

Astronomers reveal first image of a black hole

By **SETH BORENSTEIN**
Associated Press

WASHINGTON — Humanity got its first glimpse Wednesday of the cosmic place of no return: a black hole.

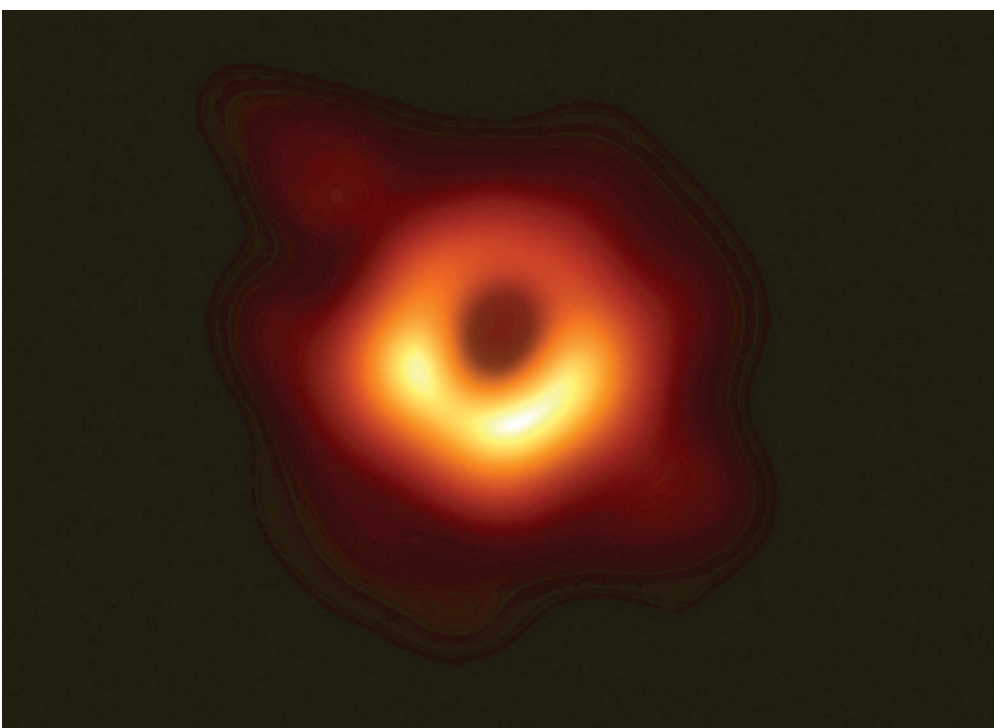
And it’s as hot, as violent and as beautiful as science fiction imagined.

In a breakthrough that thrilled the world of astrophysics and stirred talk of a Nobel Prize, scientists released the first image ever made of a black hole, revealing a fiery doughnut-shaped object in a galaxy 53 million light-years from Earth.

“Science fiction has become science fact,” University of Waterloo theoretical physicist Avery Broderick, one of the leaders of the research team of about 200 scientists from 20 countries, declared as the colorized orange-and-black picture was unveiled.

The image, assembled from data gathered by eight radio telescopes around the world, shows light and gas swirling around the lip of a supermassive black hole, a monster of the universe whose existence was theorized by Einstein more than a century ago but confirmed only indirectly over the decades.

Supermassive black holes are situated at the center of most galaxies, including ours, and are so dense



Event Horizon Telescope Collaboration/Maunakea Observatories

Scientists revealed the first image ever made of a black hole after assembling data gathered by a network of radio telescopes around the world.

that nothing, not even light, can escape their gravitational pull. Light gets bent and twisted around by gravity in a bizarre funhouse effect as it gets sucked into the abyss along with superheated gas and dust.

The new image confirmed yet another piece of Einstein’s general theory of relativity. Einstein even predicted the object’s neatly symmetrical shape.

“We have seen what we thought was unseeable. We have seen and taken a picture

of a black hole,” announced Sheperd Doeleman of Harvard, leader of the project.

Jessica Dempsey, another co-discoverer and deputy director of the East Asian Observatory in Hawaii, said the fiery circle reminded her of the flaming Eye of Sauron from the “Lord of the Rings” trilogy.

