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SCIENCE

Jerry Nelson, Designer of the Segmented Telescope, Dies at 73

By JONATHAN WOLFE JUNE 21, 2017

Jerry Nelson, who conceived of the design for the segmented telescope, which allowed scientists to peer farther into the universe than ever before, died on June 10 at his home in Santa Cruz, Calif. He was 73.

His death was confirmed by his daughter, Alexandra Nelson, who said she did not know the cause.

Mr. Nelson's designs were the basis for the twin telescopes at the W. M. Keck Observatory on Mauna Kea, a dormant volcano on the island of Hawaii. Astronomers have used those telescopes to help measure the giant black hole at the center of the Milky Way, and to find and confirm planetary bodies outside our solar system, including potentially habitable planets.

When the first Keck telescope was installed, in 1993, it was nearly twice as large as any other telescope, at 10 meters in diameter.

For decades, the size of telescopes seemed to have stalled with the roughly five-meter Hale Telescope at Palomar Mountain, Calif., built in 1949. (The Soviet Union constructed a roughly six-meter telescope in the Caucasus Mountains, but its performance never lived up to its size.)

The sticking point was the central mirror. The diameter of the mirror, a giant round disk of glass whose surface is exquisitely polished to ensure maximum accuracy, determines how much light the telescope can capture and how sharp an image it can create.

Building a mirror larger than five meters is a Catch-22: It needs to be thick enough to support its weight and not collapse, but the mass required to do that can cause gravity to change the shape of the mirror when it moves.

Rather than use a single concave mirror, Mr. Nelson, along with the physicist Terry Mast and the engineer George Gabor, proposed using 36 smaller hexagonal mirrors, arranged in a honeycomb-like pattern, to make one large one.

Each interlocking piece, about 6 feet wide and 3 inches thick, would be supported and rearranged by a computer to maintain its correct position.

It was a radical idea, and it required a level of precision that many thought impossible. “They told us we couldn’t electronically glue together broken pieces of glass,” Mr. Gabor told The Los Angeles Times in 1993.

Today, the design is the basis for many advanced telescopes, both on the ground and in space.

Jerry Earl Nelson was born on Jan. 15, 1944, in Glendale, Calif., to Julian Bonne Nelson, a machinist for Lockheed, and the former Leona Jeanette Hill, who managed the local children’s park.

After attending Verdugo Hills High School in Los Angeles, Mr. Nelson received a B.S. in physics at the California Institute of Technology in 1965 and a Ph.D. in physics at the University of California, Berkeley, in 1972. He worked as a staff researcher at the Lawrence Berkeley National Laboratory from 1970 to 1981 and taught astronomy at Berkeley from 1981 to 1994.

He spent the early 1990s in Hawaii as a project scientist during the construction of the Keck telescopes, before returning to the mainland and taking a position as a professor of astronomy at the University of California, Santa Cruz, in 1994.

In addition to his daughter, Mr. Nelson is survived by his wife, Jocelyn Torricelli Nelson; a son, Leif Nelson; a sister, Jeanne Moat; and three grandchildren. His marriage to Victoria Alexandra Wearne, the mother of his children, ended with her death in 1992.

In the 1990s, Mr. Nelson was one of the few people who understood the potential and the practical technology challenges of building adaptive optics systems, which improve the performance of telescopes by correcting for Earth's atmosphere. In 1999, he became the founding director of the Center for Adaptive Optics at the University of California, Santa Cruz.

Even after he had a stroke in 2011 that left him partly disabled, Mr. Nelson continued to travel to the Santa Cruz campus and worked as a project scientist for the Thirty Meter Telescope, a project to build the largest telescope in the Northern Hemisphere.

His colleagues recalled Mr. Nelson as a deeply curious man with almost impossibly high standards. "When you were working with Jerry," Michael Bolte, a fellow professor at Santa Cruz, said in an interview, "nothing seemed impossible."

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