



UCSB Executive Vice Chancellor Gene Lucas congratulates chemical engineering major Neil Tandon on his Undergraduate Research Colloquium project, an electric car propelled by a chemical reaction. Tandon and his student colleagues built the robot car, which was entered into an annual competition run by the American Institute of Chemical Engineers.

We're here to help you!

To find out more about undergraduate research, get in touch with your departmental advisor, your professors—or any of the people listed below.

CALIFORNIA NANOSYSTEMS INSTITUTE (CNSI) www.cnsi.ucsb.edu

■ **Liu-Yen Kramer**, Education Programs Development, California NanoSystems Institute, 1203 CNSI Building, 805-893-8544, liu-yen@cnsi.ucsb.edu

COLLEGE OF CREATIVE STUDIES www.ccs.ucsb.edu

(Offering a research-intensive curriculum in eight fields)

■ **Leslie Campbell**, Admissions Counselor and Undergraduate Advisor, 104 Building 494, 805-893-5319, leslie.campbell@ccs.ucsb.edu ■ **Christopher Wilderman**, Academic Advisor, 104 Building 494, 805-893-4146, christopher.wilderman@ccs.ucsb.edu ■ **Leroy Laverman**, Lecturer, Chemistry and Biochemistry, 805-893-5265, laverman@chem.ucsb.edu

COLLEGE OF LETTERS AND SCIENCE www.ltsc.ucsb.edu

■ **Mary Nisbet**, Acting Dean for Undergraduate Education, 1117 Cheadle Hall, 805-893-5018, mnisbet@ltsc.ucsb.edu, www.ltsc.ucsb.edu/urca ■ **Nan Anderson**, Coordinator, Undergraduate Research and Creative Activities (URCA), 2105 North Hall, 805-893-2319, urca@ltsc.ucsb.edu, www.ltsc.ucsb.edu/urca

COLLEGE OF ENGINEERING www.ltsc.ucsb.edu

■ Office of Undergraduate Studies: **Tacy Costanzo**, Student Affairs Liaison, 1001 Frank Hall, 805-893-2809 ■ **Dotti Pak**, Director, Education Programs, MRL (Materials Research Laboratory), 2061 MRL, 805-893-5314, pak@mrl.ucsb.edu ■ **Angela Berenstein**, Nanotechnology Education Programs Coordinator, Electrical and Computer Engineering, 2205E Engineering Science Building, 805-893-5999, berenstein@ece.ucsb.edu

DONALD BREN SCHOOL OF ENVIRONMENTAL SCIENCE AND MANAGEMENT www.bren.ucsb.edu

■ **Laura Haston**, Assistant Dean, 805-893-7980, laura@bren.ucsb.edu

GEVIRTZ GRADUATE SCHOOL OF EDUCATION www.education.ucsb.edu

■ **Heather Phillips**, Research Office Coordinator, 1183 Phelps Hall, 805-893-5922, heather@education.ucsb.edu ■ **Kelly Hayton**, Research Office Assistant, 1185 Phelps Hall, 805-893-2416, kelly@education.ucsb.edu

GRADUATE DIVISION www.graddiv.ucsb.edu

(Offering UC LEADS for juniors and seniors in science, engineering, and mathematics and ARC for undergraduates completing their junior year and for CSU Pre-Doctoral Scholars in the Social Sciences, Humanities, Science, Engineering, and Mathematics.)

■ **Jennifer Stewart**, Interim UC LEADS and ARC Coordinator, 3117 Cheadle Hall, 805-893-4833, jennifer.stewart@graddiv.ucsb.edu ■ Also diversity@graddiv.ucsb.edu

OFFICE OF RESEARCH www.research.ucsb.edu

■ **Carla Whitacre**, Director of Research Development, 3227 Cheadle Hall, 805-893-3925, whitacre@research.ucsb.edu

Aquatic biology major **Christina Tanner**, whose Worster award funded her research in South Africa.



