Seven in the School of Physical Sciences win prestigious National Science Foundation Graduate Research Fellowship

Their research ranges from a search for new eye disease treatments to developing next-gen nanotechnology.

Tuesday, May 09, 2023

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UCI Physical Sciences Communications



The 2023 UCI Physical Sciences NSF GRFP awardees, clockwise from top left: Diana Lopez, Jiahao Jiang, Lena Gerritz, Madolyn Kelm, Samantha Frucht, Griffin MIlligan, Anabel Chen.

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Griffin Milligan, UCI Department of Chemistry

Griffin Milligan is a Ph.D. student in the lab of Maxx Arguilla, where he plans to concentrate on materials chemistry. Milligan found his passion for making chemical structures in undergraduate organic chemistry courses, and is now using that passion to construct extremely thin wires within the walls of nano-sized tubes. Such research aims to enhance the efficiency of electronic circuits in modern computers. To garner interest in semiconductor science, Milligan participates in programs like College Access, Readiness, and Success (CARS) and Laboratory Experiments in Physical Sciences (LEAPS) where he demos experiments to underserved high school and middle school students. After graduate school, Milligan said he will “go where the wind takes me,” as long as it still lets him make “interesting stuff.”

Diana Lopez, UCI Department of Chemistry

Ph.D. student Diana Lopez researches next-gen nanotechnology materials in Maxx Arguilla’s lab. As existing technologies get smaller and smaller, there is a need to design new nanomaterials for targeted nanoscale applications. Driven by her desire to understand the relationship between structure and function in the new materials, she aims to optimize the approaches to produce high-quality nanowires. Outside of research, Lopez promotes awareness of solid-state chemistry and graduate school through programs like the California Alliance for Minority Participation (CAMP). “I believe that everyone should have the opportunity to discover their passion for science and to pursue a fulfilling career in the field if they so choose,” Lopez said. After she graduates, Lopez plans to work as a materials researcher in the tech industry.

Lena Gerritz, UCI Department of Chemistry

Lena Gerritz is a Ph.D. student in the Sergey Nizkorodov and Manabu Shiraiwa labs where she researches atmospheric chemistry. As a child, Gerritz, dreamed of being a chemist, and now she studies how particles from wildfires age over time and affect our air quality. “Being a graduate student is my dream job for this stage in my life,” said Gerritz. “I get to explore my research interests, learn new things and make mistakes, all while being in a supportive environment.” Gerritz is an advocate for facilitating inclusive learning environments for students who, like herself, have a learning disability. She is also actively involved in middle school and high school

outreach for AirUCI – an organized research unit at UCI devoted to understanding climate change and improving air quality. “Getting future students excited about air quality is crucial to me to ensure efforts in improving our air quality are just as important for generations to come,” Gerritz said.

Anabel Chen, UCI Department of Chemistry

Anabel Chen is an undergraduate researcher in Professor Eric Potma’s lab, where she develops advanced optical microscopy techniques and applies them to study biological systems. Her current work focuses on using chemical imaging to understand eye disease therapies. Outside of research, Anabel is passionate about sharing her love for science with underserved groups both locally and in Asia, where she designs educational material and leads science outreach. After earning her B.S. in chemistry this spring, Anabel will continue her research in Potma’s lab as she pursues her Ph.D. at UCI. She hopes to eventually become a chemistry professor to drive science forward and to inspire future young scientists.

Samantha Frucht, UCI Department of Earth System Science

Samantha Frucht is a Ph.D. student in the UCI Department of Earth System Science where she works in Professor Jane Baldwin’s group. Frucht's research focuses on so-called tropical cyclone-heat compound events, which occur when extreme heat directly follows a tropical cyclone (called a hurricane if the storm originates in the North Atlantic Ocean). Tropical cyclones can knock out power to huge swaths of a population, which would prevent air conditioners and fans from being used. If extreme heat directly follows a tropical cyclone, this could lead to elevated public health risks. “I use numerical climate models that can simulate both of these events to try and understand how tropical cyclone-heat events are being affected by climate change,” said Frucht. “We expect them to become more frequent with global warming, but we need to be able to better quantify why that is. My research will help inform extreme weather warning systems and adaptation strategies so that we prepare effectively for these events and minimize their negative impacts on public health."

Jiahao Jiang, UCI Department of Physics & Astronomy

Jiahao Jiang is a Ph.D. student in the UC Irvine Department of Chemistry in the lab of Professor Huolin Xin. Xin’s lab is renowned for its work developing the future of things like electric car batteries, and Jiang’s work is following suit. “In my research

proposal, I explained how my work on developing new cathode materials for lithium-ion batteries with low cobalt content has the potential to impact the electrification of transportation," said Jiang. Current lithium-ion batteries contain cobalt, much of which comes from conflict zones in places like the Democratic Republic of Congo. "My research aims to contribute to the broader goal of creating more sustainable and efficient energy storage systems," Jiang said.

Madolyn Kelm, UCI Department of Earth System Science

Madolyn Kelm is a Ph.D. student in Professor Kristen Davis' group. "My research is focused on bio-physical interactions in coastal ecosystems," said Kelm. "Specifically, we are researching how kelp farms interact with current ecosystems in the Southern California Bight, and we are using measurements from an off-shore kelp farm in Santa Barbara to see if we can understand and predict how to maximize growth and minimize negative environmental impacts." Kelp, according to Kelm, is used in many industries, including as a food item, as a biofuel production source, as well as in pharmaceuticals, cosmetics, as well as a more sustainable ingredient in animal feed production. "Farmed kelp could even help remove excess carbon from our atmosphere," Kelm said.

Honorable Mentions

UCI Department of Chemistry

Logan Brennan

Jonas Enders

Lucas Korbanka

Colleen Miller

Kaylee Shoemaker

UCI Department of Physics & Astronomy

Leon Zhang

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