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Andrew Masuda

Immersive research experiences translate into an inspiring summer for undergraduate students

Eddy Rao, a mechanical engineering major at UC Santa Barbara, spent the summer generating custom tungsten-copper composites. Working for materials Ph.D. student [Lauren Poole](#) and her graduate advisor, materials professor [Frank Zok](#), Rao analyzed data provided by state-of-the-art equipment in the campus' shared-use facilities.

"This was my first exposure to research," said Rao, a soon-to-be sophomore whose opportunity for hands-on research came by way of [EUREKA!](#), a program of the [Center for Science and Engineering Partnerships](#) (CSEP) designed to enrich the academic experience of first-year undergraduates in science, technology, engineering and mathematic fields.

"I learned so much about the process of research," he added, "and I believe that my present-day skills and abilities reflect the increased confidence in myself that I have developed as a scientist and engineer."

CSEP provides immersive research experiences for undergraduate and community-college transfer students who have demonstrated the desire and the potential to become future scientific leaders. An array of summer activities culminated in the recent CSEP Undergraduate Research Colloquium, where some 80 undergraduate students, including Rao, showcased their research to other students, faculty and

guests.

EUREKA! was one of a dozen participating training programs represented at the poster session, which included scholar programs from across campus: Edison STEM, UCSB-Smithsonian, Society for Advancement of Chicano/Hispanics and Native Americans in Science (SACNAS) [Scholars Program](#), [PIPELINES](#), McNair Scholars Program, Cal-Bridge, [University of California Leadership Excellence through Advanced Degrees](#) (UC LEADS), Quantum Foundry REU, Physics REU, [Maximizing Access to Research Careers](#) (MARC), and [Beckman Scholars](#). In addition to training in independent research projects, the programs provided opportunities for scholars to network with industry and academia, and to develop important professional skills, including scientific communication.

“We organized this event to create a vibrant poster session, where undergraduates, faculty and researchers from across disciplines can exchange ideas in a diverse and supportive environment,” explained Wendy Ibsen, CSEP associate director and undergraduate coordinator for UCSB’s Quantum Foundry. “These scholars experience a larger, conference-like environment, taking another important step toward becoming professional scientists.”

As a Quantum Foundry intern, Andrew Allison investigated the material absorption of aluminum-gallium-arsenide ring resonators in the lab of [Galan Moody](#), an associate professor of electrical and computer engineering. Allison, a physics major, enjoyed the hands-on experience of learning how to solve a real-world problem without a clear path to follow.

“It was like being in the ‘Wild West’ of technology,” said Allison, who transferred to UCSB from Santa Barbara City College. “The most rewarding and impactful part of my summer was my growth as a researcher and problem solver, especially since I had no prior experience in a lab.”

Added Jordan Brower, a third-year chemistry major and UC LEADS Scholar, “I love the work that I’ve been doing. It’s been a great hands-on opportunity to learn more about the field of chemistry and how research is done, as opposed to sitting in a classroom.”

Not every participant was new to undergraduate research. Fourth-year chemical engineering major [Jessy Gonzalez](#) has been doing research since his freshman year. He spent this summer working as a Beckman Scholar in the lab of chemical

engineering professor [Michelle O'Malley](#), whose group focuses on the biotechnological potential of unusual microbes from nature, which may have significant applications when it comes to renewable energy and manufacturing chemicals and drugs. The Beckman Program, run in partnership with CSEP, gave Gonzalez access to a network of investigators and scholars from the Arnold and Mabel Beckman Foundation and a closer look at what it takes to be a graduate student.

"This summer, I gained a lot more creative freedom to develop my own protocols and research project," said Gonzalez. "It's been a very rewarding experience to understand more about what a graduate student is and what they do. It provided invaluable insight to figure out that I want to pursue a Ph.D. in the near future."

Kai Lam, a third-year biology major, completed a trifecta of summer undergraduate research opportunities. After participating in CSEP's [Summer Institute in Mathematics and Science](#) (SIMS) and EUREKA! programs last year, he spent this summer in the MARC Program, which is funded by the National Institutes of Health to increase the number of highly trained biomedical scientists from underrepresented minority groups. Lam said his summer experiences have been life changing.

"CSEP gave me a chance to pursue science and feel comfortable talking about my work and sharing my ideas," said Lam, who described himself as extremely timid. "I've learned to step out of my comfort zone, which is a huge step for me. These programs have helped me tremendously academically and to become the stronger and more confident person that I am today."

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About UC Santa Barbara

The University of California, Santa Barbara is a leading research institution that also provides a comprehensive liberal arts learning experience. Our academic community of faculty, students, and staff is characterized by a culture of interdisciplinary collaboration that is responsive to the needs of our multicultural and global society. All of this takes place within a living and learning environment like no other, as we draw inspiration from the beauty and resources of our extraordinary location at the edge of the Pacific Ocean.