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# QUARTERLY

Spring 2001

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# CAMP STATEWIDE

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The distances from UC's southernmost campus, San Diego, to its northernmost, Davis, stretches more than 500 miles. In spirit, commencement ceremonies unite graduates of the University in more ways than one. Parting, as the Bard said, is sweet sorrow, with promises of lasting friendships and an unbreakable bond to one's alma mater. This issue features our Alumni, where they are today and their plans for tomorrow. Our cover captures some of the images UC alumni take away, the camaraderie of graduation and an affection for the signature architecture from their respective campuses, from the Campanile at Berkeley to the Geisel Library at San Diego. Cover by Susan S. Reese Design.

# QUARTERLY

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## Kenneth C. Millett Elected Fellow of AAAS

CAMP Regional Director Kenneth C. Millett, UC Santa Barbara Professor of Mathematics, has been elected to the rank of AAAS Fellow. Millett was honored for contributions to understanding the knot theory, to increased participation of minorities in mathematics, and to improved educational opportunities in mathematics for all. The honor of being elected a Fellow of AAAS began in 1874 and is acknowledged with a certificate and a rosette. Millett received these during the AAAS Fellows Forum, a part of the Association's annual meeting in February 2001 in San Francisco. Millett directs the Summer Institute in Mathematics and Science

UC News



*Dr. Kenneth C. Millett receives congratulations from Mary Good, AAAS President on his election as AAAS Fellow. Millett, a mathematician, was honored for contributions to Knot Theory.*

for incoming UCSB freshmen and is a leader in the UCSB/South Coast Community Teaching Fellows in Mathematics and Science. His role in the regional consortium is rooted in a personal commitment to encourage minority students' interests in science and mathematics careers, including teaching. Since 1994, his collaborations have supported approximately 75 students to enter the mathematics and science credential program or enter directly into teaching, in Teach for America, Teach Compton, LAUSD credential program, Peace Corps, and others.

## UC San Diego Coalition Supports Student Success

Nearly 120 undergraduates, primarily freshman and sophomores, and 30 speakers gathered April 12, 2001, at the first annual **Academic Success and Research Symposium** sponsored by the Coalition for Excellence and Diversity in Mathematics, Science, and Engineering. Dr. Phillip Bourne of the Department of Pharmacology and the San Diego Supercomputer Center, gave the keynote, "2001: A Biological Odyssey." Sessions included faculty and student panels. A poster session showcased the quality of work that undergraduates achieve through faculty mentorship. The Coalition formed about a year ago as an alliance between campus programs providing academic services for underrepresented, educationally disadvantaged, low-income, or first-generation to college science and engineering students. Coalition partners are: Academic Enrichment Programs; Honors Achievement Workshop; the Howard Hughes Undergraduate Science Enrichment Program (including CAMP); MESA Engineering Program; Office of Academic Support and Instructional Services; Office of Graduate Studies and Research, Summer Internship Program; and the School of Medicine Health Careers Opportunity Program. Vice Chancellor Joseph Watson also supported the symposium. **Alejandro Diaz-Lamas**, Class of 2000, served as MC. A former CAMP and McNair scholar currently working at RW Johnson Pharmaceutical Research Institute, Diaz-Lamas will begin the M.D./Ph.D. program at UCSD in Fall 2001.

During this 10th anniversary year, it's rewarding to look back over the past decade and marvel at how we've grown. What began as an idea among a few individuals on one UC campus is now a shared



project among many on all eight UC undergraduate campuses. Let me begin by thanking our program supporters who have made these ten years a growth experience for all involved.

Thanks are particularly due to Vice Chancellor Manuel Gómez for his leadership and good stewardship. He is stepping down from his role in CAMP Statewide to pursue broad-based student-centered work. Dr. Gómez was recently appointed Vice President for Educational Outreach, University of California, by President Atkinson.

UC's and NSF's investment in CAMP benefits students in far reaching ways, including the increase in preparation for and enrollment in graduate school. The Alumni profiles attest to this degree of support and spirit of achievement. UCLA's Gustavo Miranda, who completed his Ph.D. in Molecular Cell & Developmental Biology (page 4), affirms that the value of a UC education has never been higher. Likewise, the value added of participation in student-centered programs like CAMP provides a bonus for students working to build their credentials in an increasingly competitive world. UCLA grad Ronald Metoyer is completing his Ph.D. at Georgia Tech. He is the first student who received CAMP support as an undergraduate researcher to win the President's Postdoctoral Fellowship. Elva Torres, also of UCLA, completes the doctorate this year, under Dr. Delroy Baugh. Shondelle Wilson, who made graduate school a determined choice, is also profiled. Congratulations to the Class of 2001 and best wishes for continued success to each and every UC Alumnus.

*Marjani DeMartino*

# The Tapestry of Intellectual Life

**BY CAROLYN F. WALL**  
Vice Chancellor, Student Affairs  
University of California, Davis

*Students and faculty alike come to the University of California for the richness of opportunities available to them. In no context is this shared interest in rich intellectual experience played out more fully than in the mentoring relationship where information is exchanged, coaching occurs, and modeling of next steps is integral to the experience.*

**I**n large public research universities such as ours, these relationships do not happen without effort on the part of the faculty and initiative from the students. Many of our students have remarkable experiences in the contexts of organized mentorship programs such as CAMP, but the numbers are far too few. These students are the beneficiaries of the best that the university has to offer. They are the students who have the greatest support and encouragement to develop intellectually and to continue that development through graduate and professional school. Those who choose to follow a different path and enter a career upon graduation have had the disciplined experience that research offers: the identification of interesting and important questions, the honing of their analytical and critical thinking skills, the communication and exchange of information with others, and the opportunity to engage as one among other scholars. The time

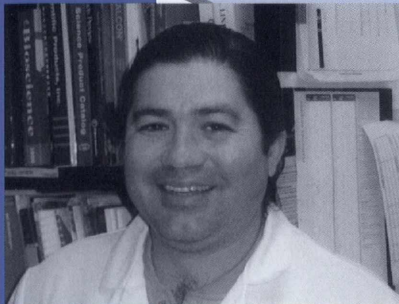
and energy we invest in these bright undergraduates returns to us many-fold as they enter our graduate and professional programs well prepared to take the next step in their academic careers.

Don't we have an obligation to provide these advising, mentoring, and research experiences to all of our students, to incorporate them in the academic majors, to build advising programs around them, to weave them into the fabric of the undergraduate experience? Don't we need to rethink our roles and recommit ourselves to these critical aspects of the undergraduate experience? Our students should have not one, but many opportunities during their undergraduate careers to engage fully in the intellectual life of our campuses, to immerse themselves in discussions and debate with their peers, to participate side-by-side with advanced undergraduates, graduate students, post-docs, and faculty in the pursuit of knowledge.

I was reminded recently of the importance of this "ladder" of effective mentoring when my most distinguished graduate student celebrated a 50<sup>th</sup> birthday and gathered round her those of us who had played significant roles in her stunningly successful career. When she was an undergraduate, I had invited her to join psycholinguistic seminars with me and a multidisciplinary group of graduate students and other faculty. She credits those early experiences with introducing her to the excitement of research and to the varied perspectives we each brought to the subject matter. We continued to work together as mentor and student and, eventually, as colleagues. She has since woven graduate students and young professionals into the tapestry of the intellectual life she now enjoys, ensuring the continuation of this all-important role we each play as mentor.

**Guest Editorial**

10-YEAR MILESTONE



# FIRST PH.D. ACHIEVED

Gustavo Miranda, CAMP undergraduate researcher at UCLA completes doctorate in Molecular Cell & Developmental Biology

The first CAMP student at UCLA has completed a long awaited goal, the Ph.D. in molecular cell & developmental biology. Gustavo Miranda completed his doctorate in December 2000, and will receive the doctoral hood in commencement ceremonies at UCLA, June 2001. Miranda cites his own personal milestones: immigrating to this country, wrestling with an impoverished childhood, military service, and transferring from community college to one of the most competitive research universities in the country. His story is one of passion for science and of steady commitment. It is a major milestone for CAMP and programs that share similar goals. Degree completion has been a long, thrilling and sometimes lonely road and Miranda readily admits that he breaks the mold.

"I'm an untraditional student in every sense of the word," Miranda says.

He was born in Costa Rica, and arrived in California at age seven. His family settled in an African American neighborhood in East L.A., and his Dad, and later he as well, worked in Lincoln Heights. Later the family moved to the San Fernando Valley, where he attended San Gabriel High School. Taken together, he experienced "a kaleidoscope of interactions with different people and cultures."

Miranda believed that he was given every chance to succeed. He also believed strongly in the "Red, White,

and Blue" and felt he owed something to his country. He joined the military at age 19. And the service afforded numerous lessons on race and class and what it means to be "different."

"The military changed my life; it reawakened my *cultura*," he explains. He was a Navy corpsman who had earned a vocational nursing certificate, returning home with the "lofty goal" of going to medical school. Miranda enrolled at East Los Angeles College, where he became involved in research for the first time with support from Minority Biomedical Research Support and Chicanos for Creative Medicine.

"I'm Costa Rican," he exudes, "but the Chicano people have taught me what it means to be brown in this country."

The research started Miranda in biological toxicity studies, and he "stuck with it."

Having great mentors at East L.A. College made all the difference. "They shaped me," he said, "they made me believe in my potential to become a scientist."

The transition to UCLA brought new hurdles. Linking with faculty at SACNAS prior to transferring made all the difference, expanding options—and horizons.

Miranda's first research experience at UCLA was an independent study with Dr. Elma Gonzalez. He received funding from the newly created CARE Center, which began with seed money from CAMP-NSF and leadership from

"Gustavo has been possessed by a grand passion for science since I first met him at East Los Angeles Community College. He has surmounted numerous obstacles to achieve his goal while remaining a very caring, very human person. I congratulate him and wish him the best for a fulfilling and productive career."

—Professor Elma Gonzalez,  
Biology, UCLA

"I've never seen anyone so motivated. Gustavo is extremely competitive and determined—you can't lose with that combination."

—Dr. Renato Aguilera, Molecular Cell & Developmental Biology, UCLA

Gonzalez, who demands from students the highest performance.

"Elma is a tremendous role model," he affirms. "She was the first of the Chicanos/Chicanas who influenced me." Of all his mentors, he says, "Elma is the hardest to please, hands down. She knows you can take it—and if you can't, you don't belong."

Miranda recognizes that he's also hard core. "I'm stubborn, hard-nosed, and strong willed. I'm one of those

I've had many great mentors: Eloy Rodriguez, Elma Gonzalez, Renato Aguilera, Frank Talamantes, Luis Villarreal. They helped me tremendously."

—Gustavo Miranda, Ph.D.

intense scientists."

Many individuals have played a major role in Miranda's development and progress toward first the bachelor's degree then the doctorate. They recognized his work ethic

and opened doors. Besides Gonzalez, Renato Aguilera, Eloy Rodriguez, Frank Talamantes, and Luis Villarreal contributed to the development of the molecular biologist.

Sustained support from Gonzalez and Aguilera was critical. "Without it," he says, "I'd never have gotten into graduate school." Research and publication built a scholarly foundation. "If I hadn't published, I wouldn't have been competitive."

Miranda currently has an NIH postdoctoral fellowship in the lab of Dr. James S. Economou, Professor of Surgery-Oncology, an M.D./Ph.D. doing leading research in gene therapy.

"Economou is doing hot stuff," Miranda says. The Economou lab's ongoing project studies how the human immune system can be activated to kill cancer cells. The lab is seeing tremendous advancements in a potential breakthrough area for cancer treatments. Miranda's role is to answer questions at the molecular level. A molecular immunologist, he "goes inside a single cell" to examine a single function. What gene or set of genes will give the desired results? Using adaptive transfer, he translates mouse systems to human systems. He explains, "I take a human tumor and inject it into the mouse, and study the molecular aspects of how this is happening in humans."

Upon completing the fellowship at UCLA, and after another NIH postdoc which he hopes to secure at the Institute's labs back East, Miranda would love to obtain a tenure track position. He says, "The biggest dream of biggest dreams would be to come back to UCLA as a member of the faculty. I would come full circle."

Once he is established in teaching, he would like to become involved in student outreach to improve the success rate of minorities in science. While it may be impossible to change the world, Miranda believes that if you alter the thinking of one person, and give that person a new positive perception [of minorities], it's a gain. He adds, "All of us first generation college students have one thing in common: we have to overcome our fear of failure."

## Dr. Gustavo A. Miranda

### Education

- Ph.D., University of California, Los Angeles (Molecular Cell & Development Biology), December 2000
- B.S., University of California, Los Angeles (Microbiology & Molecular Genetics), 1993
- A.S., East Los Angeles College (Biology), 1987

### Research and Professional Training

- Postdoctoral Fellow, Surgical Oncology, UCLA, 2000-present
- Teaching Assistant, Molecular Cell & Developmental Biology, UCLA, 1993-1999
- Student Researcher, Center for Academic Research Excellence (CARE/CAMP), UCLA, 1990-93
- Staff Research Assistant II, Department of Biology, UCLA, 1989-93
- Minority Biomedical Research Support, Chicanos for Creative Medicine, East Los Angeles College, 1985-87

### Honors and Awards

- NIH Postdoctoral Fellowship, 2000-present
- Dissertation Year President's Fellowship, University of California, 1999-2000
- Project 88 University Fellowship, UCLA, 1996-97
- Clinical Immunology Institutional Training Grant, UCLA, 1994-96
- Project 88 University Fellowship, UCLA, 1993-94
- University of California Alumni Association, 1987
- National Chicano Council for Higher Education, ARCO Foundation, 1986

### Publications

- Miranda, G.A., Galic, Z., Alva, J., Yates, Y., and Aguilera, R.J., Synergistic regulation of the murine RAG-2 promoter by the Sp1 and BSAP transcription factors. Submitted, 2000
- Brown, S.T., Miranda, G.A., Galic, Z., Hartman, I.Z., Lyon, C.J., and Aguilera, R. J., Regulation of the RAG-1 promoter by the NF-Y transcription factor. *Journal of Immunology*, 1997 June 1, 158(11):5071-5074.
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# Life After the B.S. Degree

**BY SHONDELLE M. WILSON**

UC Davis Alumna, Fourth Year Doctoral Student,  
University of Wisconsin, Madison

**S**aturday, June 15, 1997, I remember walking across the stage at the University of California, Davis Commencement Ceremony as if it were yesterday. I knew that my life would change because it marked a new beginning. You can imagine how happy my family felt watching the first person in our immediate family accept such an honor. As I heard the Dean of the Division of Biological Sciences announce my name, I began to reminisce.