Chad Burt

10 great things undergraduate research at UCSB can provide

- 1 The opportunity to help create new knowledge.
- 2 Learning experiences beyond class work (and a valuable background for future educators).
- 3 New insights as you participate in cutting-edge research.
- 4 The inherent pleasure of learning about investigation and discovery.
- 5 Teamwork in a close-knit, interdisciplinary community.
- 6 Improved oral and written communication.
- 7 A chance to find out what it's really like to work in different areas.
- 8 Marketable skills: time management, critical thinking, problem solving, specialized training, leadership.
- 9 A network of faculty and graduate students who can help open doors to future opportunities.
- 10 A competitive advantage in your studies and career.



Marcia Meier

Excellence in Mentoring: Undergraduates are fortunate to have the mentoring support of hundreds of faculty, graduate students and postdoctoral fellows. UCSB acknowledges this important role with two annual \$500 recognition awards for excellence in mentoring and ten \$1,000 scholarships for graduate students who mentor undergraduate interns in summer laboratory research projects. This support exists in large part because of Dr. Fiona Goodchild, center, who received a National Science Foundation presidential mentoring award in 2002. The 2007-08 winners of the Goodchild recognition awards are Aubrey Cano, left, from the molecular, cellular and developmental biology department, and Claudia Kouyoumdjian, right, from the Gevirtz Graduate School of Education.



UNIVERSITY OF CALIFORNIA, SANTA BARBARA
Produced by the Office of Research
Vice Chancellor for Research: Michael Witherell
Writers: Judy H. Watts & Marcia Meier
Design: Peter Allen, COE

2008

Undergraduate Research... the Other Half of a Great Education!



“Careers today require continual, lifelong learning. Few experiences better prepare students for this process than participation in research early in their education.”

—Herbert Kroemer, Winner, 2000 Nobel Prize for Physics; UCSB Professor of Electrical and Computer Engineering and of Materials

<http://research.ucsb.edu/undergrad>

UNIVERSITY OF CALIFORNIA, SANTA BARBARA

You chose to be educated at a world-class research university!

- UCSB is a member of the Association of American Universities, a prestigious group representing the **top 1.5 percent of all universities** and colleges.
- Five Nobel Prize winners** are on UCSB's faculty (two were named in 2004), and many other faculty members have earned the nation's highest honors and awards.
- Approximately 30 percent of our faculty** hold appointments in two or more departments and colleges, reflecting UCSB's highly interdisciplinary academic and research environment.
- UCSB has **more than 80 outstanding research units**, centers, and institutes. Twelve of these are national centers, including five that are sponsored by the National Science Foundation—an important indicator of research quality. Nearly all are interdisciplinary and provide opportunities for undergraduates to be involved in research. Imagine yourself conducting research in these areas (which represent only a tiny sample of what is available):
 - Chemical design of materials
 - Digital multimedia
 - Middle East studies
 - Marine and coastal research
 - Seismology
 - Neurodegenerative diseases
 - Human development
 - Theoretical and experimental physics
 - Sensors
 - Implications of new technologies
 - Ethnic studies
 - Film and new media
 - Rational drug design
 - Immersive virtual environments
 - Systems biology
 - Globalization and internationalization
 - Next-generation computers
- UCSB has been named one of the **nation's "hottest" colleges** twice in the past four years by *Newsweek* magazine.



Alice Alldredge

Cover: Sammy Davis discovered a love of aquatic biology while on a research tour with Russell Schmitt, director of the Coastal Research Center at UCSB's Marine Science Institute and professor of Ecology, Evolution and Marine Biology. Schmitt's team, which included Professor Sally Holbrook, vice chair of EEMB, spent the summer on the tiny island of Moorea, in French Polynesia, testing how coral growth is affected by changing ocean conditions.

Cover photos by Nicole Price and Gretchen Hofmann



Scott Webb

Engineers Without Borders: The UCSB chapter of Engineers Without Borders, which includes undergrads, went to Mexico in 2007 to build a home for a needy Mexican family. EWB also completed the evaluation of the pilot slow-sand filter system for a village in Araypallpa, Peru, and constructed the full-scale system for one of the two community water sources. In response to the community's request for more irrigation water, the team also implemented a pilot gray water recycling system at the community garden.

What other students say

"All my undergraduate research has taught me to think outside the box."