Three years ago, scientists using an extraordinarily sensitive observing system heard the sound of two much smaller black holes merging to create a gravitational

wave, as Einstein predicted. The new image, published in the *Astrophysical Journal Letters* and announced around the world, adds light to that sound.

Outside scientists suggested the achievement could be worthy of a Nobel, just like the gravitational wave discovery.

“I think it looks very convincing,” said Andrea Ghez, director of the UCLA Galactic Center Group, who wasn’t part of the discovery team.

The picture was made with equipment that detects wavelengths invisible to the human eye, so astronomers added color to convey the ferocious heat of the gas and dust, glowing at a temperature of perhaps millions of degrees. But if a person were to somehow get close to this black hole, it might not look quite like that, astronomers said.

The black hole is about 6 billion times the mass of our sun and is in a galaxy called M87. Its “event horizon” — the precipice, or point of no return where light and matter get sucked inexorably into the hole — is as big as our entire solar system.

Black holes are the “most extreme environment in the known universe,” Broderick said, a violent, churning place of “gravity run amok.” Unlike smaller black holes, which come from collapsed stars, supermassive black holes are mysterious in origin.

Despite decades of study, there are a few holdouts who deny black holes exist, and this work shows that they do, said Boston University astronomer professor Alan Marscher, a co-discoverer.

The project cost \$50 million to \$60 million, with \$28 million of that coming from the National Science Foundation. The same team has gathered even more data on a black hole in the center of

our own Milky Way galaxy, but scientists said the object is so jumpy they don’t have a good picture yet.

Myth says a black hole would rip a person apart, but scientists said that because of the particular forces exerted by an object as big as the one in M87, someone could fall into it and not be torn to pieces. But the person would never be heard from or seen again.

Black holes are “like the walls of a prison. Once you cross it, you will never be able to get out and you will never be able to communicate,” said astronomer Avi Loeb, who is director of the Black Hole Initiative at Harvard but was not involved in the discovery.

The telescope data was gathered two years ago, over four days when the weather had to be just right all around the world. Completing the image was an enormous undertaking, involving an international team of scientists, supercomputers and hundreds of terabytes of data.

When scientists initially put all that data into the first picture, what they saw looked so much like what they expected they didn’t believe it at first.

“We’ve been hunting this for a long time,” Dempsey said. “We’ve been getting closer and closer with better technology.”

Housing: Suggestions include updating zoning codes

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commercial services, as well as an unknown capacity for water and sewer. Population projections also show that unincorporated areas will actually see a decrease, while the rest of the county will see a modest increase.

“Certainly market forces are going to push development of housing in unincorporated areas, but we would say is (governments) need to think about the ability to accommodate that,” Buckley said.

Increasing density

So what can be done? Use residential land as efficiently as possible to offer different types of housing that are affordable to more people, the report suggests.

Many of the solutions offered in the report center around adjusting zoning requirements or updating development codes to encourage more density in zones that already allow for it.

Every area, with the exception of Seaside, which is the only city projected to not have enough land to serve its population growth, has land zoned medium and high density that is available for development.

The problem is much of this land is allowed to be developed with single-family homes.

Some of the suggestions include updating codes to not allow new single-family homes — the most prolific type of housing in the county — in high-density zones. Instead, cities should encourage more multiunit dwellings like duplexes, triplexes and groups of small, detached homes called “cottage clusters.”

This type of housing can be less expensive to build and can serve first-time and lower-income buyers.

“While having a mix of housing types in these zones is not in and of itself a bad thing, it is important to preserve an adequate supply of land designated for medium and high density for higher-density housing forms — townhouses, triplexes, fourplexes and multifamily dwellings,” the report said.

While the majority of the county allows alternative forms of housing like duplexes or accessory dwelling units — which are separate structures that can be rented out on the same lot as a single-family home



Colin Murphey/The Daily Astorian

A construction crew works on the floor of a housing development in Warrenton in 2018.

— governments often require conditional use permits.

Eliminating that barrier could make it easier for a developer to create housing options, according to the report. An example would be making it an outright use to create housing in commercial zones, rather than something that requires an extensive review process.

“A lot of those (housing options) are allowed, but there is more work to be done ... to make them more feasible in certain areas,” Buckley said.

The study also emphasized the importance of establishing minimum density standards — especially for land-strapped communities like Seaside and Cannon Beach, where filling in existing residential neighborhoods will be especially critical.