I transferred to UC Davis in 1995 after three years of study at Solano Community College, where I had the opportunity to help others by tutoring in mathematics. I was a member of the MESA (Mathematical, Engineering, and Science Achievement) program and participated in the CAMP-CCSI (California Alliance for Minority Participation Community College Summer Institute) at UC Irvine. At UC Davis I was active in the Ronald E. McNair Scholars program, MURALS (Mentorship for Undergraduate Researchers in Agriculture, Letters and Sciences), Howard Hughes Medical Institute-Transfer Students Fellows Program and I performed research at the UC Davis Medical School and at Sandia National Laboratories. These milestones were the catalyst behind my desire to teach at the college level, along with conducting research.

My acceptance to the Bacteriology program at the University of Wisconsin-Madison turned a dream into reality. Despite the struggles and obstacles I have encountered during my journey to graduate school, I have not been deterred in achieving my goal. As a fourth year doctoral student I must admit that my desire to teach was validated during my second year of graduate work while completing my teaching assistantship. I chose to teach two laboratory courses because I wanted to personally interact with each of the students. Although it was difficult to remember the names of 43 students each semester, I will never forget their faces or their expressions of joy when they got a positive result or understood a concept. As a result, in my third year I decided to train an undergraduate student who assists with one aspect of my project.

I have a passion for helping students. I serve as a mentor of high school, undergraduate and graduate students of color. This is an activity that I began at Solano Community College and it has stayed with me through graduate school. In fact,



during my visits home to Vallejo, CA I regularly speak to high school students about the trials and triumphs of attending college and the benefits of pursuing a doctoral degree.

My thesis advisor, Dr. Timothy Donohue, is exceptional because he is encouraging and supportive of not

only my scientific development but also my extra-curricular and community interests. He has been inspirational in my future aspirations to teach at the college level while conducting research in microbial genetics and physiology. Dr. Donohue is involved in multiple aspects of our department but students are his primary concern. To me he is more than a scientist, he is an excellent mentor.

My department has given me the exciting opportunity to explore different areas within the biological science community and to realize how techniques from chemistry and other disciplines can be used to solve biomedical research problems. In addition to teaching college and conducting research, I plan to develop a pre-college program to assist underrepresented minorities in their studies and preparation for college.

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—The future Dr. Wilson gave a keynote address at CAMP Symposium III, April 6-8, 2001 at UC Davis. Please see page 22.



## Shondelle M. Wilson

### EDUCATION

- University of Wisconsin-Madison, Madison WI, doctoral candidate, Bacteriology program, Ph.D. anticipated May 2003
- University of California, Davis, Davis CA, B.S. Microbiology, June 1997

### AWARDS, HONORS & FELLOWSHIPS

- Featured on the cover of the University of Wisconsin-Madison's Graduate School 2001-02 admission application and accompanying material
- National Institutes of Health (NIH) Fellowship, September 2000-September 2005

- Featured on the cover of the Solano Community College Transfer Student Brochure, Fall 1999
- Advanced Opportunity Fellowship, University of Wisconsin-Madison, August 1997-August 1999
- Mentorship for Undergraduate Research in Agriculture and Life Sciences (MURALS) Program, University of California, Davis, participant and fellowship recipient, January 1997-June 1997
- Ronald E. McNair Scholars Program, University of California, Davis, participant and fellowship recipient, January 1996-June 1997
- Howard Hughes Medical Institute-Transfer Students Fellows Program, University of California, Davis, participant and fellowship recipient, August 1995-August 1996

### **The Role of DNA Repair in Formaldehyde Oxidation by *Rhodobacter sphaeroides***

Shondelle M. Wilson and Timothy J. Donohue  
University of Wisconsin-Madison,  
Department of Bacteriology

Formaldehyde is a reactive compound that can destroy the biological activity of nucleic acids, proteins and membranes. In the case of formaldehyde-induced damage to amino groups of nucleic acids, a methylol intermediate forms a methylene adduct that can modify bases, cleave the backbone of double-stranded DNA, form inter-molecular cross-links between proteins and DNA, or generate intra-molecular cross-links in single-stranded DNA or RNA. Despite the known mutagenicity of formaldehyde, relatively little is known about the strategies used to oxidize or protect cells from this toxic compound. *Rhodobacter sphaeroides* is a purple non-sulfur bacterium that uses a conserved glutathione-dependent formaldehyde dehydrogenase (GSH-FDH) to generate energy and carbon skeletons from the formaldehyde that is produced during the oxidation of one-carbon compounds such as methanol. To identify proteins that are required for the process of biological formaldehyde oxidation, we have used transposon mutagenesis to screen for methanol-sensitive mutants. One methanol-sensitive strain, MS4, contains wild type GSH-FDH levels, so this mutant is not unable to synthesize this key enzyme in formaldehyde oxidation. <sup>13</sup>C-NMR suggests that formaldehyde oxidation is normal in MS4, so it appears that this lesion does not lead to the accumulation of this toxic compound. The Tn5 insertion in MS4 has been mapped to coordinate ~840kb on chromosome I, within a gene that encodes a homologue of an adenosine/nucleoside kinase. This potential kinase gene is linked to several others that are predicted to be involved in DNA repair; the endonuclease III structural gene (*nth*) and one (*ada*) that encodes a homologue of an O-6-methyl-guanine DNA methyltransferase. Because of this, we propose that MS4 is defective in repairing formaldehyde-induced DNA damage. As predicted, MS4 has a defect in DNA repair since it exhibits increased sensitivity to ultraviolet light. The results of additional experiments to analyze DNA repair in this and other methanol sensitive strains will be presented.

### RESEARCH EXPERIENCE

- University of California at Davis, Medical School, Davis CA Undergraduate Researcher, Jan. 1996-June 1999
- Sandia National Laboratories, Livermore CA Chemistry Intern, Summer 1996
- Sandia National Laboratories, Livermore CA Chemistry Intern, Summer 1995

### PRESENTATIONS

- American Society of Microbiology-101st General Meeting, Orlando FL, Poster Presenter, May 2001, "The Role of DNA Repair in Formaldehyde Oxidation by *Rhodobacter sphaeroides*."
- University of Wisconsin-Madison, Department of Microbiology Recruitment Poster Fair, Madison WI, Poster Presenter, March 1999, "The Identification and Isolation of Genes Involved in Formaldehyde Oxidation in *Rhodobacter sphaeroides*."
- University of Wisconsin-Madison Medical School, Summer Research Poster Fair, Madison WI, Poster Presenter, July 1998, "The Identification and Isolation of Genes Involved in Formaldehyde Oxidation in *Rhodobacter sphaeroides*."
- Gordon Research Conference-Molecular Basis of Microbial One Carbon Metabolism, Henniker NH, Poster Presenter, July 1998, "The Identification and Isolation of Genes Involved in Formaldehyde Oxidation in *Rhodobacter sphaeroides*."

### PROFESSIONAL MEMBERSHIPS/EXTRA-CURRICULAR ACTIVITIES

- University of Wisconsin-Madison, Department of Microbiology, Curriculum Committee Graduate Student Representative, September 2000-Present
- American Society of Microbiology, Graduate Student Member, December 1999-present
- National Black Graduate Student Association, North Central Regional Representative, May 1999-March 2001
- University of Wisconsin-Madison Graduate School, Graduate Student Recruiter, January 1998-Present

### PUBLICATION

- Wilson, S. & Tan, M., McNair Scholar Journal of the University of California at Davis, "Deep X-ray Lithography (LIGA) Development Process," Vol. 1. Spring 1997.

# Early Laboratory Experience Pivotal

**ANDRES NAVA**

**B.S., Information and Computer Science  
University of California, Irvine  
Class of 2000**

*It has been nearly a year since I marched in commencement ceremonies at UCI. I am now managing an Internet consulting firm with a fellow UCI and CAMP graduate. Now seems like a perfect opportunity to look back at how CAMP helped my college career.*

**I**n my senior year in high school I received a letter from CAMP about their summer program. Wanting to leave home and be on my own I quickly accepted the offer. I moved into the dorms and began taking programming, math and writing classes. Everything was so different! I no longer had my parents to rely on, and even math, which was

## Alumnus Voice

*"CAMP is an integral part of my life. I cannot imagine where I would be right now if I had not been fortunate enough to know about CAMP."*

—Andres Nava

my strongest subject, seemed foreign. Fortunately, there were others who were in the same situation and we quickly became friends and worked together.

That fall of my freshman year, I took the exact same classes that I had taken in the summer, but this time for credit.

I was amazed at

how much I had learned and how far I was ahead of the rest of the students. Clearly, without CAMP's assistance I would not have made it through the first quarter. After my

first year at UCI, CAMP funded my research with another CAMP student, Aaron Soto.

Over the summer, Aaron and I worked in the laboratories of Dr. Lubomir Bic and Dr. Michael Dillencourt, developing a program to aid their team visualize data from their MESSENGERS program. Initially, this program seemed far beyond our capabilities, but by working together, Aaron and I were able to complete it and demonstrate it to faculty members, an accomplishment that not many freshmen can brag about!

Following that wonderful summer experience, I decided to again conduct research, this time focusing on software engineering.

I had the fortune to work with the current Dean of Information and Computer Science, Dr. Debra Rich-

ardson [facing page]. This research spanned two academic quarters and the summer. Using CAMP as a resource, I conducted research with faculty members that I would have been too intimidated even to talk to. CAMP also allowed me to attend various scientific conferences, where I networked with many distinctive researchers and fellow students.

In the summer of my junior year, I co-founded a small Internet consulting firm with other CAMP students. I am fortunate to say that we are currently doing very well. Soon after starting this business, I realized how much I would be using what I learned in CAMP. The experience of presenting in conferences to distinguished researchers allowed me to quickly lose my fear of public speaking. Also, writing research papers prepared me to write the various proposals that I currently draft on a weekly basis. It is experiences like these, which are difficult to gauge, upon which CAMP has had the strongest impact.



# Dissertation Led to Professoriate

**DEBRA RICHARDSON**

Chair, Information and Computer Science  
University of California, Irvine

*A native of Orange County, CA, Dr. Richardson graduated from Rancho Alamitos High School in Garden Grove, earned a B.S. in mathematics at UC San Diego and a Ph.D. in computer science at University of Massachusetts. In the course of graduate school, as she wrote her dissertation, she decided to become a university professor. Richardson views software development, her area of interest, as a cyclic process requiring perpetual testing and quality analysis.*

I thought I was going to be a high school math teacher, a career decision made sometime in high school. Although it wasn't called as such, I was in what would have been considered "AP Math" and took calculus in high school. I had some very good math teachers and that's what really changed my life. In fact, one of my more advanced math classes was taught by a woman, so I had a good role model. I went to UC San Diego, Revelle College, and majored in mathematics. My junior year was the first time I enrolled in a computer science course—and I just loved it. So I took several computer science classes and decided that computer science was what I really wanted to pursue. I then got a job programming. At the time, I had almost completed my math requirements and was ready to graduate early, and decided that it would make more sense to go on to graduate school in computer science rather than get a double major.

I had planned to take a year off to work, save some money, and then go to graduate school. But to play it safe, I put in applications and was

accepted at several graduate schools. I thought that it was time to leave California for a while, to experience the East Coast, so I applied to the University of Massachusetts. Someone from UMass called on a day that I was particularly bored with nuts and bolts programming—just at the right time—and they offered me a fellowship. I called back the very next day to say I'd accept.

At the time I actually thought that I would stay for just two years, get my masters and come back to California to finish my Ph.D. But I became very interested in software testing, so I decided to stay on. I saw some problems in software testing that I didn't think were being addressed by the current research. Basically the way most people test programs is based on the program itself. Most of the tools and technologies that assist in testing programs are based on the source code rather than on the requirements of that program. So my thought was wouldn't it make more sense for

these testing activities to be based on both artifacts—the requirements for what the program is supposed to do as well as the actual code that's written—what it actually does. You need to look at both aspects. This was a shortcoming I saw in software testing, and came up with the notion of specification-based testing. So I did my dissertation in that area and developed a technique that combined information from the requirements of the code with information gathered from the software itself. I used this integrated approach to validate and verify the software. And in the course of doing that decided that I wanted to continue research and teaching and so become a professor of computer science.

In the academic environment we don't get a lot of resources to do much implementation, but we do some. We've developed a tool set that supports specification-based testing. Any tool that you write to process software is written for a particular language, whether a programming or specification language. What we've done recently

in fact is to build some tools that work based on a combination of languages.

We've developed tools that work with Java and then at the higher level with UML, unified modeling language, and an architecture description language called C2, a model in which those things work together.

Consequently, you can write some high level descriptions in UML and various notations from UML, and then build an architecture. The tool set supports some testing-like activities before you ever code the program—that's another key theme in my work, that testing should not be

## Faculty Voice

*"I had some very good math teachers and that's what really changed my life."*

—Debra Richardson,  
Chair, ICS



done in the eleventh hour, at the end of the life cycle. Perpetual testing is what we call it, and that means not only is software continually tested but it's tested early. I say, test early and often. When you start to write specifications you should do some analysis right away that lets you find problems early. It's been shown that most problems or defects in software are introduced in the early stages of development; because we don't quite understand the requirements, we often write something that's ambiguous or incorrect or inconsistent.

We have a very broad program in ICS that teaches a solid conceptual foundation—but it's untraditional. The program includes the humanistic, interactive side of computing with lots of interdisciplinary collaborations. Our belief, of course, is that when you have these foundations, you will be able to learn new things, build upon them, and move on with the field. We need our graduates to be employable—up to date with current technology, current languages, and where the field is going. More of the really good students are not staying in academia because they can go out and make so much right now. The ones who stay have to have the passion for continued education, and potentially becoming faculty members themselves.

