson, Arizona, streetlights account for no more than 14 percent of light pollution, according to a 2019 experiment in which the city dimmed them for several nights. This suggests additional light sources, such as signs and sports fields, must be curbed to preserve dark skies.

ROCKY WITH A CHANCE OF ROCKS

The Earth-sized exoplanet K2-141 b has an atmosphere of rock vapor, according to simulations. With surface temperatures of 5,400 degrees Fahrenheit (3,000 degrees Celsius), its lava oceans evaporate, condense, and rain rocks.

HIGH HONOR

The 64-meter Parkes radio telescope in Australia has been given an Indigenous name by elders of the Wiradjuri, the Aboriginal people native to the area. The name, *Murriyang*, means "Skyworld," which is the mythological home of the Wiradjuri creator spirit Biyaami.

GETTING HEATED

The average temperature of galaxy clusters in the universe is nearly 4 million F (2.2 million C) — three times hotter than it was 8 billion years ago, according to new research. The heating is due to friction generated as clusters pull in gas over time. – M.Z.