

# THE ART OF SCIENCE

**Picture it** Visual representations of scientific concepts, whether they relate to black holes or the Great Barrier Reef, render them less abstract, writes Michael Bailey.

**T**he first ever picture of a black hole caused a global sensation last year, but few realised the image was as much art as science. "It's the modern equivalent of taking a picture of a unicorn," says science communicator Margaret Wertheim of the image produced by the Event Horizon Telescope project.

Assembled from astronomical radio sources gathered by a global network of telescopes, the black hole image might seem an unlikely subject for an art symposium.

However, that's exactly the topic being discussed this week at an event organised by the University of Melbourne's *Art+Australia* magazine. The Event Horizon image's depiction of bent space and time in a galaxy 55 million light years away resonates as the greatest art does, says the magazine's editor, Edward Colless.

"For all its technical grandeur, the image has the eeriness of the very first analog photographs or X-ray images, as if this too may be the start of a new way of seeing things," he says.

"As a picture of apocalyptic destruction – the brink where space and time are sucked into the obliterating singularity of a black hole – the image seems to have arrived at an auspicious, if not ominous, moment, when we gaze at our human world collapsing under a climate crisis, in the prospect of species extinction and within the wave of a viral pandemic."

The symposium will feature a talk by Brisbane-born Wertheim, who wrote a 1995 bestseller interrogating male domination of the sciences – *Pythagoras' Trousers: God,*



*Physics and the Gender Wars* – and is now based in Los Angeles, where she runs the Institute For Figuring with her identical twin, Christine, who is an artist.

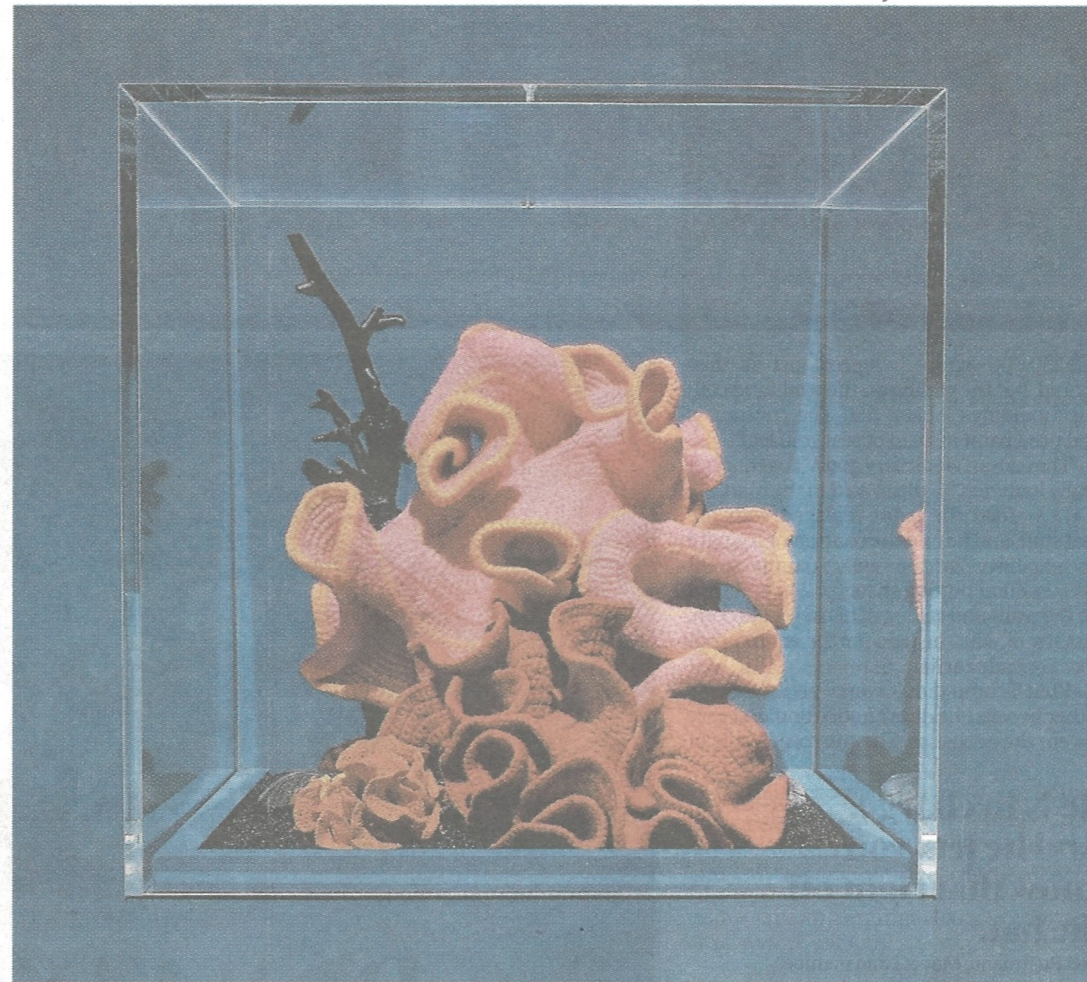
The Event Horizon black hole is the type of thing close to the institute's heart.