We're working to attract and retain women in computer science. This year we held an event to encourage women to go on to graduate school. Potentially, this will create a pool of women faculty as well as mentors for incoming students. Next year, we'll hold a high school women's computer science fair—including student and faculty panels—to encourage girls to go into computer science. From the figures that I have seen, it's down to about 16%. I think it is the image that girls have of computer science, of what a computer scientist is—a backroom programmer who sits in front of a computer all day. I think I can change that image.

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—Dr. Richardson will serve as Co-P.I. for CAMP Phase III, 2001-06. She was recognized by Orange County Metro magazine as one of 10 women in Orange County making a difference.

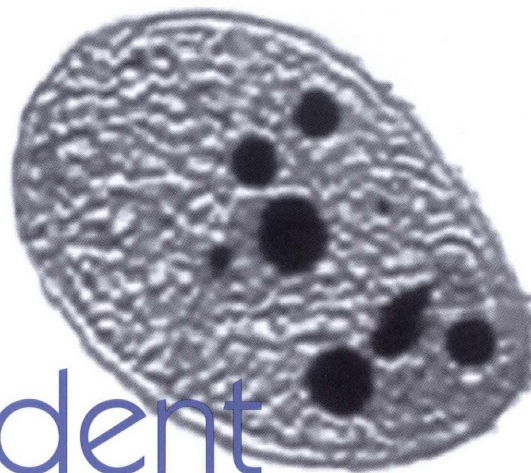
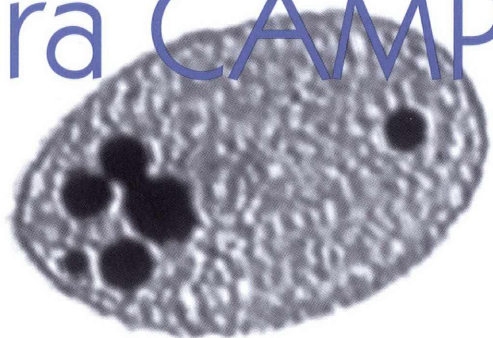
## The Study of *Tetrahymena* as a Pharmacological Model Enriches Undergraduate Education for

# Maribel Reyes UC Santa Barb

By Robert S. Jacobs, Ph.D.  
Department of Ecology, Evolution,  
and Marine Biology, UCSB

**O**ur *Tetrahymena* study focuses on utilizing this cell as a model to investigate marine natural products that decrease inflammation and pain. It is based on our hypothesis that these protists have certain genetically based physiological functions that are surprisingly similar to those functions seen in certain immune cells in mammals. This ancient unicellular ciliate thus has the potential to provide new information on the biological properties of a number of important biologically active marine natural products whose mechanism of action is poorly understood. Since it is a cell-based mechanism model, it hopefully will also allow us to open new avenues of research of evolutionary and ecological interest. It is of importance that we better understand the function of these marine natural products in nature since they may well function as important growth factors and hormones that helped *Tetrahymena* survive for hundreds of millions of years.

# ara CAMP student



*Tetrahymena* belongs to the Ciliated Protozoa, a major, successful and diversified evolutionary lineage of unicellular eukaryotes. It is an aquatic organism that commonly inhabits streams, lakes and ponds. There have also been reports of *Tetrahymena* in salt marshes and soil samples. The cells are large (40-50 $\mu$ m) along the anterior-posterior axis. *Tetrahymena* cells have a striking variety of highly complex and specialized structures such as a buccal apparatus, food vacuoles, an anal pore, Golgi apparatus, mitochondria, micronucleus, macronucleus, and nucleoli. The *Tetrahymena* genome size is roughly 220 megabase pairs. This protist is of great interest to molecular geneticists as an experimental system due to its rapid reproductive rate, its structural and functional differentiation, its accessibility to genetic and molecular manipulation, its large evolutionary distance from any other commonly used genetic model system, and its potential for biotechnological applications.

In *Tetrahymena*, there appear to be functional similarities to the intracellular transduction and cell to cell signal-

ing systems found in bone marrow derived monocytes such as macrophages, and neutrophils. These similarities include G proteins, components of the inositol phospholipid pathway, phospholipase A<sub>2</sub> and C, prostaglandins, protein kinases, adenylate cyclase/cAMP systems, guanylate cyclase/cGMP systems, calcium calmodulin systems, and nitric oxide systems. *Tetrahymena* may synthesize prostaglandins that appear to be important in the maintenance of growth.

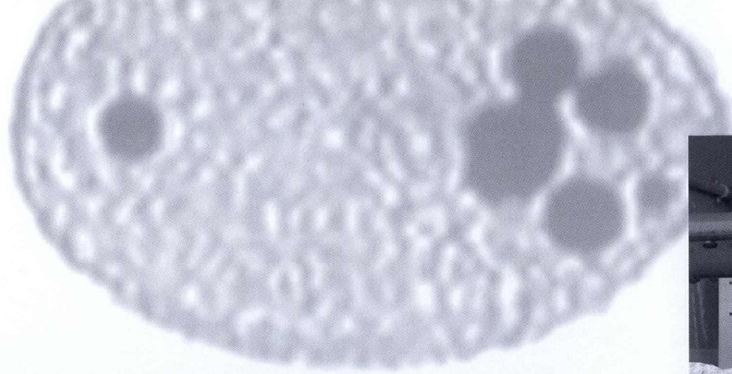
*Tetrahymena* recognize different hormones and ligands typical of vertebrates by increasing or decreasing its phagocytic process. Phagocytosis involves the rapid formation of a small vacuole, the phagosome. It responds to hormones such as thyroxin, nerve neurotransmitters (epinephrine), and other chemicals known to regulate mood and behavior in

man. In addition, it can also respond to insulin, vasopressin, and oxytocin.

*Tetrahymena* can undergo what is known as imprinting or receptor induction. This process is subject to regulatory processes similar to those of cells involved in immune responses. Imprinting is specific for the evoking hormone



**Undergraduate Maribel Reyes, left, and graduate student Claudia Moya assess the density of *Tetrahymena* cultures.**



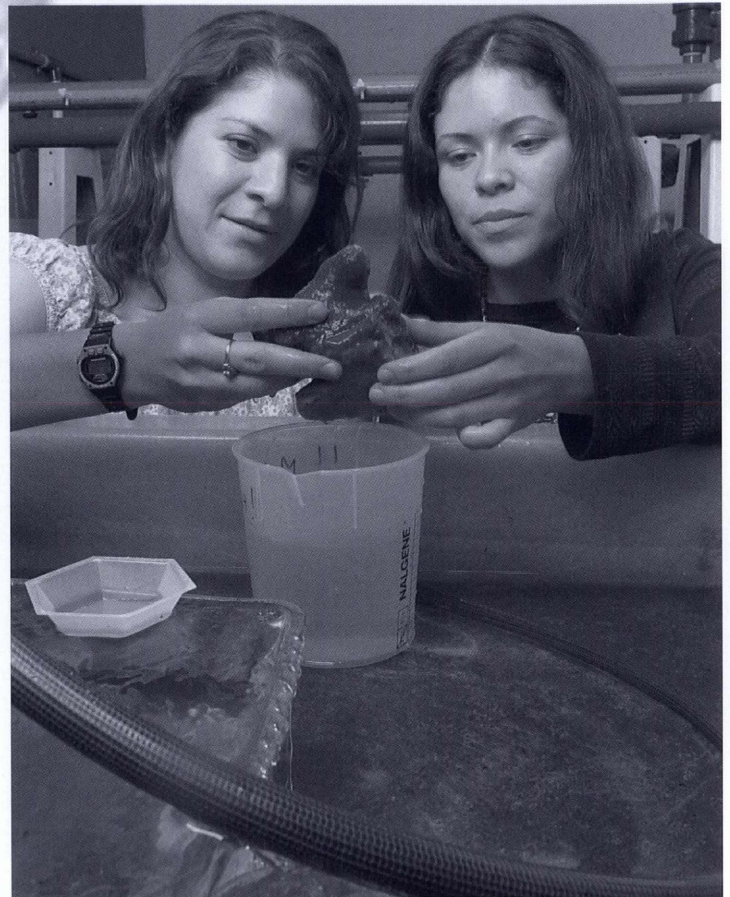
**“Our CAMP students are an extremely important component of our laboratory.”**

—Robert S. Jacobs, Ph.D.

or ligand. Once the ciliate has been exposed to a ligand and has developed a specific receptor, it is able to pass this receptor specificity to its progeny for up to 600 generations. The exact mechanism of imprinting is unknown, but the following are potential hypotheses. 1) The first encounter with the ligand causes a gene rearrangement similar to that produced during the formation of antibody coding genes. 2) By the rearrangement of methylation patterns of the appropriate genes, the imprinting can influence the expression of receptors, and this change is inherited by the progeny generations. 3) The third presumable mechanism involves changes in the membrane subpatterns forming the receptor. 4) Another possibility is the transmission of information of imprinting from the progenitor (imprinted) to progeny cell populations by contact or the secretion of a hormone or ligand.

The different families of drug and hormone receptors of *Tetrahymena* are not known and only a few have been characterized thus far. For example, the opiate receptor of *Tetrahymena* was studied and sequenced and it was found to be similar to the opiate receptors found in rat sand leeches. In vertebrates, opiates bind selectively to various recognition sites throughout the body and produce pharmacologically significant effects. These include alterations in detection of pain, decreased intestinal motility, alterations in endocrine function and physiological and psychological addiction. It is interesting that *Tetrahymena* lacks nerve nets, yet it is still capable of imprinting a functional opiate receptor influential in chemotaxis.

A specific focus in this laboratory has been the investigation of the inflammatory response induced by phorbol myristate acetate (PMA). We have identified specific inhibitors of the process and investigated their mechanism of action. These include the PLA<sub>2</sub> inhibitors, manoolide and scalaradial, the 5-lipoxygenase inhibitor, fuscoidin, the pseudopterosins, the scytonemins, and the topsentins, all anti-inflammatory compounds, some of which are currently under investigation and one is marketed as an additive in cosmetics to prevent skin irritation in sensitive individuals.



***Claudia Moya and Maribel Reyes note that the Tetrahymena model can become a useful method to study the activity of biologically active marine natural products. Claudia not only provides insight and direction to Maribel on her research but also her options after graduation.***

The rate of phagosome formation in *Tetrahymena* is analyzed using a microscope to measure the incorporation of India ink into the newly forming phagosome in the presence and absence of the various marine natural products. This apparently direct technique requires a great deal of planning and organization. Care must be used to conduct the experiments under sterile conditions and in addition there are long hours of data collection and analysis that CAMP student, Maribel Reyes, conducts under the direct supervision of graduate student Claudia Moya and myself. Ms. Reyes is one of several CAMP students we have had the pleasure of working with over several years. This particular *Tetrahymena* project is unique, however, and has an additional, urgent pressure attached to it. It is becoming apparent to us that this microorganism might well substitute, in some cases, as a pharmacological model reducing substantially the need to euthanize mice and rats for the purpose of harvesting macrophages and neutrophils. These highly differentiated immune cells do not divide and only live about 19 hours in cell culture. In vertebrates, new cells differentiate from stem cells in the bone marrow to replace old macrophages regularly. *Tetrahymena* cells, on

### CAMP Student Profile

## MARIBEL REYES

*Junior, Pharmacology major*

*Mentor: Dr. Robert S. Jacobs, Ecology, Evolution and Marine Biology Department, UC Santa Barbara*

*Research: Tetrahymena Thermophila as a Pharmacological Model*

### Honors & Activities:

- Dean's Honors List
- Member of Chemistry Club since Freshman year
- Member of El Congreso, three years
- Outreach Officer, Los Curanderos, Pre-Health organization
- Summer Research Apprentice Researcher and current Advanced Researcher, Dr. Robert S. Jacobs' Laboratory
- CRC Award in Chemistry, Freshman year
- SACNAS 2000 Conference Poster Presenter
- Educational Opportunity Program High Academic Achievement Award
- 2001 CAMP Symposium III winner for oral presentation
- Accepted to MIRT 2001 Summer Program at University of Maryland to conduct research in Chile
- Involved in outreach to high school students

the other hand, divide every two hours or so in simple culture media thus providing a readily available and inexpensive source of phagocytic cells. It is a bit early to claim we have found a useful alternative to a vertebrate animal model, however we are hopeful that the genetic similarities can be established that authenticate the pharmacological and physiological similarities we are observing.

Our CAMP students are an extremely important component of our laboratory. They are excellent researchers who are eager and dedicated experimenters that are an indispensable human resource for our laboratory. We believe they gain a special insight into the reality and difficulty of working in this complex area of research.



# Sandra Villa

UC RIVERSIDE

**MAJOR:** Chemistry

**LEVEL:** Junior

**MENTOR:** Dr. Sheri Lillard,

Chemistry Department

**DEGREE GOALS:** B.S. degree  
and Ph.D. in biological chemistry/  
pharmacology

As a student at the University of California Riverside, I am focusing on courses that will prepare me for the Ph.D. I am highly interested in the discovery of better drugs with fewer side effects as well

## Student Spotlight

as the improvement of existing drugs.

When I was a freshman, all I did was study, and that fulfilled all my needs at the time, but now, I feel that I have to do more than just study. I enjoy peer counseling because it helps others achieve their goals. I remember when I was a freshman, there were days when I felt overwhelmed by all the difficult course work and by the fact that I started out in chemistry prep and basic algebra. I did not think I would be able to survive in my science courses. But every time I would leave a peer-counseling meeting, I would get such enthusiasm that I felt I could do anything. Now I have a 3.8 gpa. Once I earn my degree, I will be in a position to help those interested in chemistry. I want to inspire minority students who never thought of themselves as chemists. As an active mentor and leader in programs such as CAMP, I can help increase diversity. I am a strong believer that what comes with diversity are experiences and modes of thinking that are not otherwise achieved. I would like to see more minorities pursue graduate studies. This change will not occur overnight but I will do my part, encouraging undergraduates to work in my lab.

