

July 8, 2004 UCSD Undergraduates Participate In Collaborative Studies Abroad On Cyberinfrastructure

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Nine undergraduate students from the University of California, San Diego have arrived in Asia and Australia to conduct collaborative research on a wide variety of topics related to cyberinfrastructure. They were selected to participate in the first of a three-year program funded by the National Science Foundation (NSF) and other organizations, to help prepare more U.S. engineers and scientists to work on international projects. As part of the Pacific Rim Undergraduate Experiences (PRIME) program, the students will work for nine weeks this summer at host research institutions in Osaka, Japan; Hsinchu and Taipei, Taiwan; and Melbourne, Australia.

The program is sponsored by the NSF's Office of International Science and Engineering, with additional support from its Division of Shared Cyberinfrastructure, and the California Institute for Telecommunications and Information Technology [Cal-(IT)2]. PRIME provides students with an opportunity to participate in project-based international and collaborative research experiences that will better prepare them for future scientific endeavors, particularly in the context of a global workforce. The students - all from UCSD's Jacobs School of Engineering - are also expected to develop their research methods and skills, while achieving greater understanding of the cultural environments of their host countries.

Each undergraduate has a minimum of two mentors: one affiliated with UCSD, and another with the host institution. The host organizations are all connected to the Pacific Rim Applications and Grid Middleware Assembly (PRAGMA) collaborative program.

Gabriele Wienhausen, founding provost of Sixth College and Cal-(IT)2's Education layer leader at UCSD, is one of three program coordinators for PRIME and is the principal investigator of the NSF award. She is joined by Linda Feldman, director of UCSD's Academic Internship Program, and Peter Arzberger, PRAGMA's principal investigator, director of the Life Sciences Initiative at UCSD, and director of the National Biomedical Computation Resource (NBCR).

Jacobs School undergraduates Stephen Geist, Ramsin Khoshabeh, and Takumi Takahashi are working in Osaka, Japan with professor Shinji Shimojo, vice-director of the Cybermedia Center at Osaka University. Shimojo is a world-renowned scientist who is the principal investigator on a major award to build a Biogrid in Japan. Assisting in the collaborative efforts from Osaka University is Susumu Date, an assistant professor in the Graduate School of Information Science and Technology. Takumi Takahashi, a pre-med Bioengineering major, will work with Date and Shimojo and UCSD Bioengineering chair Shu Chien to adapt tools to integrate data from different genomic databases relevant to cell function. Ramsin Khoshabeh, an Electrical and Computer Engineering (ECE) major, aims to explore the next-generation IPv6 protocol with respect to key components of the telescience infrastructure. Stephen Geist, a mechanical engineering major from Thurgood Marshall College at UCSD, is concentrating on migrating code from a camera at UCSD's National Center for Microscopy and Imaging Research (NCMIR) to the same camera on the Osaka microscope. Khoshabeh and Geist are working with professors Shimojo and Toyokazu Akiyama in Osaka, as well as a team of UCSD mentors including neuroscientist Mark Ellisman (director of both NCMIR and the Center for Research in Biological Structure), NCMIR's executive director Steve Peltier, and center researcher Tomas Molina.

Robert Ikeda and Brandon Smith are at the National Center for High-performance Computing (NCHC) in Hsinchu, Taiwan, under the guidance of its Grid Computing Division manager Fang-Pang Lin, and Bioengineering assistant professor Trey Ideker at UCSD. They are working to develop large-scale, computer-aided models of biological signaling and regulatory pathways. ECE's Ikeda is pursuing the development of a graphical user interface for pathway editing and integration in Cytoscape, while Computer Science and Engineering (CSE) undergrad Smith will help install a wireless network while extending the Ecogrid in Taiwan's Ecological Parks. Smith will also be enhancing software of the Collaborative Lake Metabolism Project (<http://lakemetabolism.org>) that is vital to his proposed research. Smith is mentored by Lin, Arzberger, and Tony Fountain, who directs the Knowledge and Information Discovery Lab within the Data and Knowledge Systems program of the San Diego Supercomputer Center (SDSC).

Jared Bell, a Revelle College undergraduate who expects to earn his Bachelor of Science in structural engineering in June of 2005, is also spending the summer in Taiwan. Bell's research centers on Internet-based virtual laboratory testing for earthquake resistance of structures using the National Earthquake Engineering Simulation (NEES) model. He is working for Keh-Chyuan Tsai, director of Taiwan's National Center for Research on Earthquake Engineering; NCHC's Fang-Pang Lin; and Chia-Ming Uang, professor and vice-chair of UCSD's Structural Engineering department.

Australia

Three additional students are performing research at the School of Computer Science and Engineering at Monash University in Melbourne, Australia. Bioengineering's John Colby, together with CSE's Christopher Kondrick and Duy Nguyen, will work under the direction of David Abramson, a well-respected researcher in software for cyberinfrastructure and a developer of Nimrod/G in Melbourne. Colby, a Revelle College student also majoring in premedical molecular biology, will employ Nimrod and Continuity to study the impact of temporal and spatial distribution of two pacemakers around the heart to understand therapeutic optimizations. Nguyen, who is the first member of his family to attend college, aspires to incorporate a Rocks cluster, NIMROD, and GAMESS into a ready system for scientific data computing. And Kondrick will work on modifying the NIMROD infrastructure to work with two computational chemistry codes, GAMESS and APBS, to carry out high-throughput chemistry calculations. Apart from Abramson, the students will also be mentored by UCSD Bioengineering vice-chair Andrew McCulloch, and two scientists from the San Diego Supercomputer Center: Kim Baldrige, its director of Integrated Computational Sciences; and Philip Papadopoulos, SDSC's program manager for Grid and Cluster Computing, as well as co-principal investigator on the PRAGMA award.

PRIME students are required to be U.S. citizens or permanent residents, and must be enrolled as full-time students at UCSD with a minimum GPA of 3.0 (out of 4.0). In the fall quarter students will participate in the PRAGMA 7 workshop, to be held in San Diego, and will be expected to submit papers on their experiences abroad and present papers at the UCSD undergraduate research conference. A gathering will also be held for PRIME participants to celebrate their successes, and to engage more students and faculty mentors in the program for 2005.

For further information on the PRIME program, see <http://prime.ucsd.edu>.

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