"It's taken a concept as complex and arcane as a hole in the structure of space-time, and made it a captivating picture," Wertheim says of the image, where orange material appears to hover peacefully around the black hole. In reality it's being consumed by immense gravitational pull.

"I'm not sure the image constitutes art, but an enormous amount of artistry was involved to get that level of finesse we see in it," she says.

What Event Horizon did for black holes and general relativity, Wertheim aims to do for other scientific concepts at her Institute For Figuring.

"If science can be made more representational or more play-based,



Above left: The Event Horizon Telescope image of a black hole in a galaxy that is 55 million years away. Above: A part of the Crochet Coral Reef project. Below: science communicator Margaret Wertheim.



people will learn more about it than they'd probably give themselves credit for – certainly more than listening to someone give a lecture," she says.

The Wertheim sisters have made this point most successfully with *Crochet Coral Reef*, a project that's been running for 15 years and has been added to by 10,000 knitters from around the world.

The project is based on a discovery in 1997 by Latvian mathematician Daina Taimina that crocheted items can be used to illustrate so-called "hyperbolic space". Itself dis-

covered only in the 19th century, hyperbolic space is based on lines that curve outwards, as opposed to the longer-established Euclidean space based on parallel lines, or spherical space where lines curve inwards.

With its negative curvature, hyperbolic geometry underlined Einstein's theory of relativity. However, once Taimina had inspired the Wertheim sisters to take up knitting needles and create their own hyperbolic forms, they discovered on their doorstep an example of the geometry that had been around for millions of years: the Great Barrier Reef.

The frills and crenellations of coral are



The *Crochet Barrier Reef* project was conceived by the Brisbane-born sisters Margaret and Christine Wertheim.

embodiments of hyperbolic geometry, designed to give filter-feeders the maximum surface area with which to absorb nutrients.

The crinkling on lettuce leaves and the flanges on sea slugs are other examples of this geometry which mathematicians, wedded to the straightness and certainty of the Euclidean form, spent hundreds of years trying to prove impossible.

"They had such a symbolic view, they couldn't see what was going on in the salad in front of them," Wertheim says.

In that spirit, the Wertheims began crocheting coral forms that deviated slightly from strict hyperbolic models, and began getting the wild-looking forms that have been exhibited everywhere from the Andy Warhol Museum to last year's Venice Biennale.

The project has recently evolved from woolly evocations of wetness to include "toxic reefs" made of plastic waste pulled from oceans, highlighting the threats to nature's serendipity from man-made pollution and climate change.

And unlike all those male mathematicians, women intrinsically get it.

"So much science communication doesn't reach women, and I hear from them at our workshops that it's so empowering to do a handicraft, which they relate to because their mother or grandmother did it, and be exposed to the mathematics underlying general relativity at the same time," Wertheim says. **W**

*Art+Australia's Event Horizon virtual symposium runs from August 17 to 21.*