SANDRA VILLA, UC RIVERSIDE

2000 UC San Francisco Summer Research Training Program

Mentors: Chaok Seok, Ph.D., and Ken Dill, Ph.D.

Department of Pharmaceutical Chemistry, UC San Francisco

### COMPARATIVE MODELING USING THE GAUSSIAN MODEL

The mapping of the human genome is yielding many sequences with unknown structures. Comparative modeling is a computational way of determining how a sequence, say S2, folds if the structure of a related sequence S1 is known. Current comparative modeling fails to identify structural similarities when sequences are less than thirty percent identical, an occurrence called the "twilight zone." Our strategy is to use a crude folding algorithm, based on spring forces, called the Gaussian model. We "learn" the spring forces by forcing sequence S1 to fold to its native structure, and then apply these parameters to try to fold S2. The parameters "learned" from small proteins of approximately 50-70 residues gave RMSDs (Root Mean Square Deviation) of about 2.0 angstroms. For larger proteins of about 150-250 residues, the accuracy decreased. Using the optimized parameters, the predicted structures had RMSDs of approximately 8-10 angstroms for protein pairs of 55-65 percent sequence identity and 9-14 angstroms for those of 15-25 percent. Our results demonstrate that the Gaussian model, in the present form, is not accurate enough to predict structures with low sequence identity. Further modifications, such as incorporating more atomic details in the Gaussian model, would be necessary to improve the predictability of structures.

#### Research Experience:

- Summer Research Training Program Fellow, UC San Francisco, Summer 2000  
Mentor: Dr. Ken Dill, Department of Pharmaceutical Chemistry  
Abstract Title: "Comparative Modeling Using the Gaussian Model" (see above)

#### Activities:

- CAMP Peer Counselor, Fall 2000– present; assist freshmen and transfer students to ensure that they have a successful transition to the university. Facilitate individual and group discussions covering study skills, time management, and social concerns.
- UC LEADS Scholar 2000-2002  
Mentor, Dr. Sheri Lillard, Chemistry Department, UC Riverside  
(Summer away research completed at UC San Francisco; Mentor: Dr. Ken Dill)
- SACNAS National Conference, Poster Presenter, October 2000
- Conversation Volunteer Tutor, UCR Extension (January – June 2000)

#### Honors:

- Chancellor's Honors list June 2000 and Dean's list Spring 1999- Spring 2000
- American Chemical Society Scholar, 2000-2001
- Professor Emeritus of Physics Robert Wild Family Scholarship
- Dean Loda Mae Davis Scholarship
- Karin Moore Gandolfo Scholarship



*"For me, CAMP unites  
different individuals  
with common interests."*



# Richard Silva

UC IRVINE

**MAJOR:** Biological Sciences

**LEVEL:** Junior

**MENTOR:** Dr. Andrea J. Tenner,  
Molecular Biology & Biochemistry

**CAREER GOAL:** Medicine/  
teaching, possibly the MD/Ph.D.

I first visited the University of California, Irvine campus with the K.I.D.S. (Kids Investigating and Discovering Science) program, founded by Dr. Eloy Rodriguez, when I was ten years old. What I remember most is the little white lab coats that we got to wear. I felt so important in that coat. I have participated in a whole list of outreach programs, beginning with K.I.D.S. My teacher even drove me to campus because I couldn't get there otherwise. I am a product of Santa Ana schools, attending Fremont Elementary, Lathrop Intermediate and Saddleback High School. I couldn't have imagined that today I'd be considering medical school. All the biology I ever learned, I learned here at UCI. I had a good chemistry teacher in high school—actually he was a graduate of UCI. For my future, I'm interested in pediatrics. I love working with kids. Right now, I volunteer as a translator at the UCI Medical Hospital Family Center, translating for doctors. They let me observe, which is always interesting. I want a lot of

things changed. One of the doctors told me you have to create change 'one patient at a time.' Little by little I can make a difference. I love motivational speakers but a lot of them miss the point. They fail to tell you that it's going to be tough, that you'll

struggle. I've learned that if you really want something, you can do it. I just go with the flow. I have days when I'm lost, then I'm back. My parents have been a great influence in getting me this far. My whole family encourages me. They are my inspiration.

## Research Experience:

- UC Irvine, academic year research, molecular biology; Dr. A. J. Tenner and Dr. Minha Park, postdoctoral fellow
- Harvard University Summer Honors Undergraduate Research Program; Dr. M. Hattori
- Stanford Medical School Summer Research Program in Biomedical Sciences; Dr. O. M. Martinez

## Activities:

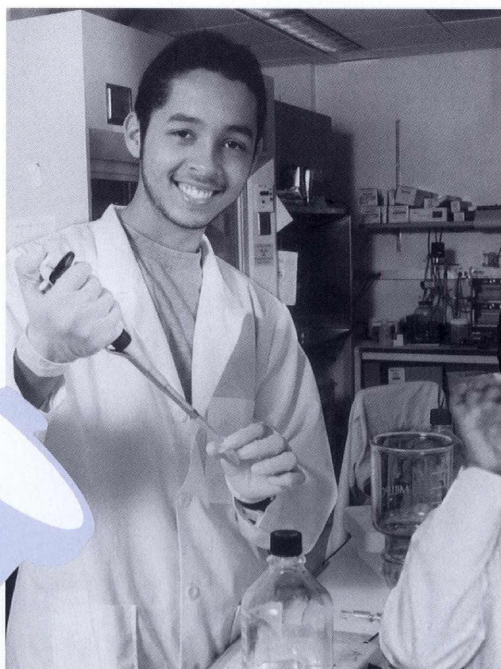
- CAMP-UC Irvine
- Chicano/Latino Medical Students Association
- Chicanos for Creative Medicine
- Society for Advancement of Chicanos and Native Americans in Science
- Oral and poster presentations at National Minority Research Symposium, SACNAS, Leadership Alliance Conference, LSAMP conferences, CAMP Statewide

Undergraduate Research Symposium, CAMP-UCI Scholars Symposium

- Tutor for Saturday Math Academy in algebra and pre-algebra for junior high students and AP biology tutor for high school students, through UCI Center for Educational Partnerships
- KinderCaminata 2000 volunteer, introducing youngsters to college

## Honors:

- Dean's Honors List
- Golden Key National Honor Society
- Campuswide Honors Program
- Lilly Endowment Inc./Hispanic Scholarship
- National Hispanic Coalition of Federal Aviation Employees Scholarship
- Wayne Holbrook Memorial Scholarship
- Santa Ana Teacher's Association Scholarship



*“My parents are my inspiration and model in working hard for my education.”*

*If the coat fits, wear it. Silva, right, at age 10 in his K.I.D.S. lab coat and today in Dr. Tenner's lab.*

# CAMP Ten Year Anniversary

## Accomplishments & Challenges

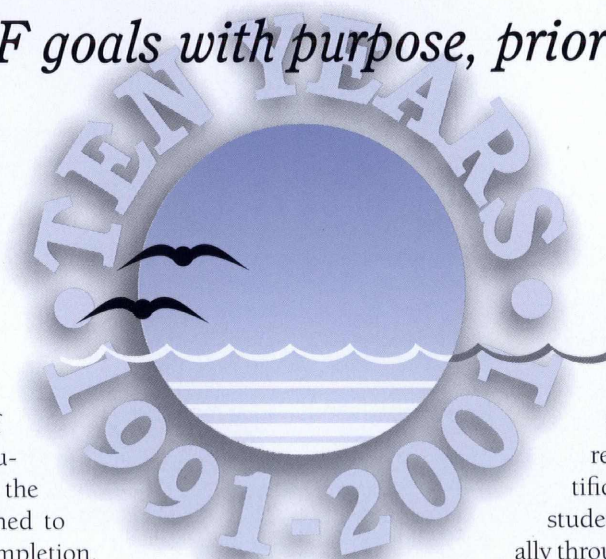
*Engaged in NSF goals with purpose, priorities & resolve*

**T**he California Louis Stokes Alliance for Minority Participation at the University of California (CAMP) represents a new era of support for underrepresented students in the sciences. It is one of the University's key vehicles established to enhance retention and degree completion. It has become a cornerstone and a catalyst for undergraduate attainment. CAMP owes its genesis to faculty participation and the University's top level leadership, who recognized the opportunity for substantive engagement in the lives of disadvantaged students—the heart of CAMP and our *raison d'être*.

Over ten years, in the face of a recession in the early 1990s and more significantly, the passage of Proposition 209, the UC minority SMET enrollment has increased 33.9%. Conversely, minorities in non-SMET majors did not experience an equivalent increase. The minority SMET degree completion rate rose 78% from baseline, for a total of 9,022 B.S. degrees, not including 2001. The sets of relationships the Alliance has developed regionally and nationally yield an unprecedented infrastructure within the University of California. The cumulative history of our efforts and these relationships, created from significant personal and professional commitment, reduce attrition, raise expectations, and ensure

degree completion. Over ten years, 171 companies, foundations and organizations provided program support and 30 student/faculty co-authored papers (self-reported) were published in scientific journals. Approximately 1,600 students systemwide are served annually through retention strategies that bolster academic performance, build community, and enhance graduate school preparation. The surge in UC minority admissions for Fall 2001 brings fresh promise and new resolve.

Across the University, preminent UC faculty serve as mentors and advisors, bringing students into their laboratories and preparing them for dynamic careers in research and development. Among them is Dr. Kenneth C. Millett, who was elected Fellow of the Association for the Advancement of Science. Dr. A. Russel Flegal, who won the UC Santa Cruz Excellence in Teaching Award, was nominated for U.S. Professor of the Year. Founding CAMP faculty member, Dr. Luis P. Villarreal of UC Irvine received the 2000 Presidential Award for Excellence in Science, Mathematics and Engineering Mentoring.



**James Shackelford, Marjorie DeMartino and Manuel Gómez present CAMP ten-year cake at Symposium III, UC Davis.**

## *Small tasks done well yield great results*

### **LOWER DIVISION RETENTION AND DEVELOPMENT**

CAMP supports incoming freshmen through peer relationships, cooperative learning, attendance at discipline-based faculty seminars and speaker series, and participation in professional development opportunities such as internships. The program promotes laboratory research as a pivotal experience that encourages students to apply scientific knowledge while developing their resume for graduate school. Programmatic components include:

- New freshman orientation and discipline dialogues
- Dedicated study space with computer access
- Interaction with upper division students, graduate students, research fellows, and faculty
- Introduction to the university research laboratory and its culture
- Academic success through core-course workshops
- Science writing skills through critical thinking
- Enrichment through attendance at symposia

### **UPPER DIVISION/GRADUATE OUTREACH**

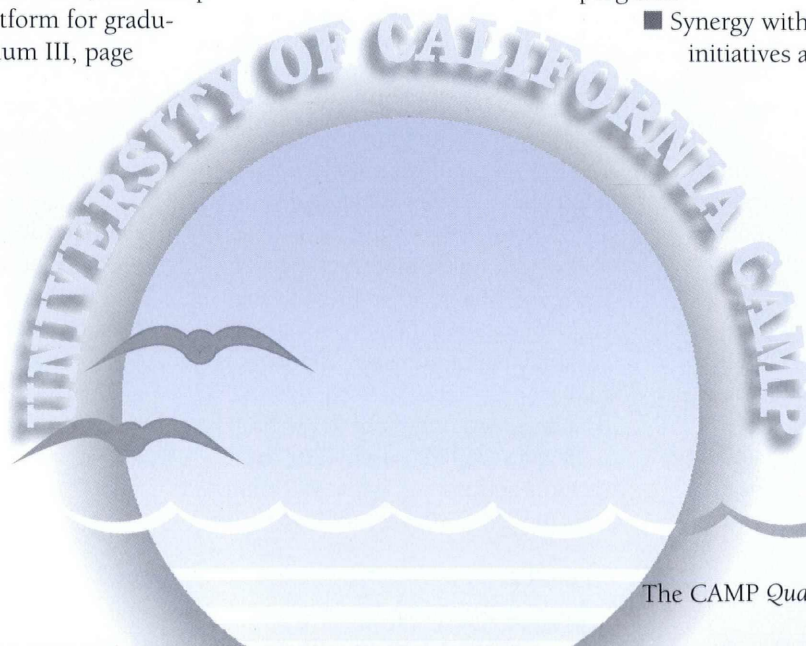
To achieve a competitive academic profile, scholastic growth must be accompanied by social and professional development. Excellent communication skills, both oral and written, are essential for undergraduate success, competitive eligibility, and transition to graduate school. Leadership ability shapes a student's options as well as a strong academic record. These characteristics are addressed in upper division enrichment. Engaging students early in research yields seasoned upper division students to represent their home campus at professional society meetings. Faculty mentored research is recognized as an effective tool for retention, leadership development, and a platform for graduate school (see Symposium III, page

22). In 1998-99, we found that 299 ladder rank faculty supported/mentored CAMP participants in some capacity. Collaboration enables:

- Peer mentoring of new freshmen or transfers by juniors and seniors
- Faculty mentoring and laboratory research team or individual project
- Travel to national professional society conferences and to graduate programs
- Development of a co-authored scientific or technical paper for publication
- Development of a poster or oral presentation, including multimedia technology
- GRE preparation and graduate admissions process, including statement of purpose
- Academic and professional career counseling and exposure to science career options

### **CAMP SUPPORTS UNDERGRADUATE RETENTION AND ENRICHMENT THROUGH:**

- Institutionalizing the first UC alliance of its kind systemwide
- The *CAMP Quarterly*, featuring intellectual reflections of faculty and students
- Unprecedented access to undergraduate research opportunities
- Increased enrollment of underrepresented SMET students amid social change
- Encouraging undergraduates to excel in a highly competitive environment
- Relational database monitoring participant progress toward degree
- Substantial increase in enrollment in graduate programs
  - Synergy with related UC and NSF initiatives and affiliated programs



# Who's Doing What and Where

*UC Alumni: Part of making history -  
part of history in the making*

## Berkeley

ALUMNI PROFILES

### **Gerardo Dominguez**

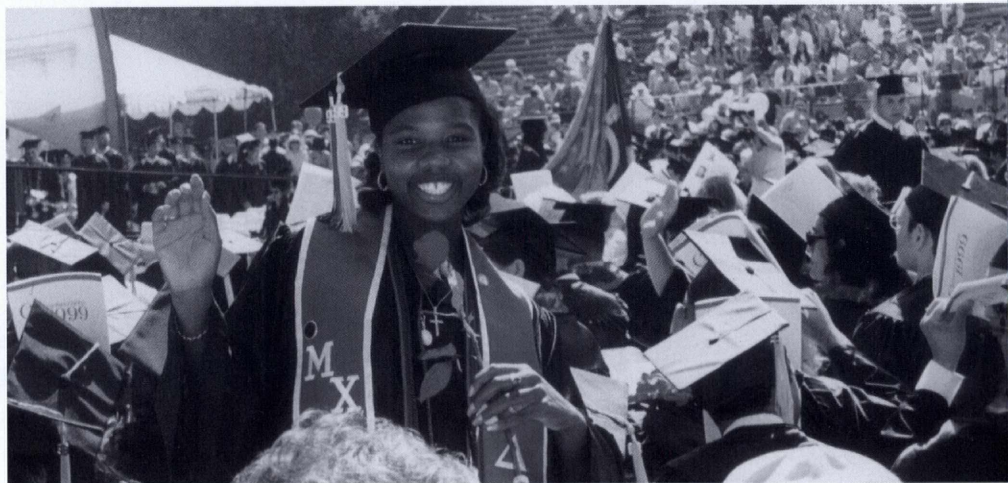
- B.A. Physics 1998
- M.A. Physics 2001
- Ph.D. Candidate in Physics

An undergraduate at UC Berkeley, Dominguez experienced the CAMP paradigm as a student of Professor Bruce Birkett and Andy Elby, who designed the Physics Scholars Program, supported by CAMP-NSF. He participated in MSREP at Stanford University. From this experience, graduate school became a definite possibility. Before, it was kind of a “murky” abstraction.