— **Eileen Becker**, Chemistry

Although Eileen Becker doesn't plan to join a forensic evidence team anytime soon, the résumé she's assembling could be a deal-maker later on. A chemistry major, Eileen joined the lab of earth science Professor David Valentine the summer before her junior year and tested ocean water samples to determine the breakdown of organic acids. The following summer, she went on a two-week research cruise with Valentine's group aboard the *Atlantis*, a Navy-owned vessel equipped with four main labs, including a wet lab, and a three-person submersible called the *Alvin*. Eileen's chief project involved science on demand: "Whenever *Alvin* surfaced with new samples (cores from the ocean floor that were sectioned and compressed to release water), we had to run all of our tests right away; otherwise, the samples would react with the air," she explains. She tested water from locations up and down the West coast. "When I first began, I couldn't have thought of an idea for a project of my own," Eileen says. "But now I'm more than ready to do that."



David Valentine



Norma Marquez

"When I heard about a faculty researcher who would be leading a summer excavation in Peru, I applied to join the team!"

— **Amanda Mummert**, Anthropology

After landing a place with the field crew, Amanda spent five weeks in south central Peru cataloguing and sorting skeletal remains of an ancient pre-Inca people. By using tools of bioarchaeology—a fusion of physical anthropology and archaeology—the researchers began to see how the people had been affected by social upheaval of the time. In summer 2008 Amanda returned for additional work on the project. "Another great thing about

this field," she says, "is that you can do research all over the world!"

"I really enjoy any research with a goal defined as making people's lives better."

— **Ricardo Alamillo**, Chemical Engineering

The first in his family to attend college, Ricardo Alamillo entered UCSB as a mechanical engineering student, but switched to chemical engineering at the end of his freshman year. "It was greatly due to my EPSEM (Expanding Pathways to Science, Engineering, and Mathematics) freshman research program and working in the chemical engineering department," Ricardo says.

Ricardo worked with Professor Samir Mitragotri of chemical engineering on transdermal drug delivery systems research from the winter quarter of his freshman year through his sophomore year. Then, in summer 2008, Ricardo worked at La Universidad de Chile in Santiago, Chile, in the chemical engineering and biotechnology department under Dr. Raul Quijada. His research focused on synthesizing copper-based, silica-based, and double-layered nanospheres. The program is sponsored by the UCSB Materials Research Laboratory through the Cooperative International Science and Engineering Internship program.



Brian Peoples

"Everyone can learn from what it takes to be a good mathematician!"

— **Jeffrey Danciger**, Physics and Mathematics

When Jeff Danciger came up with a mathematical theorem that had long been needed in the field, his faculty mentor praised it as being "totally new, with an ingenious proof." Although in this case Jeff worked for months before the key step fell into place, he says all undergraduates would benefit from his basic approach to problem solving. "You don't give up," he says. "You just have to push yourself and push yourself and keep working." Now a doctoral student in mathematics at Stanford, Jeff adds: "My best advice? Just get involved in as much as you can! Be enthusiastic. Work really hard. And join summer research programs for undergraduates—you'll meet great people and learn an insane amount!"



Norma Marquez



Marcia Meier

Helping Latina moms and daughters communicate: Education Professor Laura Romo's "Growing Together" program through Santa Barbara Girls Inc. reaches out to Latina moms and daughters to teach them how to communicate about sexuality. Funded with a grant from the William T. Grant Foundation, the project engages both graduate and undergraduate researchers. Magali Bravo, second from left, became involved as an undergraduate and was inspired to continue as a graduate student. With Magali and Dr. Romo, second from right, are graduate students Rebeca Mireles, left, and Elena Cruz, right.

How to get started

(Motivation is the key!)

- 1 Think** about the subjects that truly interest you and that you'd like to explore.
- 2 Decide** what you could gain from working on a project—such as simply learning more about a field of study, being better prepared for a future career, and working closely with faculty and graduate students who can offer professional guidance and mentoring.
- 3 Check out** UCSB web pages to identify researchers working on projects that interest you; you might want to sit in on an upper-division lecture to get a sense of a subject's scope.
- 4 Tell your professor** of your interest after class or during office hours.
- 5 Contact** the individuals listed on the back of this brochure—or the academic adviser in your major—for more information. (And don't limit your thinking to just one discipline! Many UCSB researchers work in at least two fields; think about all the possibilities.)