

Sharing Her Joy in Science:

A Conversation with Nobel Laureate Dr. Andrea Ghez

By Jenna Jablonski, Guest Writer

Andrea Ghez, PhD, UCLA's Lauren B. Leichtman and Arthur E. Levine Professor of Astrophysics and director of the UCLA Galactic Center Group, won the 2020 Nobel Prize in physics for her discovery of a supermassive black hole at the center of the Milky Way galaxy. I sat down with her (virtually) to hear more about her career working to solve the mysteries of the universe, and why she wants to bring the public and the next generation of scientists along with her on this quest.

Responses have been lightly edited for clarity.



Photo credit: Elena Zhukova

Jenna Jablonski: Women are still vastly underrepresented in physics compared to other STEM fields. How has this affected your experience throughout your career?

Andrea Ghez: Well, there definitely are very few women. It's always hard to say how it affects one's career. I was really fortunate to come from a family that supported my love of science, and I had wonderful mentors along the way, who supported my professional development and encouraged me along the way.

JJ: You are now known as the fourth woman to win the Nobel Prize in physics, but you have been a role model for women in science for much longer. You even published the book *You Can Be a Woman Astronomer* in 1995. What key message or advice do you have for other women in science?

AG: Find the things that you enjoy. On one hand, you can really develop the things you understand and enjoy. On the other hand, keep trying new things, because we don't know what we enjoy until we try them. I like to encourage my students to try things that they haven't done before.

JJ: The theme of this magazine issue is innovation and collaboration. What lessons have you learned about collaboration—and competition—through your research?

AG: Both collaboration and competition are very important. Having the opportunity to interact with people who have different points of view really furthers the science, and you can do that collaboratively or you can do that competitively. Both have their place, and they complement each other in really interesting ways. I have a big team of people that I lead and collaborate with today, and at the same time there's a competing group. I see it as the benefit of the "other"—both collaboration and competition help you reach a deeper understanding of what you are trying to achieve. I think everybody brings their own insight, their own background, their own perspective, and it's really wonderful to be able to harness that broader understanding.

JJ: You've made a point to share your knowledge directly with the public through documentaries, exhibits, and talks. Why is this so important to you—and why should the public know about black holes?

AG: I've been very committed to public engagement in science for two reasons. First, I think it's so important for women going into science to see women who are at the next level. I think having good, strong role models is really effective. So, the most effective way I can think of encouraging the next generation is by sharing my story, my research—and my joy in it. There's something really powerful about seeing people who look like you in a field. Of course, the converse is not seeing people who look like you, which makes you question whether or not you belong there. That's something I have felt along the way.

My second reason, which answers the question of why the public should know about black holes, is that so many people have a fundamental curiosity about the place in which we live in the universe. Astrophysics serves as a really important field for public engagement and for getting people excited about science and technology. We live in this highly scientific, technical world, and yet there's a tremendous amount of phobia and increasing skepticism about science. So, I think actually sharing the results of a field that people have an innate curiosity about is super important. And there's something very humbling about astronomy and astrophysics: it really points out that we have a lot in common. While we think a lot about our differences here on this planet, in the big picture, we all live on this tiny, insignificant planet. Astrophysics has a really effective way of pointing out both that commonality, and in some sense, our smallness.

JJ: You've been tracking stars since the 1990s, you've pioneered new imaging technologies, and have now made groundbreaking discoveries regarding the

supermassive black hole at the center of the Milky Way. What puzzle are you excited to solve next?

AG: Oh, there's so much more to do! In terms of our work at the center of the galaxy, we answered the question we set out to address, but the technology and the data set we've acquired over the last twenty years have actually uncovered more questions than answers. There are so many new puzzles that are in front of us.

Most of the predictions that you can make about what we expect to find around supermassive black holes have been inconsistent with the observations, which tells us that we have more to understand about the interaction between black holes and their host galaxies. Black holes are also intriguing because they point the way to a deeper understanding of gravitational physics. The fact that we can't really explain what a black hole is today tells us that there is more to be learned.

Understanding how gravity actually works in the vicinity of this exotic object that defies our current models continues to be an exciting objective. And as you make more and more measurements of these orbits, their scientific power for probing how gravity works near supermassive black holes increases. Really, we're just on the cusp of a lot of new results. So, it's exciting both to be at this point where the work is being recognized—shining a light on what's been done—but also giving us an opportunity to focus on the excitement of what remains to be done.

JJ: Is there anything else you would like to share with AWIS members?

AG: I think it's really important to have communities and networks of women. In terms of advice to young women, not only do I think it's important to find your passion and explore it, but also to find a community of people who will support you. While professionally I may be a minority, I'm certainly not a minority in the world outside of physics. So, something that's been very important to me is to have hobbies and passions through which I can have strong friendships and networks that provide the support system that we all need when we tackle really hard problems. While the Nobel Prize highlights success, we don't usually talk about the failures along the way. So much of science is built upon trial and error. Along with what works are a lot of things that don't work, so one needs to develop resilience to failure or challenges. Having strong social networks through lots of different organizations is important. I think it's wonderful that AWIS provides a vehicle for those communities. 🍷

Jenna Jablonski is a marketing communications consultant and founder of sisterstem.org, a website amplifying the voices of gender minorities in STEM.