So far, the only place in the county that requires a certain number of units is Mill Pond in Astoria.

Another significant part of the problem is how housing is used. Twenty-seven percent of homes

in the county are vacant. In South County, the construction of second homes outpaced those for long-term residents.

Vacation rentals and second homes are consuming a substantial share of the housing stock, which in turn affects the costs of both long-term rentals and home sales, according to the report.

“We don’t want to imply that it’s all negative,” Buckley said. “But what we’ve talked about is the fact that short-term rental activity at its heart ... that’s a commercial activity. And if that’s happening in your residential zones, that’s like allowing a hotel in your residential zone.”

The report suggests solutions that many communities have already adopted, like capping rentals and restricting them to certain areas or zones.

Incentives

Getting housing projects rolling might be difficult without some resources for local governments.

“You cannot build affordable housing for 80% of (the area medium income) and below without some kind of public subsidy,” said Matt Hastie, a project manager with Angelo Planning Group.

The report suggested using an urban renewal fund, a construction excise tax and passing a county-wide bond to have a steady stream of money that would fund projects or subsidize rents.

Over the next few months, the consultants will make presentations to each of the cities and work to develop a summarized document with specific advice and guidance.

While the county and each city has its own unique challenges, working as a region and having regulatory consistency and efficiency is a critical part in driving change, Hastie said.

“In few industries is the old adage that ‘time is money’ more true than the development industry,” the report stated.

Funding: Teachers have expressed concerns over increased class sizes

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Approximately \$1 billion every two years would go into a Student Success Fund providing grants directly to school districts. The grants would target four broad areas: reducing class sizes; expanding learning time and reducing time lost to assessments; student health and safety, including more health professionals and improved facilities; and expanding learning experiences, including early literacy programs and class options.

“Some of these we already want to do,” Hoppes said. “We just don’t have the money to do it.”

Grant distributions would use the same formula as the State School Fund, which looks at average daily enrollment with weighted amounts for special circumstances such as special education, English learners and pregnant teens. Students in poverty would bring in double the weight in grant funding.

The state Department of Education would tie the grants to targets around on-time graduation, finishing ninth grade with six credits, third-grade reading proficiency, attendance and other local goals.

Teachers statewide have expressed concerns over increased class sizes leading to behavioral problems. The school district’s highest priority with any additional funding will be reducing class sizes that have reached as high as 29 on average at Astoria Middle School.

“If we have the money, I’m going to be looking to add some teachers,” Hoppes said.

Juries: Legislature working on a bill asking voters to reconsider nonunanimous juries

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In 1972, the nation’s highest court ruled 5-4, in a case out of Oregon, that the right to a jury trial doesn’t require unanimous verdicts. In March, the Supreme Court agreed to hear a case out of Louisiana, signaling that the court may be looking to change course.

Under the Sixth Amendment, unanimous verdicts are required in federal criminal cases. In fact,

49 states and the federal government all require unanimous verdicts.

Oregon is the last state in the country that allows juries in criminal cases to reach verdicts without all 12 jurors agreeing. Last fall, voters in Louisiana voted to change its constitution, scrapping split juries there.

Critics point out that not only do nonunanimous juries allow for convictions when there’s doubt, but they argue they discriminate

against defendants of color.

In Louisiana, nonunanimous juries were enshrined in the constitution after slavery to make it easier to convict African American defendants and provide the state with a convict workforce. Oregon adopted nonunanimous juries in 1934. At the time, the Ku Klux Klan was powerful in the state and the anti-immigrant sentiment was high.

“Both laws were based on discrimination and are, like, last rel-

ics of those times,” said Aliza Kaplan, director of the criminal justice reform clinic at Lewis & Clark Law School in Portland, during an interview last year.

Proponents argue they allow for a more efficient criminal justice system and fewer hung juries.

“The only thing nonunanimous juries do is reduce hung juries. And the only thing unanimous juries do is increase hung juries. Each is true regardless

of race. So the only question is do we want more hung juries or not?” Josh Marquis, the former Clatsop County district attorney, wrote with Tillamook County District Attorney William B. Porter and Jefferson County District Attorney Steve Leriche in an opinion column in *The Oregonian* last November.

The Oregon Legislature is working on a bill that would ask voters to reconsider nonunanimous juries in a ballot measure.