UCLA Astrophysicist and Nobel laureate Andrea Ghez delivers 2024 Reines Lecture

Ghez told the story of how she led the team that discovered a supermassive black hole at the center of our galaxy.

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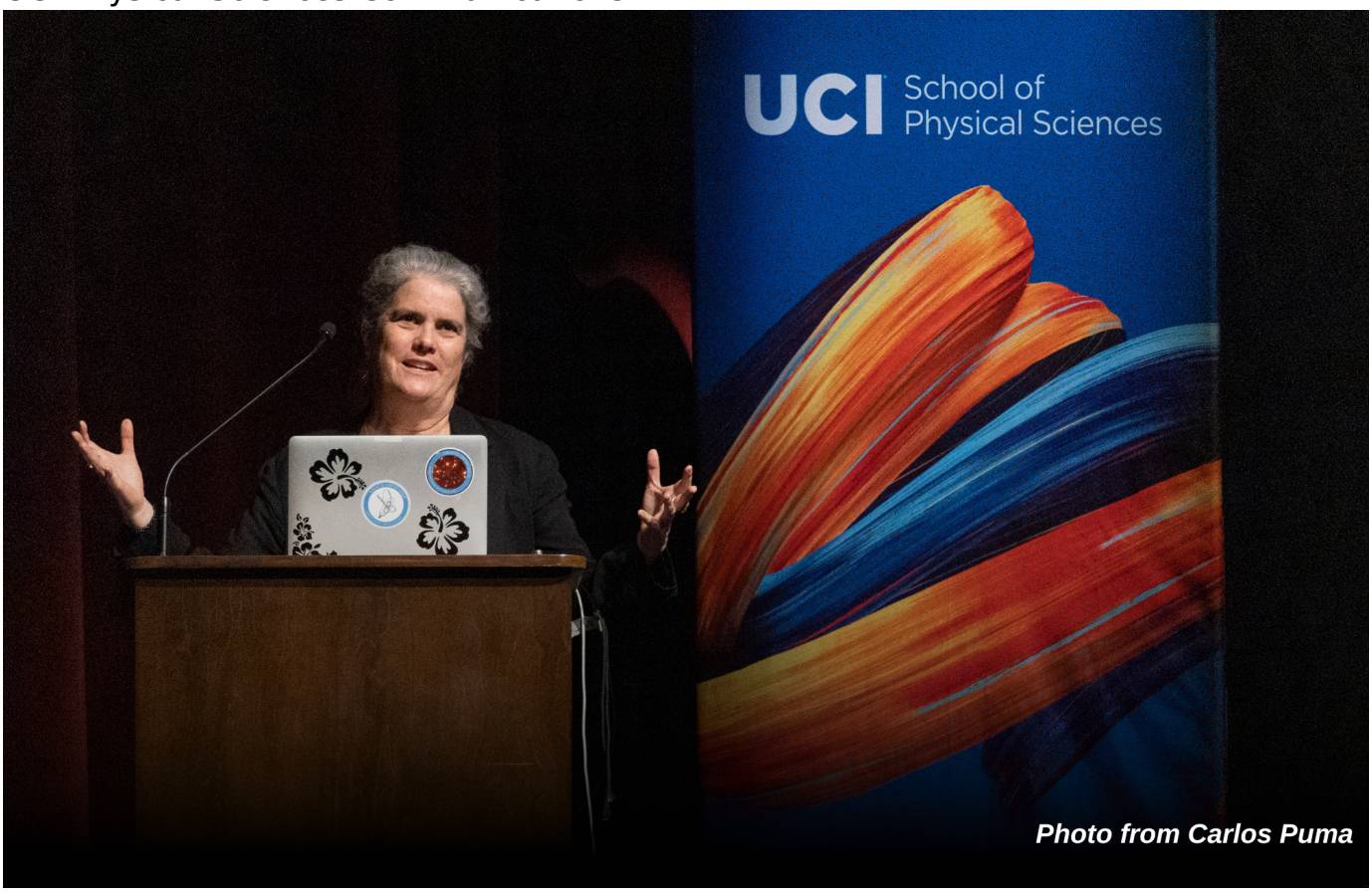

Professor and Nobel laureate Andrea Ghez of UCLA tells the story of the discovery of the supermassive black hole at the center of the Milky Way.

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When Professor Andrea Ghez started her career as an assistant professor of astrophysics at UCLA, she sought to answer one of the biggest questions in her field – is there a supermassive black hole at the center of our home Milky Way galaxy?

Her quest for an answer earned her the Nobel Prize in Physics in 2020, and on March 12th at the Irvine Barclay Theatre, Ghez recounted the story as part of the UCI Department of Physics & Astronomy's 2024 Reines Lecture.

Back in the 1990s, when Ghez started working on the black hole question, no one knew what lay at the center of our galaxy. So, Ghez applied for a grant to get the project started.

But "we didn't get support," Ghez said. "They didn't believe this project would be successful."

Rather than give up, Ghez's resolve only strengthened. "Every challenge is an opportunity," she said.

Using the University of California-administered W.M. Keck Telescopes on the summit of the dormant Mauna Kea volcano in Hawaii – and with the help of telescopic instruments developed at UC Irvine by Gary Chanan – Ghez and her team eventually proved beyond a shadow of a doubt that a supermassive black hole resides at the heart of the Milky Way.

It was a hard trick to pull off, because black holes, which have a gravitational force so large that not even light can escape them, are impossible to observe directly. Instead, the team observed the movement of the stars around the galaxy's center, and by charting the details of their orbits, they showed that there must be an invisible massive black hole exerting a gravitational influence on them.

"This has been an incredible journey," Ghez said. "And we have so much further to go."

The Reines Lecture is named for former UCI physicist and Nobel Laureate Professor Frederick Reines, who alongside Clyde Cowan was the first scientist to detect a neutrino – a subatomic particle that's the second most abundant particle in the universe.

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