Honors include:

National Physical Science Consortium Graduate Fellowship; UC Berkeley Chancellor's Scholar (four years); McNair Scholar; Physics Undergraduate Research Scholar.

“My undergraduate career went by really fast. I got a feel for astronomy following my sophomore year, in a summer program at Stanford's Physics Department. I was interested in astronomy and astrophysics and even though I wasn't able to contribute to the field, through this first research experience I got a feel for it. I worked harder as an undergraduate than now as a graduate student,



*CAMP*er Denise Gentles, UCR Class of 1999, in her graduation regalia

[because] undergraduate work is very intense in a way that's different from the graduate workload.

I had many, many options for graduate school, including Harvard, Yale, UCLA, Stanford, Michigan, and University of Texas, Austin. I chose Cal because it not only has one of the best physics departments, but also many options because of its size and proximity to the Lawrence Livermore Laboratory—it's the best place for me.

I've been working on a 90 GHz receiver, designing a prototype for a telescope in Chile. When finished, 12 such receivers would be made, all intended for a cosmology project at CalTech. This receiver uses cutting-edge mimic amplifiers, which are not yet available in industry. My work is to design the receiver itself, making drawings, sending them to the shop to be constructed, assembling the receiver and testing, while still taking

classes and learning more about cosmology. This research is towards understanding the Cosmic Microwave Background—stuff left over from the Big Bang.

Teaching was one of the reasons I wanted to go to graduate school, because I had taught for the Physics Scholars Program/CAMP course, Physics 7B and the advanced physics laboratory. More than anything, I enjoyed seeing the expression on students' faces when something clicked in their head.”

### **Fabian Martinez**

- B.S. Electrical Engineering and Computer Sciences 2000
- Graduate School, UC Berkeley

“I am completing my first year of graduate school here at Berkeley in mechanical engineering. Within the department, I am studying the field of microelectromechanical sys-

## Alumni News

tems. A research position with Professor Fernandez-Pello has kept me busy. We are developing the world's smallest internal combustion engine. Aside from this research, I teach students in a first semester physics course here at UCB. I also have had the opportunity to speak to students from El Cerrito High School and UCB's Women In Science & Engineering (WISE), encouraging them to pursue advanced education."

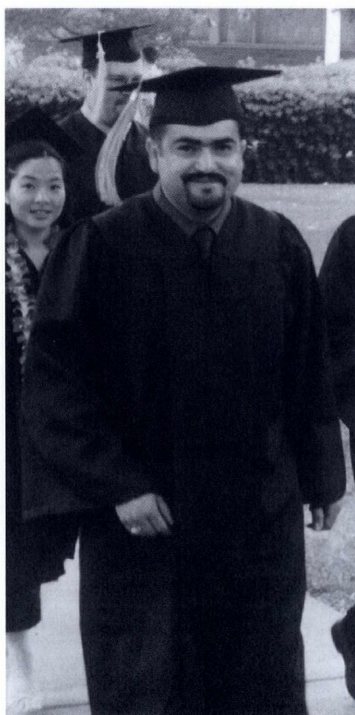
# IRVINE

ALUMNI PROFILES

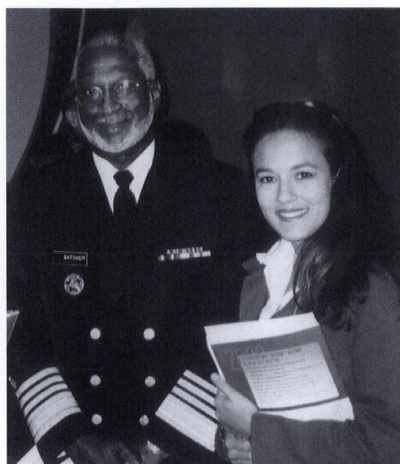
## **Carlos Arenas, Jr.**

- *B.S. Biology 1994*
- *Validation Engineer, Amgen, Inc.*

"As a student at UCI and a member of the CAMP program, I learned tremendously from the [staff] who made it a successful educational resource. CAMP taught me honesty, integrity, loyalty, and accountability. Having all of these qualities as pillars of my educational experience helped me to become the



**Roberto Arellano, UCR 2000**



**Esmeralda Iniguez, UCSD 2000, with David M. Satcher, M.D., U.S. Surgeon General, at the national meeting of the American Public Health Association.**

person I am today. CAMP provided the supportive environment to help me realize my dreams of working for the world's most influential biotechnology company, Amgen."

## **Ruben Begino**

- *B.S. Biological Sciences 1996*
- *D.D.S., UC San Francisco 2001*

"College was a big step up from high school. I didn't know how to study for this demanding new challenge. Consequently, I did not do very well my first year. Luckily for me, I had the CAMP program. I wasn't sure what I wanted to do after college [until] I received an email informing me of a summer dental program at Marquette University. I completed the program and decided that dentistry interested me. I am in my last year at UC San Francisco Dental School."

## **Patricia Jimenez**

- *B.S. Biological Sciences 1998*
- *Science teacher, Bell Gardens High School*
- *UCI Teachers Institute*

"I teach coordinated science to ninth- and tenth-graders, integrating life, physical and earth science. I introduced a new course, AP Environmental Science into the curriculum and participate in a UCI program, ESER, Encouraging Students

in Ecological Research. I'm also the Environmentalist Club advisor. My activities include AVID, Advancement Via Individual Determination, which supports students for entry into four year colleges and universities. Bringing my students to my alma mater, UCI, is especially rewarding. I get a chance to put into practice everything I learned about academic attainment through four years as a CAMP participant and skills in program management as an administrative assistant in the CAMP Statewide Office."

## **Azza Rifaat**

- *B.S. Biological Sciences 1995*
- *Master's in Public Health, University of Michigan*

"My main mentor was Dr. Eloy Rodriguez who gave me the opportunity to conduct research in his labs and provided me with the confidence that I needed to succeed. Through NIH-MIRT grants, I traveled to Venezuela and Mexico. The experiences set me apart from other applicants when I applied to graduate schools. Additionally, through CAMP I met my lifelong friends. Although we came from different cultures, our vision and goals united us. Since graduation, I obtained a dual master's degree from the University of Michigan, Ann Arbor in the School of Public Health. Currently, I am working at General Motors, Health and Safety Division, where I am involved in recruiting minorities."

## **Herman Villalba**

- *B.S. Biological Sciences 2000 Magna Cum Laude*
- *Honors: Phi Beta Kappa, Harvard research internship, AAAS Honorable Mention, UCI Campuswide Honors*

"As a somewhat adrift freshman, I wandered into the CAMP office. I was immediately transformed from a rather isolated student into a member of a family. This may seem like a pleasantry, or a trivial function of an office whose purpose is the advancement of minority education. However, if one understands the cul-

ture from which I come, from which in fact many of the students in CAMP come, one realizes that this familial, reassuring, and nurturing environment can, and does, stabilize many students. This stability allows students to focus on academic advancement. I currently have an NIH postbaccalaureate research position in Bethesda, MD, and am in the process of applying to medical school.”

**Julie Escamilla**

- *B.S. Biology 2000*
- *Staff Research Associate, UCI*
- *Graduate school bound*

“I was very fortunate to be involved with the CAMP program. I formed new friendships with other CAMPers, many of which continued after graduation. In addition to meeting countless wonderful people, I also had many experiences that I will remember for the rest of my life. Topping the list was attending conferences to present posters of my research. My future success will always have the CAMP influence upon it. I have accepted an offer from Oregon Health Sciences University for graduate school, for the Ph.D.”

**Adriana Huevo**

- *B.A. Spanish Literature 1995*
- *Director, UCI Early Academic Outreach Programs (EAOP)*
- *Master's of Education, Azusa Pacific University 2001*

Huevo, '95, represents the voice of students who for various reasons changed out of science majors. She was an active CAMP participant for three years as a biological sciences major. Promoting science has remained a personal and professional goal. Huevo is responsible for the EAOP summer institutes in AP chemistry, biology and calculus at UC Irvine. Goals include building a pipeline for CAMP. She is completing a Master's of Education in Pupil Personnel Service and a counselor credential for middle school.

“CAMP and the staff provided more than academic support; they helped determine my career. For over

20 years (with offices on each UC campus) EAOP has prepared young Californians from educationally disadvantaged backgrounds for college. I am extremely grateful for this career pathway and I look forward to increasing the number of Latinos, African American and American Indian students who experience CAMP and a university education.”

# Los Angeles

ALUMNI PROFILES

**Ronald Metoyer**

- *B.S. Computer Science and Engineering 1994*
- *Ph.D., Georgia Tech*
- *UC President's Fellowship*

Metoyer was a CAMP member at UCLA, doing research under professor Alan Garfinkel. He presented at the NSF Conference on Diversity in the Scientific Workforce. He won an AT & T Cooperative Research Fellowship for four years of graduate study. Metoyer is the first CAMP student to receive the prestigious President's Postdoctoral Fellowship. He is applying for a position at UC Irvine.

**Naiyma Houston**

- *B.S. Microbiology and Molecular Genetics 1998*
  - *Honors for Research*
  - *Research Associate, Amgen*
- “I've done several things since

completing my degree. In my first year after graduation, I taught 7th and 8th grade math and science. After that I worked in an academic research lab for about a year and then I started my job here at Amgen in one of the research labs. I absolutely love it. The opportunities are great. I plan to start a master's program this summer supported by my employer.”

**Elva Torres**

- *B.S. Chemistry 1996*
- *NSF Graduate Fellowship*
- *Ph.D. Chemistry Fall 2001*

Torres, a CARE/CAMP member 1993-96, conducted research under Dr. Delroy A. Baugh as both an undergraduate and graduate student. She received the Cota-Robles Fellowship and plans to be a professor in a research university.

# Riverside

ALUMNI PROFILES

**Carlos Cao**

- *B.S. Biology 1998*
- *CAMP Peer Counselor and Tutor 1997-98*
- *MPH UC Berkeley 2000*

“Since graduating from UCR, I dedicated two years at UC Berkeley's School of Public Health acquiring a master's with a concentration in infectious diseases. From there I spent a summer at the National Institute of Health working at their HIV



All smiles at commencement: from left, Magdalia Serna and Awilda Jimenez, UCR 2000; Patricia Jimenez, UCI 1998.

vaccine center. I am now at the UCLA School of Medicine and will graduate in 2004.”

**Maricela Covarrubias**

- *B.S. Biology 2000*
- *Presenter, AAAS, SACNAS*
- *Microarray Tech*

“I work in the Musculoskeletal Disease Center Laboratory. My project involves identifying genes that help a specific mouse strain regenerate soft tissue. At the present time I’m not in school, but I am planning on obtaining an MBA. I’d like to go into industry and market the products I’m using now, in my work at the VA Medical Center.”

**Roberto Estrada**

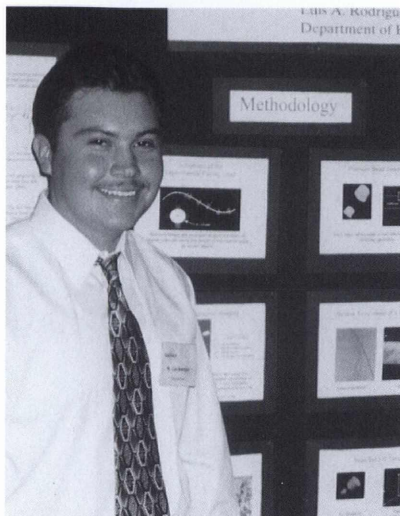
- *B.S. Mathematics 1999*
- *CAMP Tutor 1997-98*
- *M.S. Operations Research 2001*

“I am at the State University of New York at Buffalo, in the department of Industrial Engineering. I expect to receive my M.S. with a concentration in Operations Research at the end of summer 2001. Then I will continue with the Ph.D. program with a concentration in Production Systems. I am also an IGERT fellow.”

**Denise Gentles**

- *B.S. Biology 1999*
- *CAMP Peer Counselor 1996-99*
- *UC Irvine School of Medicine Post-Baccalaureate Program 1999-2000*
- *University of Kansas Medical Center, enrolled Fall 2000*

“I’m a first year medical student, University of Kansas Medical Center. One of the most enjoyable experiences I have had this first year at Kansas is with the early clinical exposure. I will be spending my summer in Equador on a medical student exchange program. This is exciting because I will be able to explore my interests in furthering my studies in Spanish and to provide care to underserved communities. In my fourth year, I plan to take advantage of the opportunity to take some of my rotation electives abroad.”



