Three UCSC Graduate Students Win Big Grants for Biotechnology Research

Three graduate students at the University of California, Santa Cruz, have been selected to receive training grants intended to hasten innovations in a variety of biotechnology-related fields. The two-year grants provide $50,000 per year for each student.

The UCSC students are among 11 UC graduate students at eight UC campuses to receive the highly competitive Graduate Research and Education in Adaptive bioTechnology (GREAT) Training Grants this year. Given by the UC Systemwide Biotechnology Research and Education Program, the grants are among the highest individual awards for graduate education and training anywhere in the nation.

"These are exciting awards that provide fantastic opportunities for graduate students," said Lisa Sloan, dean of graduate studies at UCSC.

The two-year training awards support biotechnology-related research that incorporates cross-disciplinary training in areas that span essentially all fields of science, engineering, medicine, and agriculture. The program has graduated 22 students who have gone on to careers ranging from full-time faculty members in academia to biotechnology entrepreneurs.

Todd Lowe, assistant professor of biomolecular engineering in UCSC's Baskin School of Engineering, said the grants enable researchers to pursue projects that otherwise might not be possible. Lowe's graduate student David Bernick won a GREAT grant for his research on gene regulation in a special class of microbes called the Archaea, which have very unusual biological characteristics and may have great potential for biotechnology applications.

"It's really enabled this project," Lowe said. "The grant not only fully funds his work for two years, it allows us to work on a high-risk project. There is very little grant money available for this kind of high-risk, high-payoff project."

Electrical engineering student Oscar Azucena won a GREAT grant for his project developing novel adaptive-optics microscopy for deep-tissue imaging. Azucena is working with Joel Kubby, associate professor of electrical engineering in the Baskin School of Engineering and an affiliate of the Center for Adaptive Optics at UCSC. Image degradation is a serious problem as light travels through thick biological specimens, so the researchers are using adaptive-optics techniques developed for astronomy and applying them to microscopy. This approach could have widespread application in many fields of biology and biomedicine.

"This grant is key to keeping the project moving forward," Kubby said.

Biology graduate student Jesse Raab won a GREAT grant for his work with Rohinton Kamakaka, associate professor of molecular, cell and developmental biology. Raab is

developing bioinformatics tools to identify and characterize important factors in gene regulation known as insulator elements. They play a crucial role in regulating the expression of genes in everything from yeast to mammals.

"This gives us seed money to start a new project and expand our research into new areas," Kamakaka said. "We've been studying insulator elements in my lab for ten years, mostly in yeast, and now we will start studying them in human cells."

Martina Newell McGloughlin, director of the UC Davis-based UC Systemwide Biotechnology Research and Education Program, said the GREAT training grant program aims to nurture rapid advancements in technology in diverse fields such as nanotechnology and biomedical engineering.

"Each year, this spirited competition draws the brightest young minds from all of the UC campuses, with 11 graduate-student researchers selected on the basis of their demonstrated ability to understand and solve problems that cross over very different disciplines," McGloughlin said.