

UCLA

CSW Update Newsletter

Title

Andrea Ghez Receives Crafoord Prize

Permalink

<https://escholarship.org/uc/item/33k669dn>

Author

Sher, Ben

Publication Date

2012-03-15

Copyright Information

This work is made available under the terms of a Creative Commons Attribution-NonCommercial-NoDerivatives License, available at <https://creativecommons.org/licenses/by-nc-nd/3.0/>

Andrea Ghez Receives Crafoord Prize

PROFESSOR IN DEPARTMENT OF PHYSICS AND ASTRONOMY AT UCLA
IS FIRST FEMALE RECIPIENT OF THE PRESTIGIOUS AWARD

THE ROYAL SWEDISH ACADEMY OF SCIENCES has selected Andrea Ghez, a professor of physics and astronomy at UCLA, to receive the 2012 Crafoord Prize in Astronomy. She is being honored by the Academy for “observations of stars orbiting the Galactic center, indicating the presence of a supermassive black hole.” The Crafoord Prize, which includes an accompanying award of 4 million Swedish krona, is considered one of the world’s largest scientific prizes. Ghez is the first woman to win the award since its establishment in 1982.

For the last few decades, astronomers have argued for the possibility of a black hole at the center of our galaxy. However, until recently, the limitations of technology have made it impossible

to prove their hypotheses. Professor Ghez has been able to produce extraordinarily clear, detailed images of a variety of astronomical objects. In doing this, Ghez drew upon her expertise in high-resolution imaging and University of California’s impressive resources. In particular, Ghez utilized the two largest telescopes in the world, located at The Keck Observatory in Hawaii.

“This research was possible thanks to the W.M. Keck Observatory...they have enabled us to achieve the tremendous progress that we have made in correcting the distorting effects of the Earth’s atmosphere with high-angular resolution imaging,” Ghez stated in an article for UCLANews, published on January 19, 2012. “The most recent technology of adaptive optics is now



Andrea Ghez

opening up new horizons and allowing us to learn even more about this black hole at the center of our galaxy—how it was formed, how it grows, and how to correctly describe the properties of space and time in the vicinity of such an exotic object.”

Ghez described black holes as collapsed stars so dense that nothing can escape their gravitational pull, including light. They cannot be seen directly, but their influence on nearby stars is visible and provides a signature. The black hole at the center of our galaxy, residing approximately 26,000 light-years away from the earth, has a mass more than 3 million times that of the sun. In a recent phone interview with the CSW, Ghez emphasized the importance of her discovery to our current understanding of the universe’s makeup. She also quelled any science-fiction movie induced anxieties raised by the terms “black hole.”

“In terms of are we in danger from a black hole—we’re fine. We’re not going to get sucked in. It’s going to effect our understanding of the universe,” says Ghez. “We now know that these objects that [have been thought of as] really exotic, these black holes, basically represent the breakdown of our physical understanding of the universe... These black holes seem to exist at the center of our galaxy, and our galaxy is fairly garden variety, so this seems to suggest that they exist in all galaxies. By learning about the formation and the black holes, we’re really learning about the formation and evolution of our galaxy, which

is the basic building block of our universe.”

In an interview with *The Daily Bruin* published on January 13, 2012, Ghez pointed out that the black hole demonstrates to astronomers that the current physical description of the universe needs to be revised, because current physics laws do not make sense of how black holes can exist. Ghez and her colleagues are currently continuing their exploration of the black hole and its surroundings. This research has yielded several surprising discoveries.

“Not only have we been able to prove that there’s a black hole by taking these very high resolution pictures at the center of the galaxy, but what we’ve seen there is very unlike our predictions of what we would see there,” says Ghez. “We originally predicted that, around a black hole, we wouldn’t see young stars—because a black hole would make it hard for young stars to form. [We also predicted] that there would be lots of old stars. Yet what we see observed is the exact opposite: we see tons of young stars and fewer old stars.” These findings are leading researchers to re-think their understanding of how black holes interact with their surroundings, and how the black holes and their host galaxies grow over time.

Ghez is thrilled and honored that her work, and the work of her colleagues, has been recognized with this prestigious award. “The award is really a gift. The award recognizes the work that’s

been done, and of course there’s a lot of work that we’re hoping to do in the future, so we’re in no way done with our research,” says Ghez. “Hopefully it will allow us to take the next step. I’m really thrilled, I’m so happy that the work that’s been done here at UCLA, and of course this is work that I’ve done in collaboration with a lot of people here, has been recognized. That’s really exciting, and of course it’s sort of hard to believe, but I’m thrilled.”

Ghez, who came to UCLA in 1994, has received many awards and honors during her tenure here, including being selected as a 2008 MacArthur Fellow and becoming one of the youngest people to be elected to the National Academy of Science. Ghez takes special pleasure and pride from the fact that she is the first woman to receive the Crafoord prize. According to the UCLA Newsroom website, she is “delighted to be the first woman to be awarded this prize” and that she especially enjoys “being a role model to women science students.”

Ben Sher is graduate student in Cinema and Media Studies at UCLA and a writer for CSW Update.