UC Irvine and Los Alamos Partnership Drives Scientific Excellence

Physical Sciences graduate students are redefining their fields at Los Alamos National Lab

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UCI Physical Sciences Communications



From left: Brandon Momanyi, Department of Physics & Astronomy, Elisa Olivas, Department of Chemistry and Juan Tolento, Department of Earth System Science, Marshall Campbell, Department of Physics & Astronomy and Austin Green, Department of Chemistry

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The UC Irvine School of Physical Sciences continues to grow its partnership with Los Alamos National Laboratory (LANL) by providing invaluable research opportunities for graduate students through the UCI-LANL-SoCal Hub graduate fellowship program.

The partnership, driven by a shared commitment to scientific innovation, is producing groundbreaking research at the lab where J. Robert Oppenheimer developed the atomic bomb.

The UCI-LANL-SoCal Hub graduate fellowship program allows UCI graduate students to work directly with leading scientists at LANL. Over the past two years, five students in the School of Physical Sciences have participated, immersing themselves in high-impact research projects alongside their UCI faculty advisors and LANL mentors. Each fellow receives one year of funding to support their research with LANL.

“Our graduate students in the School of Physical are strongly motivated to solve the toughest problems that the world faces, being able to provide an opportunity for them to both gain access to some of the nation’s best scientists and infrastructure at LANL not only sets them up for success for their doctoral work but provides them with unique career opportunities and professional development as well," said Associate Dean of Graduate Studies Franklin Dollar.

The 2023-2024 UCI-LANL-SoCal Hub graduate fellows from the School of Physical Sciences are:

Brandon Momanyi, Department of Physics & Astronomy

Elisa Olivas, Department of Chemistry

Juan Tolento, Department of Earth System Science

The inaugural 2022-2023 cohort of fellows included:

Marshall Campbell, Department of Physics & Astronomy

Austin Green, Department of Chemistry

Each fellow’s story and research with LANL highlight the opportunities fostered by the program. Below are some exemplary pioneering research endeavors that have resulted from the strong partnership between UC Irvine and Los Alamos National Laboratory.

Pioneering Climate Research

UCI Department of Earth System Science Ph.D. student Juan Tolento exemplifies the program's impact. This past winter, Tolento worked with LANL sea ice modeling experts Andrew Roberts and Erin Thomas to refine computer models that simulate Earth's climate. "Making a small change in the atmospheric component could easily cause errors in other areas of the model," Tolento explained. His work aims to improve the representation of how snow reflects sunlight, a critical factor in climate projections.

"Juan's time at LANL helped us create a valuable collaboration with him that we will continue to nurture for the remainder of his Ph.D. candidature," said Roberts. "It is also important that we learn from students like Juan who bring fresh ideas to this field of research."

Innovations in Chemistry

Elisa Olivas, a Ph.D. student in UC Irvine's Department of Chemistry, is another fellow making strides in her research with LANL. Under the mentorship of John Watt at LANL, Olivas is exploring how enzymes function within metal-organic frameworks (MOFs). Using state-of-the-art electron microscopy, she aims to understand enzyme behavior to improve industrial processes, like those in food and drug processing. The support she has received from LANL scientists is one reason she's returning in the summer to continue her research. "They always take the time to help you out with something," said Olivas. "They're very nice people."

Advancing Quantum Computing

Marshall Campbell, a Ph.D. student in the Department of Physics & Astronomy, is using his time at LANL to advance his research on controlling the properties of quantum materials. His research at LANL involves optical measurements at cryogenic temperatures to measure the changes in the material's crystal structure and electronic properties. His work is being compiled into a first-author paper that will feature several co-authors from LANL.

"Next, I plan to explore dynamic strain in my study materials using surface acoustic waves – another method to possibly control the electronic properties of quantum materials," he explained. Campbell will continue his work over the next two years as a UC-National Lab In-Residence Fellow.

Looking Ahead

The UCI-LANL partnership is providing world-class research opportunities for UCI graduate students and is one of many ways that the School of Physical Sciences is fostering long-term collaborations to drive basic research and innovations important to national security. The School of Physical Sciences will shortly announce the fellows for the program’s third year with plans to expand the fellowship program and deepen collaborative ties in future years.

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