*Luis Rodriguez, UCSD Class of 2000, presents at his first national meeting, SACNAS '98. He won awards in 1998 and 2000.*

**Christine M. Gonzales**

- *B.S. Mathematics 1999*
- *CAMP Tutor 1998*
- *M.S. Applied Mathematics 2001*

“I am completing my master’s this spring in Applied Mathematics at UCLA and based on my qualifying exam results, I hope to continue on to the Ph.D. program. I have enjoyed UCLA. I began my graduate studies in fall 1999, for which I received a University Graduate Fellowship. Currently I teach Elementary Statistics and Algebra at Santa Monica Community College. I also am involved in the development of the Golden State Examination at the Orange County Department of Education. I do not believe that I would have pursued graduate school without the support of the UC Riverside CAMP Program. CAMP helped me learn what the University had to offer as well as the confidence that I could be part of groups such as the University Honor’s program or be a presenter at an AMP conference. I found the CAMP community to be supportive and welcoming to all members. Graduate school has been an experience that has opened up my mind to many new ideas—both frustrating and interesting. For the moment, I am applying for full-time tenure track mathematics teaching positions at community colleges.”

**David Holmes**

- *B.S. Mathematics 1999*
- *M.S. Mathematics 2001*
- *Community College Instructor*

“I took a year off to work at Glendale Community College as mathematics supplemental instructor and mentor for the First Year Experience program. I returned to Riverside to complete my master’s degree. By the way, I earned a 4.0 this quarter.”

**Maria Martinez**

- *B.S. Environmental Engineering 1998*
- *M.S. Environmental Engineering, Stanford University 2001*

“After graduating from UC Riverside in 1998, I returned to the campus to work for a former professor in the Department of Environmental Engineering. In September 1999, I started work on my M.S. degree at Stanford University, in the Department of Civil and Environmental Engineering, with a concentration in Environmental Engineering and Water Studies. This past March, I completed my master’s degree and am currently interviewing for positions at environmental firms and government agencies in Southern California. My future plans include obtaining my PE license, and perhaps a Ph.D.”

**Carlos Melgar**

- *B.S. Mathematics 1999*
- *CAMP Peer Counselor 1997-99*
- *Master’s in Education, Claremont Graduate University Fall 2001*

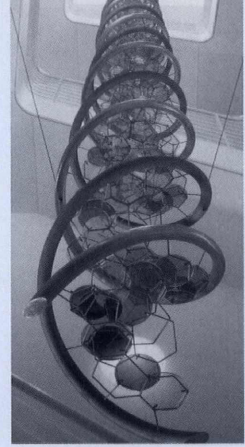
“I’m a math teacher at El Rancho High School, my alma mater in Pico Rivera. I teach several bilingual math classes. Imagine, me teaching math in Spanish. As to my own schooling, I’m working on my teaching credential and Master’s in Education at Claremont Graduate University. I will complete the program this August. Yes! Oh, last year I purchased my first home in Pico Rivera.”

*UC CAMP Alumni continues on page 29*

UNIVERSITY OF CALIFORNIA  
Davis  
Irvine  
San Diego  
Santa Barbara  
Riverside  
Los Angeles  
Santa Cruz  
Berkeley

# SYMPOSIUM III

University of California,  
Davis hosts annual CAMP Statewide  
Undergraduate Research Symposium



*The University of California, Davis hosted an outstanding symposium for students, faculty and program staff at the annual CAMP Statewide Undergraduate Research Symposium, April 6-8, 2001. Hosts James Shackelford, CAMP Regional Director, Ryan Mitchell, CAMP Coordinator, and Cassandra Fong, Co-Coordinator, welcomed 54 presenters and 20 UC faculty mentors.*

Students enjoyed camaraderie and traditional Aggie hospitality throughout the weekend.

Special guest speakers recognized students as leaders and urged them to exercise their new leadership position in the scientific community. In her remarks to participants, Celeste Rose, Vice Chancellor of University Relations at UC Davis, said of leadership: "Nothing is more important; nothing is more elusive. We're always looking for it; we can't necessarily define it, but we know it when we see it!"

CAMP Statewide Executive Director, Dr. Manuel N. Gómez, gave his personal

touch during the opening night dinner. He observed, "Students working with their faculty mentors opens an awareness of the central role research plays in intellectual progress."

From dinner at the Silo Pub to the gracious meals and presentations by keynote speakers, Dr. Robert Matthews, Professor Emeritus; Celeste Rose, Vice Chancellor for University Relations; and Shondelle Wilson, UC Davis alumna and current doctoral student, participants enjoyed a focused, student-centered weekend. Thirteen presenters received special merit for research in their disciplines. A symposium proceedings is planned for release in early fall.

**"Hosting this event is a special treat for me, having been involved with CAMP since its earliest days."**

—James Shackelford, Professor of  
Materials Science and Engineering, UC Davis

SYMPOSIUM III

CAMP



**Keynote Address by Vice Chancellor Celeste Rose:**

"It is all too rare that I am able to be with young people like you—the best and brightest math, science, and engineering students who have the opportunity to study at a world class research university. You are positioned for leadership and destined for success. . . . It seems like only yesterday, but in fact it was 33 years ago, that I arrived on the UCLA campus as a freshman. UCLA had a population of 30,000, larger than the town in the Pacific Northwest where I grew up—it was a little overwhelming! As you might have experienced on your home UC campus, it is ever so easy to get lost in the shuffle. But I am here today because there were those within the university who were interested in my success. I am here today because I am interested in your continued success, because I believe in reinvesting in the next generation of leadership. And I trust that when it is your turn, you will do the same."

—Remarks will appear in full in the forthcoming CAMP Symposium III Proceedings.

*Symposium III  
Student Awardees*

# SPECIAL MERIT

*Computer Sciences  
and Engineering-Poster*  
**Marisa Garcia, UC Riverside,  
Mechanical Engineering**

*Computer Sciences  
and Engineering-Poster*  
**Milton Symister, UC Riverside,  
Physics**

*Computer Sciences  
and Engineering-Oral*  
**Olufemi Oloyede, UC Davis,  
Computer Engineering**

*Computer Sciences  
and Engineering-Oral*  
**Marissa Yanez, UC Berkeley,  
Mechanical Engineering and  
Materials Science**

*Physical Sciences-Oral*  
**Alison Castro, UC Riverside,  
Mathematics**

*Physical Sciences-Oral*  
**Felipe Leal, UC Santa Barbara,  
Biochemistry**

*Physical Sciences-Poster*  
**Blanca Zauscher, UC San  
Diego, Physics**

*Life Sciences-Poster*  
**Oluwole Awosika, UC Los  
Angeles, Physiological Science**

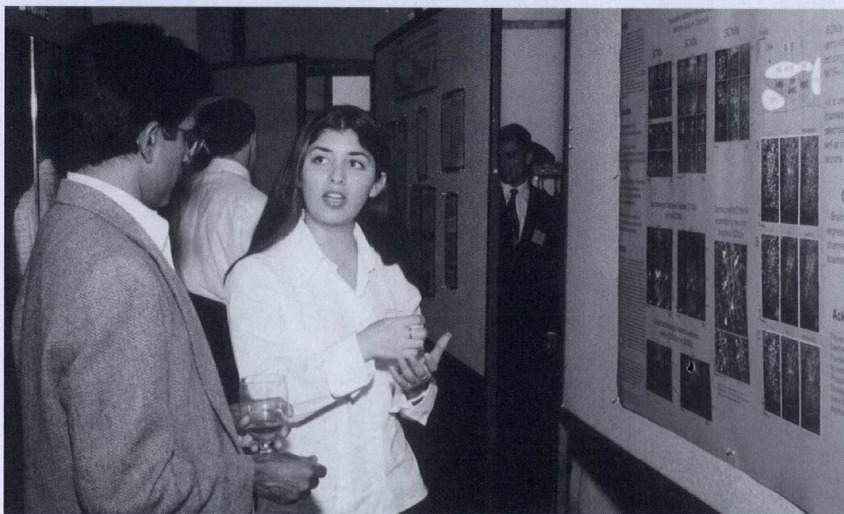
*Life Sciences-Poster*  
**Sonia Escobar, UC Los  
Angeles, Biology**

*Life Sciences-Poster*  
**Carolina Valder, UC San  
Diego, Biochemistry**

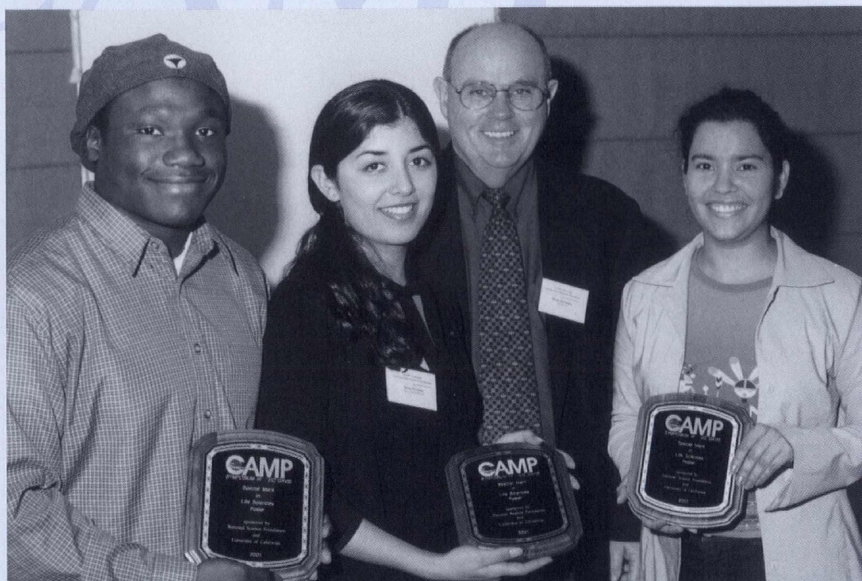
*Life Sciences-Oral*  
**Maribel Reyes, UC Santa  
Barbara, Pharmacology**

*Life Sciences-Oral*  
**Missy Soto, UC Davis, Biology**

*Life Sciences-Oral*  
**Ana Vargas, UC Irvine,  
Biological Sciences**



Clockwise, Teresa Cofield, UCR, Marlene Robinson, UCSC, and David Artis, UCSD, enjoy the display at the Alumni Center; Celeste Rose, keynote speaker; Carolyn Wall (see Guest Editorial, page 3); student poster presenter.



Above, Mark McNamee, Dean of Biological Sciences, UC Davis, congratulates awardees. Students recognized for merit in research, left to right: Oluwole Awosika, Sonia Escobar, and Carolina Valder. Upper right, Professor Russell Flegal hears poster presentation by Nicole Munoz.



**Excerpt from Keynote Address by Professor Emeritus Robert Matthews:**

“I want to talk to you about my research in Africa, a year I was on sabbatical, and tell you about flexibility. I had packed my research gear and shipped it to Kenya. When I arrived, I immediately had two setbacks. My colleague and main contact had suddenly pulled up stakes and relocated to South Africa. I was wondering what I was going to do now. Then, instead of storing my gear, all my geophysical equipment, it was left on the docks, unattended. It had been broken into and stolen. This is when I had to be flexible. I learned that UNESCO had a project in northern Kenya, and we set up an appointment to fly me up to the northern outpost to talk to the director. They needed shallow, 50’ wells. To his dismay, I had confirmed that the previously selected well sites were bone dry. I was a *persona non grata*. But I had one more ace up my sleeve—UREP, University Research Expedition Program. I was interested in the project to study an insulberg, a mesa, a mist forest in the middle of the desert. The mesa had springs, actually groundwater exiting to the surface. The mesa also had fog. I wondered if the fog was recharging the groundwater. It resulted in an interesting project that helped local people maintain a water supply for agricultural purposes. I had learned a lot about staying flexible, and urge you to look for options when plans go awry.”

—Dr. Matthews’ remarks will appear in the forthcoming CAMP Symposium III Proceedings.

The following abstract was one of 13 research endeavors recognized for special merit. All of the award-winning research abstracts will appear in the forthcoming CAMP Symposium III Proceedings, anticipated in Fall 2001.

## SPECIAL MERIT

*Physical Sciences – Poster*

**Blanca Zauscher, UC San Diego, Physics**

### OPTIMIZATION OF DIFFUSION-WEIGHTED MAGNETIC RESONANCE IMAGES

*Blanca E. Zauscher and Lawrence R. Frank.*

*Department of Radiology, UC San Diego*

Recent magnetic resonance imaging techniques have been developed to measure diffusion tensors that describe the magnitude and direction of diffusion processes within a tissue. These techniques are useful in many applications, one of which is the mapping of myelin fiber tracts in brain white matter. The mapping of myelin fibers may lead to a better understanding of white matter diseases such as multiple sclerosis. In order to obtain high contrast fiber tract maps, high diffusion b-values are desirable. This study used the equations of the signal intensities for stimulated echo and spin echo spiral pulse sequences to determine which type of pulse sequence and what ideal pulse sequence parameters (i.e. spin-spin relaxation time and spin lattice relaxation time) yield(s) higher diffusion contrast and net signal intensity for given b-values.

—Blanca Zauscher presented her work in Glasgow, Scotland, April 23-27, 2001 at the International Society for Magnetic Resonance.

**Excerpt from Address by Shondelle Wilson, the "future Dr. Wilson"**

"Something that keeps me going every day is summed up in one word: perseverance. Before I transferred to UC, I was not an honors student, I barely carried a 3.0 gpa, but I stayed with it and persevered. My counselor at Solano Community College saw potential in me. He said, "You are in control of your destiny. You have to take charge." You students here at this symposium are at a point where you can control your next step. I'm living proof. Learn from my mistakes. I skipped a GRE tutorial to hang out with my friends in summer. But if you want to go to graduate school, you have to put activities on the side. Why do I share these personal sentiments with you? They lead to a relevant point. I attended the CAMP Community College Summer Institute because my MESA director made me fill out the application. He couldn't make me go, but he made me apply. I did go, and it was the coolest thing ever. I was surrounded by 50 other community college students who were so intelligent, and they were from all over California. Now that I'm at Wisconsin, I say, these folks, who are so intelligent, come from all over the world. I could have doubted my own intelligence, but I knew that I wanted my Ph.D."

