UCSD Receives $2.1 Million Grant to Enhance Undergraduate, Community College and Pre-College Science Education

Howard Hughes Medical Institute funding will support teaching and learning in the biological sciences for disadvantaged and first-generation college students

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The Howard Hughes Medical Institute (HHMI) has awarded the University of California, San Diego a four-year, $2.1 million grant to further education in the biological sciences at the UCSD undergraduate and community college transfer levels, in addition to aggressively supporting science education for students and teachers at partnering high schools and middle schools.

UCSD is one of 50 universities nationally named recently to receive such HHMI funding for biological sciences this year. HHMI is the nation's largest private supporter of science education, with its current round of grants totaling $86.4 million and ranging from $1.5 million to $2.2 million each. This grant contributes to the $1 billion fundraising goal of The Campaign for UCSD: *Imagine What's Next.*

The UCSD grant, which will focus primarily on students from educationally disadvantaged backgrounds and on selected schools having traditionally low college-going rates, will involve an array of university and community partners in carrying out its mission.

These partnerships form the basis of the grant's strength, says Eduardo Macagno, Founding Dean, UCSD Division of Biological Sciences, who will serve as principal investigator of the HHMI award.

"Just as the rapid evolution of biological research requires that scientists from a wide range of academic disciplines work together effectively," he says, "so must we in biological education work more closely and creatively with committed partners from the public and private sectors if we are to significantly increase the number of educationally and economically disadvantaged students entering higher education to pursue bioscience-related majors and graduate school."

These sentiments are echoed by the grant's co-principal investigator Shu Chien, UCSD professor, Bioengineering & Medicine, and director, The Whitaker Institute for Biomedical Engineering, and by Loren Thompson, Assistant Vice Chancellor, UCSD Student Educational Advancement, whose area will coordinate and direct the grant's undergraduate and pre-college outreach efforts.

Grant Involves Collaboration With an Array of Partnerships "This new initiative will allow us to synergize the outstanding talents and expertise of our faculty in various departments, with a particular emphasis on improving the education, research opportunities, and mentoring for low-income, first generation and ethnically underrepresented students in biology," says Chien.

Adds Thompson: "We look forward to implementing the powerful educational programs that were collaboratively conceptualized and designed by all of our contributing partners."

Partners in the grant include: Sweetwater Union High School District; Southwestern Community College; the San Diego Community College District's three campuses; UCSD's Division of Biological Sciences; the Bioengineering Department of UCSD's Jacobs School of Engineering; UCSD School of Medicine, and Student Educational Advancement, or SEA (a division of UCSD Student Affairs which provides key pre-college academic outreach initiatives, undergraduate academic assistance support, and faculty-mentored undergraduate research opportunities on an ongoing basis at the university).

Macagno adds: "We are also grateful to be supported by a host of key biotechnological and biomedical firms." These companies will provide summer research internships for UCSD's HHMI students.

"To this end," says Chien "we will work with these and other partners, including the Office of Minority Engineering Program of the Jacobs School of Engineering, and in concert with the Division of Biological Sciences, to enhance the internship opportunities for students from educationally disadvantaged backgrounds and from schools having traditionally low college-going rates."

How the Grant Will Work Capitalizing on UCSD's strengths in biological sciences, engineering, medicine and other disciplines, the HHMI grant is intended to enhance science education on two key fronts:

Undergraduate Level: *Strengthening Student Retention in Science and Research.* "We recognize the critical need to prevent the attrition of large numbers of underrepresented, first generation-college undergraduates at UCSD from the bioscience pathway," says SEA's Loren Thompson. "As a result," he says, "through this grant, we will be using an extensive support program that we've developed to retain disadvantaged students in their bioscience majors during their first two years of study by providing them with an early and exciting introduction to research through close interaction with faculty mentors." Adds David Artis, Ph.D., director of SEA's Academic Enrichment Programs (AEP): "We also know that doing well in 'gatekeeper' courses - ones that lower-division UCSD students must take in order to progress toward higher academic levels --is critical to students' success and retention." Therefore, he says, the HHMI grant will play a "key role" in sponsoring rigorous workshops designed to enhance HSP students' performance in mathematics and science gatekeeper courses. UCSD's HSP will also provide freshman and sophomore seminars, faculty and peer mentoring, and individual counseling. At the upper division level, undergraduates will focus more intensively on preparation for graduate or professional school, or a career in the biosciences through AEP-sponsored opportunities in summer research with faculty mentors, or by gaining research experience with a local biotech company. Additionally, students will develop their writing and speaking skills, receive graduate school exam preparation, medical school exam readiness (through the UCSD School of Medicine's Medical Scholars Program), gain experience in presenting their research findings -- both at conferences and through journal submissions -- and participate in career-oriented seminars and panel discussions.

Pre-College and Other Outreach: *Enrichment for Middle School/High School Students and Teachers.* As a primary partner in the grant, Sweetwater Union High School District, California's largest high school district (enrolling 42,000 students in grades 7-12), has designated three of its high schools and associated "feeder" middle schools to serve as active participants in the grant's pre-college outreach initiatives. Outreach for middle school and high school students will include: incrementally progressive after-school science inquiry programs, science fair activities, intensive summer science inquiry camps, science research opportunities, and college admission information and preparation involving students and parents. The grant also includes a strong component for middle school and high school teachers that will expose them to summer courses and laboratory experiences at UCSD and elsewhere, curriculum material development and the opportunity to teach in summer science camps - all of which is intended to help teachers integrate and adapt the latest information in bioscience for engaging classroom learning.

Assistance for Community College Transfer Students In addition, students at the community college level will also benefit. Such students who intend to transfer to UCSD from one of four local community colleges will be invited to take advantage of program services if they commit to attaining a B.S. (or advanced degree) in a science-related major. These students will be encouraged to engage themselves early in research activity at the community college level, be invited to research seminars and talks by UCSD faculty, and have access to in-person and email-based peer mentoring by UCSD students concerning the transfer experience. Transfer

students would also receive peer coaching on undergraduate research internships, and be invited to poster and oral presentations at UCSD undergraduate research conferences/symposia.

Jointly administering the grant project will be a steering committee which includes: Project Director Mel Green, UCSD professor of Biology (Emeritus); Loren Thompson, Assistant Vice Chancellor, Student Educational Advancement; David Artis, director, Academic Enrichment Programs, and Stephen Rodecker, high school science coordinator, Sweetwater Union High School District, who will serve as the grant project's outreach coordinator. This is the fourth four-year HHMI grant project awarded to UCSD in recent years. UCSD's three previous HHMI projects -- under the direction of Gabriele Wienhausen, now Provost, UCSD Sixth College, and Barbara Sawrey, Vice-Chair, UCSD Chemistry & Biochemistry -- ran continuously from 1989-2000 and funded middle and high school science enrichment, undergraduate research opportunities, and curriculum development.

For more information on HHMI and this year's grant recipients, visit: http://www.hhmi.org/news/06012006.html
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