Fears about NASA funding

Galaxy, exoplanet and dark matter studies by UC Irvine physics and astronomy researchers are facing potential cuts.

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At Vandenberg Air Force Base on California's central coast in March 2025, a SpaceX rocket was prepared for launch. It's payload was the SPHEREx space telescope, one of several NASA-funded astronomy projects involving UC Irvine faculty and student researchers. The instrument is being used to create an all-sky map of the universe to help astronomers answer questions about the history of the cosmos and learn more about the presence of water and other life-supporting molecules in the Milky Way galaxy.

Picture Credit:
NASA

- UC Irvine physicists and astronomers have conducted groundbreaking research with support from NASA.
- Scientists are uncertain about the future of their work given the turmoil at the federal level of the U.S. government.

For decades, the wonders of the cosmos and the humanity-affirming promise of space exploration have driven the National Aeronautics and Space Administration to support academic research. Astronomers, cosmologists and physicists at the University of California, Irvine have received substantial NASA grants over the years, but many are now wondering if that backing will continue amid U.S. government tumult at the federal level.

Despite the uncertainty, UC Irvine researchers are moving forward with their work on several NASA-funded projects.

Euclid mission

Euclid, a European Space Agency mission with substantial contributions from NASA, aims to gain a better understanding of dark matter and dark energy, two of the biggest mysteries about the universe. Asantha Cooray, UC Irvine professor of physics and astronomy, and his group have been involved in Euclid since their first proposals were submitted around 2008. In 2012, NASA authorities agreed to donate roughly 20 percent of the hardware needed for the project in exchange for membership in the science cohort.

“I have two team members – undergraduate students in UC Irvine’s Donald Bren School of Information & Computer Sciences – who are first authors of a Euclid science results paper describing the use of a machine learning technique to classify galaxies,” Cooray says. “That paper, now undergoing internal review, has between 200 and 250 co-authors from the U.S. and Europe, and our students are leading the work – not a bad accomplishment for two junior undergrads.”

U.S. government officials have suggested pulling away from such international space partnerships, which would be “devastating,” Cooray says, given the nearly two decades of effort and resources devoted to the Euclid project alone.

SPHEREx space telescope

In March, Cooray and some of his team were given an opportunity to view the launch of the SPHEREx space telescope in person at Vandenberg Air Force Base, on California's Central Coast. Cooray is on the scientific roster of SPHEREx, a NASA survey telescope that's being used to investigate the origins of the universe and inflation, the split second after the Big Bang in which the universe underwent a massive expansion. The telescope allows astronomers to study galaxy formation across the cosmos and detect the presence of life-supporting molecules in the Milky Way galaxy.

The current government turmoil is delaying a related NASA satellite mission, called MISE, that would extend the detectable range of wavelengths on the electromagnetic spectrum to longer infrared, beyond the capabilities of SPHEREx. This would give scientists like Cooray more tools to map the universe and, as proposed, would be much less expensive than the SPHEREx mission.

NASA exoplanet investigations

Paul Robertson, UC Irvine associate professor of physics and astronomy, specializes in the hunt for hard-to-detect exoplanets, planets beyond those in our own solar system. A recent effort involves the search for GEMS, giant exoplanets orbiting M stars. These are the smallest stars in our galaxy, and Robertson says longstanding theories of planet formation have predicted that they do not have enough mass to form giant planets like Jupiter and Saturn. However, he says, NASA's Transiting Exoplanet Survey Satellite has revealed that some GEMS do exist, and his team has been characterizing their basic properties.

"We are currently funded by NASA to do this work in preparation for the upcoming Ariel space mission, which will measure the composition of their atmospheres," Robertson says. "And two recent UC Irvine undergraduates and a Ph.D. student in my group have been working on a paper that describes two new exoplanets that fit the GEMS category."

James Webb Space Telescope research

Aaron Barth, UC Irvine professor of physics and astronomy, is operating under a NASA grant supporting the analysis of data from the James Webb Space Telescope observing program. "This involves studying an unusual high-redshift galaxy to understand its black hole properties and environment," Barth says. "High-redshift" indicates that a galaxy is very distant and expansion of the universe has stretched

its light into longer, redder wavelengths.

NASA funding for research using the James Webb and Hubble space telescopes does not come directly to UC Irvine but rather to its researchers through their affiliation with the Space Telescope Science Institute. But, Barth notes, there is some uncertainty about future funding for the James Webb Space Telescope observing program.

Technology transfer

Cooray says that a substantial amount of funds allocated to NASA by Congress every year goes on to support academic laboratories and research – from data analysis projects to the design, formulation and delivery of science missions. Research and development initiatives are enacted on campuses and through university-industry partnerships that are coordinated by NASA.

“Under the planned budget scenarios for the coming years, the large decrease in NASA funds will primarily impact such university-led science payloads, which will negatively impact not just university research but also small industries that have thrived in the past,” he says.

“Also, while the overall benefits of NASA research and associated tech developments are slow to be seen in the public, past research has had tremendous impact on our society,” Cooray says, providing examples such as medical imaging equipment and sensors in digital cameras and smartphones.

“If not for the tech effort to develop sensitive sensors for space-based astronomy over the last few decades, we would not have seen the parallel industrial effort that transferred NASA technologies for public use,” he says.

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