**Welcome Remarks  
Manuel N. Gómez, Vice President,  
Educational Outreach, University of California**

"During my ten years in CAMP, I have been consistently impressed and grateful for the faculty who have volunteered their time and intellectual energy to mentor students, promote their academic achievement, and ensure their success beyond their undergraduate education. I have also been impressed with and touched by students who have taken the opportunities CAMP offered them and flourished, finding their way, not only through the maze of college, but through the intricacies of demanding disciplines. Program staff have also contributed substantially to the success of CAMP, coordinating, planning, keeping on top of every detail to assist students. I would also like to note that the longevity and prosperity of CAMP has depended on the work of individuals from every cultural and ethnic background. In this sense, CAMP has been a truly cooperative venture. To the students here tonight, you will probably not be able to calculate the value of your experiences in CAMP for many years to come. Soon, your life will be yours to do with what you like, but if you take one thing with you from this experience, I hope it is a commitment to reach out to others along the way and offer them the kind of support you have been fortunate enough to receive."

**"[Students] Soon, your life will be yours to do with what you like, but if you take one thing with you from this experience, I hope it is a commitment to reach out to others along the way."**

—Dr. Manuel N. Gómez

*Good Luck*



*Above, awardees in physical sciences. Right, from left, Professor James Shackelford, UC Davis host with Keynote Speaker Robert Matthews, Professor Emeritus, and Professor Pat Turner, also of Davis.*



# Ensuring a Strong U.S. Scientific, Technical, and Engineering (ST&E) Workforce in the 21st Century

By Norman L. Fortenberry, Sc.D.

Acting Division Director, Division of Human Resource Development  
Division Director, Division of Undergraduate Education

*mentioned that Dr. Judith Sunley spent time at the National Science & Technology Council (NSTC), a coordination council that attempts to impose order on the vast federal science bureaucracy. The council also attempts to step back and examine the landscape and offer advice to policy makers on logical next steps. In April 2000, the NSTC released a report analyzing the impact of demographic and socio-economic changes could have on the future science, technical and engineering workforce in the United States. It also analyzed programs of federal agencies that are designed to increase the participation of women, minorities, and persons with disabilities. The recommendations are primarily aimed at post-secondary school efforts. The principle conclusion is that it is imperative for members of all ethnic and gender groups to participate at increasing rates if a strong scientific workforce is to be ensured. Dr. Sunley was instrumental in strengthening its recommendations.*

## Preamble

This report defines the science, technology and engineering workforce as spanning the range from highly skilled technicians with associate degrees to scientists and engineers with bachelor's, master's, and doctoral degrees. The report looked at both emerging business sectors such as biotechnology and information technology as well as "old growth" sectors such as manufacturing and service sectors.

## The Need for a Robust, Diverse, ST&E Workforce

The report makes the absolute case for a robust, diverse workforce based upon the importance of a highly skilled workforce to international competitiveness and national well-being. This case supported by

1) The growth in the ST&E fraction of the workforce from 11% in 1962 to 15% in 1995 and the conservative estimation of continued growth in this sector; and 2) The expected increase in retirements as the Baby-Boom generation continues to age and the resultant need for the remaining workers to exploit the increases in productivity which ST&E investments provide.

## The Current ST&E Workforce

The report goes on to observe that the predominant membership within the ST&E workforce is white males. Although women made up almost half of the baccalaureate recipients in 1996, their participation at graduate degree levels fell to 38% at the master's level, and 32% at the

doctoral level. These are aggregate numbers, representation of women in the mathematical and physical sciences and engineering were even lower. Similar declines in participation from bachelor's to doctoral degrees are seen in non-Asian minority populations.

## The Future ST&E Workforce

The point is then made that the dominant white male character of the ST&E workforce is unsustainable given demographic projections on birth rates and therefore, unless significant changes are made in the participation of other groups, our national economic growth is imperiled. White males are projected to shrink in relative terms from 37% in 1995 to 26% by 2050. After 2010, the white male population will shrink in absolute as well as relative size. Given this reality, if the participation of women and minorities were to remain consistent with the current situation, the U.S. would face a 9% decrease in the number of 22-year-olds earning science and engineering degrees. This decrease would occur at the same time the nation has a greater need for the productivity that results from having ST&E workers in the economy.

The traditional safety valve of increasing immigration is less likely to provide relief given that other countries are increasing investments in their own economies and work-

forces, recent HI-B legislation notwithstanding. Thus the pool of immigrants in ST&E fields is likely to decline. This is already seen in decreasing doctoral degree awards to international students. Indeed, many countries are luring home graduate students and professionals who previously would have stayed in the U.S.

## The Role of Research Funding Agencies

The report then makes several observations on the actions being taken by federal agencies to address the challenges to preparation and persistence of underrepresented groups including:

- Direct student financial support (grants, scholarships, fellowships, and other financial vehicles),
- Focusing on key transitions in the educational continuum (within K-12, high school to community college, transfer to four-year, undergraduate to graduate),
- Enhancing institutions, especially minority serving institutions,
- Fostering cooperation among institutions, such as partnerships and networking,
- Rewarding cooperation exemplary efforts to increase inclusiveness,
- Providing workforce opportunities,
- Increasing diversity within an agency's own ST&E workforce, and
- Encouraging grantees and contractors to promote diversity.

## Conclusions

The report concludes by making two important observations: Science, technology and engineering workers are essential to both the private and public sectors. In the private sector, they propel the economy and provide valuable services. In the public sector, they support important federal missions. Based on the tight global ST&E workforce market,

changing demographics, and projected growth in ST&E-based jobs, it is in the national interest to vigorously pursue the development of domestic ST&E workers from all ethnic and gender groups. We should pay special attention to groups that are currently underrepresented because it is with these groups that much of our nation's growing talent pool resides.

## The report makes four recommendations targeted to higher education:

1. Federal agencies should critically evaluate how the wide range of programs they support can particularly increase participation by women, minorities, and persons with disabilities. Efforts judged as particularly high leverage are those that facilitate key transitions in student education or address requirements for financial resources. We are doing this within the minority-focused programs of HRD.

2. Federal agencies should continue to support research on barriers to full participation. HRD recently sponsored a meeting hosted by the American Association for the Advancement of Science in support of strengthening NSF's education research base in this regard. AGEP includes a research component looking at barriers and enablers to participation within its program announcement and we have also added a similar education research component to Phase II LSAMPs.

3. Federal agencies should emphasize the recruitment of qualified individuals from underrepresented populations. Beyond touching one of my personal pet peeves, which is why the dis-

cussion is always about "qualified" WMD as though someone were seeking to force unqualified individuals into the workforce and why is that never an issue except when we discuss WMD? But in any case, let me observe that HRD is actively taking steps to increase participation of underrepresented populations on NSF's own staff. Two manifestations of that is our use of the faculty directory for HRD's minority focused programs edited by Dr. Louis Dale and the presentation later this morning by representatives of NSF's Division of Human Resource Management.

4. The last recommendation calls on the federal government to establish and maintain an internet site on ST&E workforce related programs. It seems to me that much of this site already exists within the expanded MOLIS web site. However, if there are gaps, I call upon those here to pool their collective wisdom and develop an appropriate proposal to the National SMET Digital Library program.

My final observation is that the points noted in the report are already reflected in the design and implementation of NSF's minority-focused programming. And even though there has been a change in Administration, the basic truths outlined in this report and the recommendations resulting therefrom remain as compelling as ever. As a group, you have the collective wisdom and experience to make substantial progress in meeting this National challenge. We are depending upon you to do so.

**"...the basic truths outlined in this report and the recommendations resulting therefrom remain as compelling as ever."**

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*Remarks from the National Meeting of NSF-Directorate of Education and Human Resources, Division of Human Resource Development, Joint Project PI./PD. meeting of HRD Diversity-Focus Programs: Louis Stokes Alliances for Minority Participation, Alliances for Graduate Education and the Professoriate, Centers of Research Excellence in Science and Technology, Historically Black Colleges & Universities Undergraduate Program.*

# NSF-HRD Programs Project Directors Meet

*LSAMP, CREST, AGEP Leadership Convenes,  
Promotes Collaboration*

**P**roject directors of the National Science Foundation Human Resource Development Diversity-Focused Programs met in Crystal City, Washington, D.C., March 25-26, 2001, for the annual joint meeting. The plenary session on day one featured NSF leadership speaking about the role of the programs in fueling the nation's demand for a quality trained scientific workforce. Judith S. Sunley, Interim Assistant Director, Directorate for Education and Human Resources, and Norman L. Fortenberry, Acting

Director, HRD addressed the directors, with particular focus on the report of the National Science & Technology Council on the Scientific, Technical, and Engineering Workforce in the 21<sup>st</sup> Century (previous pages).

"What works differs from the kind of institutions you represent," Dr. Sunley told attendees. She urged the project directors to "take the knowledge about your local situation, your domain, and craft

effective activities." She encouraged fostering cooperation and building connections to other areas of the National Science Foundation. "Look at what works in one place," Sunley offered, "and scale it up in another." Of the range of programs represented, she said, "There is high interest in Congress in these programs."

The second day featured program-centered breakout sessions. For the Louis Stokes Alliances for Minority Participation, this session brought together representatives from 27 alliances as well as leadership from new proposals, including Alaska.

The meeting featured a 10-year celebration at the Smithsonian Institution for the Louis Stokes AMPs, the foundation's flagship undergraduate program.

## National Scene



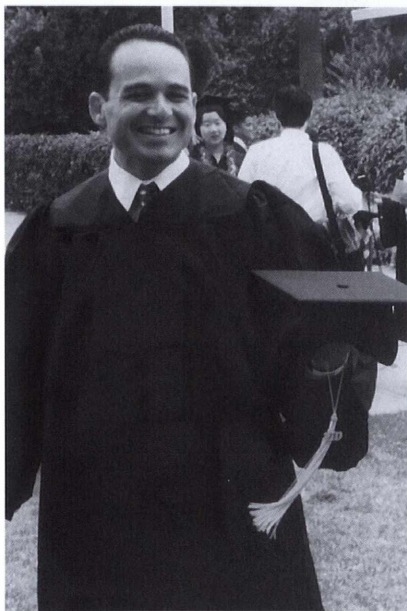
*Teresa Cofield, UC Riverside CAMP Coordinator, attended the joint PD meeting as part of the CAMP Statewide contingent. Cofield wears several hats: she facilitates AGEP and UC LEADS as well.*



*Dr. Juan Francisco Lara, CAMP Statewide Office (second from left), made representatives of the original AMPs honorary "CAMP-ers." Lara presented a golden anteater, Irvine's mascot, and a UC ornament to project directors from Alabama, Arizona, Puerto Rico, Mississippi, and Texas A&M—the "Grand AMPs," as dubbed by Dr. Louis Dale, UAB.*

## UC CAMP Alumni

continues from page 21



**Daniel Smith, UCR 2000, plans to be a university professor. He has a Chancellor's Fellowship to support his graduate degree in microbiology, and is an AGEP student.**

### **Leticia Pelayo**

- *B.S. Biology 1999*
- *CAMP Peer Counselor 1998-99*
- *Stanford University Medical Student, Class of 2003*

"Well all is good. I have finished my preclinical years at Stanford University and am soooo thrilled. I now have to further develop my physical exam skills and also make an attempt at studying for the boards. It is so great! I have run into a fellow CAMPer a few times too, really cool."

### **John Scheel**

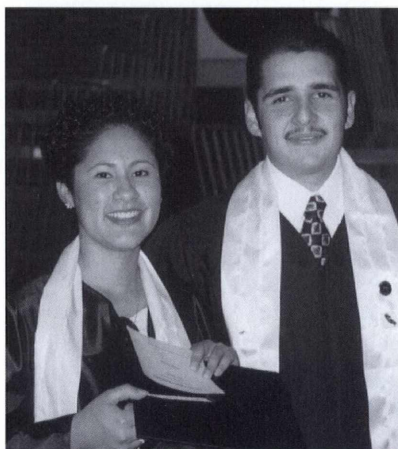
- *B.S. Biology Class of 1997*
- *National Institutes of Health Post-Baccalaureate Intern*

"Since graduating from UCR, I spent a year at NIH as an intern. I am currently a third year student in the UC San Diego Medical Scientist Training Program and will graduate in 2005. For my thesis I'm studying gene expression in neural stem cells involved in neural degeneration and regeneration."

### **Magdalia Serna**

- *B.S. Mathematics 2000*
- *CAMP Peer Counselor and Tutor 1998-2000*
- *M.S. Financial Mathematics 2001, University of Chicago*

"Since graduation from UCR, I have been attending the University of Chicago. I will be completing my Master's of Science degree in Financial Mathematics in June 2001. After graduation I plan to work in investment banking and I am currently interviewing for positions."



**Adriana Aguayo and Miguel Gaeta, UCR Class of 1999**

### **Marissa Vasquez**

- *B.S. Biochemistry 1998*
- *CAMP Peer Counselor and Tutor 1996-1998*
- *UC Davis School of Medicine Post-Baccalaureate Program 1998-99*
- *National Hispanic Medical Fellowship Award 1999-2000*
- *Temple University Incentive Award 1999-2000*

"Currently I am wrapping up my second year of medical school at Temple and getting ready to take the USMLE Step 1 Board exam in June 2001. I'll be kicking off the beginning of my clinical rotations on June 25th, starting with Surgery, then Internal Medicine, etc. I do know definitely that I want to go into Primary Care. I am planning to run for a national office in the National Boricua Latino Health Organization executive board."

### **Maria Isabel Zamudio**

- *B.A. Mathematics 1997*
- *Math Peer Tutor*

"I am working as a Student Affairs Officer in the Learning Center at UCR. I teach a weekly lab for college algebra, counsel students on how to improve their academic performance. One of the most rewarding aspects of my job is that I have continued to work with the CAMP program and its students. I plan to work towards a master's degree in Applied Mathematics within the next few years. In September 1997, I married fellow CAMPer Silvestre Zamudio and we plan to buy our first home this summer."

