What matters to Maya Silverman

The UCI Ph.D. candidate is unraveling the mysteries of dark matter and pushing the culture of physics in new directions by asking a simple, powerful question.

Friday, March 22, 2024

Lucas Van Wyk Joel
UCI Physical Sciences Communications



Maya Silverman works to amplify the voices of women and other underrepresented groups in physics and astronomy.

Picture Credit:
Hana Schiff / UCI

Maya Silverman, a Ph.D. candidate in the UC Irvine Department of Physics & Astronomy, has a powerful tool she uses to study the cosmos.

It’s not an all-seeing telescope that only she has access to or a network of wormholes that lets her traverse the universe with ease.

It’s a question: “Why?”

Silverman learned to ask “why” from a high school science teacher in San Francisco, Dr. Paolo Carini, who taught her that if you ask why enough times, you’ll eventually uncover what makes the universe work the way it does.

With “why” in her toolbox, Silverman, alongside Professor Manoj Kaplinghat, studies one of the most enduring enigmas in astrophysics: dark matter.

Unlike the matter that we can all see and touch, dark matter is invisible. Not only that, but as far as we know it doesn’t interact with regular matter.

But physicists know dark matter must exist because without it few of the things we *can* see in the universe make sense. Take our home Milky Way galaxy, for instance. The amount of observable matter in our home galaxy is not enough to explain the movement of stars around the supermassive black hole at the galaxy’s center.

In research Silverman and Kaplinghat published in 2023 in *Monthly Notices of the Royal Astronomical Society*, they describe how dark matter exists as a “halo” around galaxies like the Milky Way, with most dark matter concentrated at the center of the galaxy. And those halos, they report, can sometimes collapse as a result of dark matter particles colliding with one another.

Like the dark matter she studies, Silverman works to address another force: discrimination of women and other underrepresented communities in physics and astronomy. Historically, the number of women who receive a Ph.D. in those fields has lagged significantly behind men.

Encountering sexism, Silverman said, is a common experience among women and non-binary people in the sciences, which can make people “feel less than comfortable in certain spaces.”

Wanting to make a change, Silverman has worked to make physics and astronomy more inclusive fields. As a member of UNITY (Underrepresented Genders in Physics and Astronomy), she spearheaded a speaker series called Magnifying Voices in Physics, which sees fellow physicists like UCI postdoctoral researcher Sindhujha Kumaran tell the story of their journeys into science.

Silverman was also the Project Administrator for Professor Aomawa Shields' program Rising Stargirls, which helps middle school girls from underrepresented backgrounds learn about physics and astronomy through the creative arts. Silverman helped redesign the program to make it more accessible and engaging for participants. "That's something I'm really, really proud of," she said.

For all her work lifting up women in her field, Silverman won the Women in Natural Sciences award in 2022 and is now a DEI Graduate Leaders Fellow.

"One of the reasons I chose to come to UCI was that the department was working to increase diversity and make this a welcoming, inclusive space," said Silverman. "There are people, like Professor Mu-Chun Chen (Associate Dean of Diversity, Equity and Inclusion at UCI Physical Sciences), who are champions of DEI initiatives, and I wanted to be in a place where progress was being made, while acknowledging that underrepresented groups still face racism, sexism and other barriers to success on a regular basis."

While Silverman and others do a lot to change the culture of their field, she believes that the needed cultural shift will happen when everyone considers equity and inclusion their responsibility, too.

Because why not?

Feature Stories
Physics & Astronomy
The Future of Fundamental Science
Awards
Diversity, Equity and Inclusion
View PDF