### **Silvestre Zamudio**

- *B.S. Computer Science 1997*
- *Software Engineer*

"After graduation, I began working at a small company in Riverside that focuses on biometric computer security, I/O Software, Inc. I have worked on several major projects here, including "SecureSuite™." This product was the first to utilize a new biometric device interface standard, also developed at I/O Software, Inc., named Biometric Application Programming Interface (BAPI). I was fortunate enough to be part of the team which developed BAPI. It is very exciting knowing your work may be used by so many people around the world. As for my future plans, I hope to continue my career as a software engineer and perhaps acquire an MBA in a few years."

### **Omar Zuniga**

- *B.S. Mathematics 2000*
- *Ph.D. Student in Mathematics, University of Arizona, Tucson*

"After graduating from UCR, I entered the graduate program in mathematics at the University of Arizona, Tucson. I hope to obtain a Ph.D. in mathematics by Spring 2005. I am completing my first year of graduate school. It has been very difficult, but a great experience. I am finding the work challenging and will be taking my first qualifying exams this summer. Starting in August, I

will begin teaching entry level math courses at the University of Arizona, and will have full responsibility for the course. I really like the people here and feel very comfortable [at UA].”

## Santa Barbara

### ALUMNI PROFILES

#### **Jennifer Keyani**

- *B.S. Chemistry 2001*
- *Graduate School bound*

Accepted to Ph.D. programs at Northwestern, MIT, and Berkeley. Attending Berkeley in Fall 2001.

#### **Felipe Leal**

- *B. S. Biochemistry 2001*
- *Research Honors*

Accepted to Ph.D. programs at UCLA, UCSD, Notre Dame, University of Michigan and the University of Washington. Received Special Merit Award for oral presentation at the CAMP Symposium III at UC Davis for “Kinetic and Structural Studies of Osmium Nitric Oxide Porphyrins.”

#### **Jennifer Rodriguez**

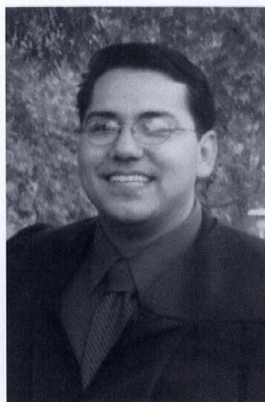
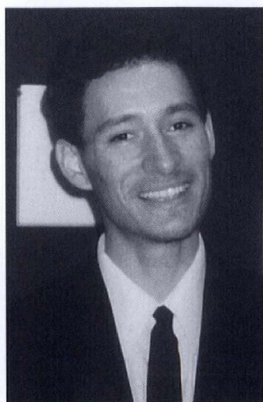
- *B.S. Bio-Psychology 1998*
- *CAMP Researcher*

“I just wanted to write you a quick note to let you know how things are going. I followed your advice and am attending UCLA. I am in the industrial hygiene program, and have begun doing my second year research. I feel the experience that I had through CAMP and the lab has really put me ahead of the other first years.”

#### **Adam Sanjurjo**

- *B.S. Mathematics 2000*
- *Commencement Speaker; UC/DC Program; Peer Advisor, Summer Institute in Math and Science (CAMP supported)*
- *Analyst, Federal Reserve*

“Everything here is going pretty well. I am just getting back in



*Michael Palmer, UCSD 2000; Ruben Maldonado and Maricela Covarrubias, UCR 2000*

the swing of things after returning from a month long trip to South America. The majority of my work has involved computer programming. I would say that the “economics” that I have done has all been indirect, or simply the application of others’ work to programs. Some of the projects I have been working on: Value-at-Risk models and studying stock liquidity.”

#### **Jorge Torres**

- *B.S. Biological Sciences 1998*
- *Former Teaching Fellow, CAMP Researcher, Graduate Student Princeton University*

“I am completing my third year as a graduate student at Princeton. I have passed all my class requirements and general examinations. I am concentrating on my thesis lab work. For the past year and a half I have been a member of the Zakian lab. This lab works primarily on telomeres and trinucleotide repeats, both of which have been implicated in human disease. As part of graduate school requirements, students must assist professors in two courses. I am now assisting with a genetics course. I previously assisted with an introductory course, where I received an award for outstanding performance as an assistant in instruction. I am also co-authoring a review on the family of helicases from our lab. In the future I hope to follow a path towards becoming a professor, thus I will do a postdoc after graduate

school. I am extremely happy with my career choice thus far. Finally I’d like to say *thank you* to you and all your staff that have put a lot of hard work into the CAMP program over the last ten years. I am grateful that I was given the opportunity and the training to succeed in science.”

#### **Gallen Triana-Baltzer**

- *B.S. Molecular Cell, Developmental Biology 2001*
- *Graduate school bound*

Accepted to Ph.D. programs at UCSB, UCSD, and the University of Washington; currently deciding which institution will best meet his career goals.

## Santa Cruz

### ALUMNI PROFILES

#### **Angelina Flores**

- *B.S. Chemistry 1999*
- *Master’s program, Cal State L.A.*
- *Public Health Center*

“Remember me? I completed the internship at the genetics clinic at UCLA and am doing good in the postbac program here at Cal State L.A. I’m preparing for the MCAT this fall and learning to balance my personal and academic life since I got married last year. It has been a roller coaster!”



### **Albert Mendoza**

- *B.S. Chemistry 1999*
- *M.S. University of Utah*
- *Awardee LSAMP Research Conference, Montana 1998*

At SC, Mendoza conducted research under Dr. Philip Crews on “Chemical Profile of a Marine Sponge, *jaspis splendens*,” and won national honors.

“I am working in Brenda Bass’s lab in the Department of Biochemistry. I came in through the Biological Chemistry program, just finished my second year as a graduate student, and am doing my prelims (orals). I hope to become a Ph.D. candidate and finish three years from now.”

### **Brenda Pereda**

- *B.S. Biology and Molecular Biology 2000*
- *Postbaccalaureate program, UC Davis*

“Doing the two summer research internships in biochemistry really prepared me for my work here at Davis and my goal of admission to medical school. I feel good about the experience I’ve gained in the postbac, am learning a lot, and making good connections at the medical school.”

## *San Diego* ALUMNI PROFILES

### **Michael Palmer**

- *B.S. Biological Sciences & Biochemistry 2000*
- *High merit in research*
- *First year graduate student at UC Irvine, AGEF Fellowship*

“I started with the Fast Track Program (FTP) during the summer, which is a good starting place, both socially and academically, for incoming minority students. Fast-track provides excellent short- and long-term resources. From there, Dr. Martha McCartney suggested a lab rotation in which I would be working with frogs and limb regeneration with Dr. David Gardiner.

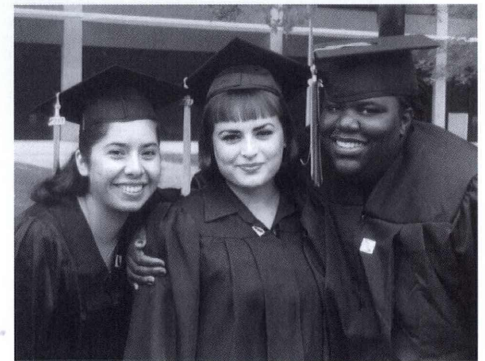
When looking at a lab to join, even for a rotation, try to think about what kind of approach you like, i.e. purifying proteins, a biochemical approach or probing and finding new genes, a molecular biology approach. Make sure that the professor you are working for takes an active role in your results and experiments (within reason). I’ve worked with Dr. Stewart, who studies spinal cord regeneration and repair mechanisms. This is great stuff, and I hope this will be my final destination in graduate school. For two quarters now, I’ve worked on slice cultures, taking brain slices of the hippocampus, and keeping them alive in a culture method that is supposed to mimic *in vivo* conditions. Though I have found my “dream lab,” I am rotating into another lab next quarter. I want to stay, and I am certainly going to find out what is going on with my slice culture, but I would also like to get a look at a different area of neurobiology before I commit to one lab for the next four to five years.”

### **Mauricio Dujowich**

- *B.S. Neuroscience & Animal Physiology 2000*
- *First year veterinary student at UC Davis*

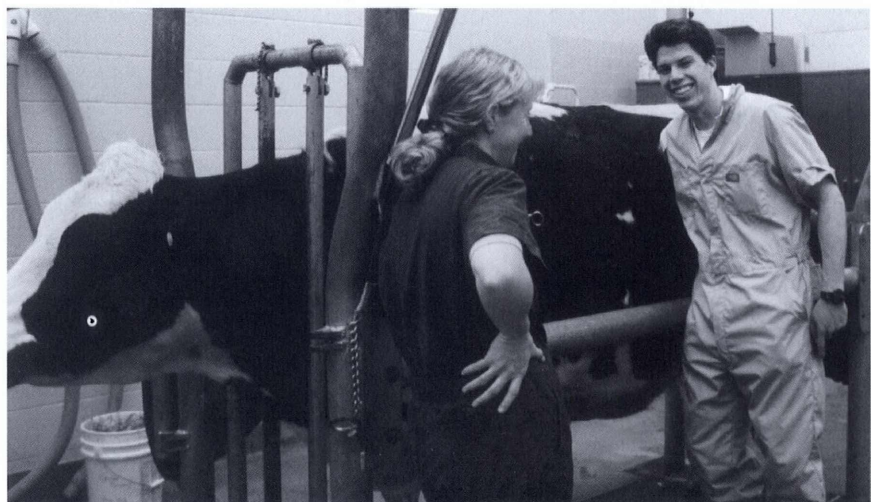
“It seems as though only yesterday I was sitting in Sarah Richards’ (UCSD CAMP Coordinator) office

struggling with my veterinary school application. I applied to eleven schools and was lucky enough in the application process to be picked by the school of my choice. Three quarters have passed since I began vet school at UC Davis. I am grateful for the preparation I received at UCSD, not necessarily in the form of science classes but the good study

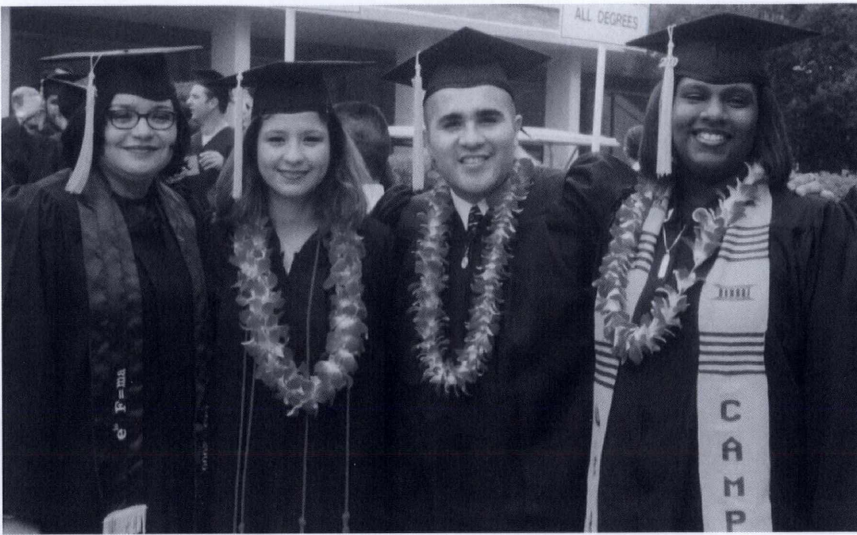


*From left, Rosa Soto, Nadia Sapien, and Rebecca Nanyonjo, UCR Class of 2000*

habits and focus I picked up during my undergraduate career via extra-curricular activities such as CAMP. The curriculum here is set up so that the first two years of this program are mostly book work, thereby establishing a strong scientific background in veterinary medicine. Then the last two years are mostly clinical work. We have not yet had much hands-on



*Mauricio Dujowich with his hand inside a cow that has been fistulated for the benefit of the first year physiology students. (The cow does not seem to mind and recovers quickly.)*



*New UC Alumni, from left, Adriana Rubalcaba, Monica Villarreal, Omar Zuniga, and LaKrecia Sanders savor the moment, UCR 2000 commencement*

experience with live animals, but we do get the occasional “stick your hand in the cow’s rumen” lab (see page 31). Here at Vet school I have learned three things: 1) It’s impossible to know everything; 2) If you get four hours of sleep that’s good; and 3) I still don’t know how to cook. Even though school is intense (multiple all-nighters), I find myself enjoying every minute of it.”

**Luis Rodriguez**

- *B.S. Mechanical Engineering 2000*
- *Nokia Scholarship*
- *GEM Fellowship*
- *Plans for Ph.D. in Robotics*

“This year has been very beneficial to me since it has given me the opportunity to explore my interests and career options. I postponed my graduation for one quarter in order to take an introductory course on intelligent systems, to broaden my background in computer vision and robotics. After completing this course last fall, I realized that robotics is an extremely challenging and exciting field which has unlimited application. However, I was uncertain about whether to pursue graduate school or start working as a mechanical engineer. To help me decide, I applied to both graduate

schools and engineering companies. I also applied to the National Consortium for the Graduate Degrees for Minorities in Engineering and Science (GEM) fellowship.

Shortly after, I accepted an internship with a small consulting company to explore what it would be like to work as a mechanical engineer with a bachelor’s degree. From this internship, I have experienced working both for a small company and also for a large corporation, since I am currently working offsite with a large company. I have observed that people with advanced degrees are the ones making design decisions and are usually project leaders. This internship helped me realize that I really do want an advanced degree. As a recipient of the GEM fellowship, I have an internship position at Ford Motor Co. this summer and it will pay my tuition and a stipend.

My future plans are to obtain a doctorate in robotics and to develop machines or systems that help improve the overall quality of life and the efficiency of healthcare delivery. I also want to serve as a positive role model for minority groups. I have been accepted to and am currently considering University of Wisconsin, Madison and Carnegie Mellon University for graduate study.”

**Esmeralda Iniguez**

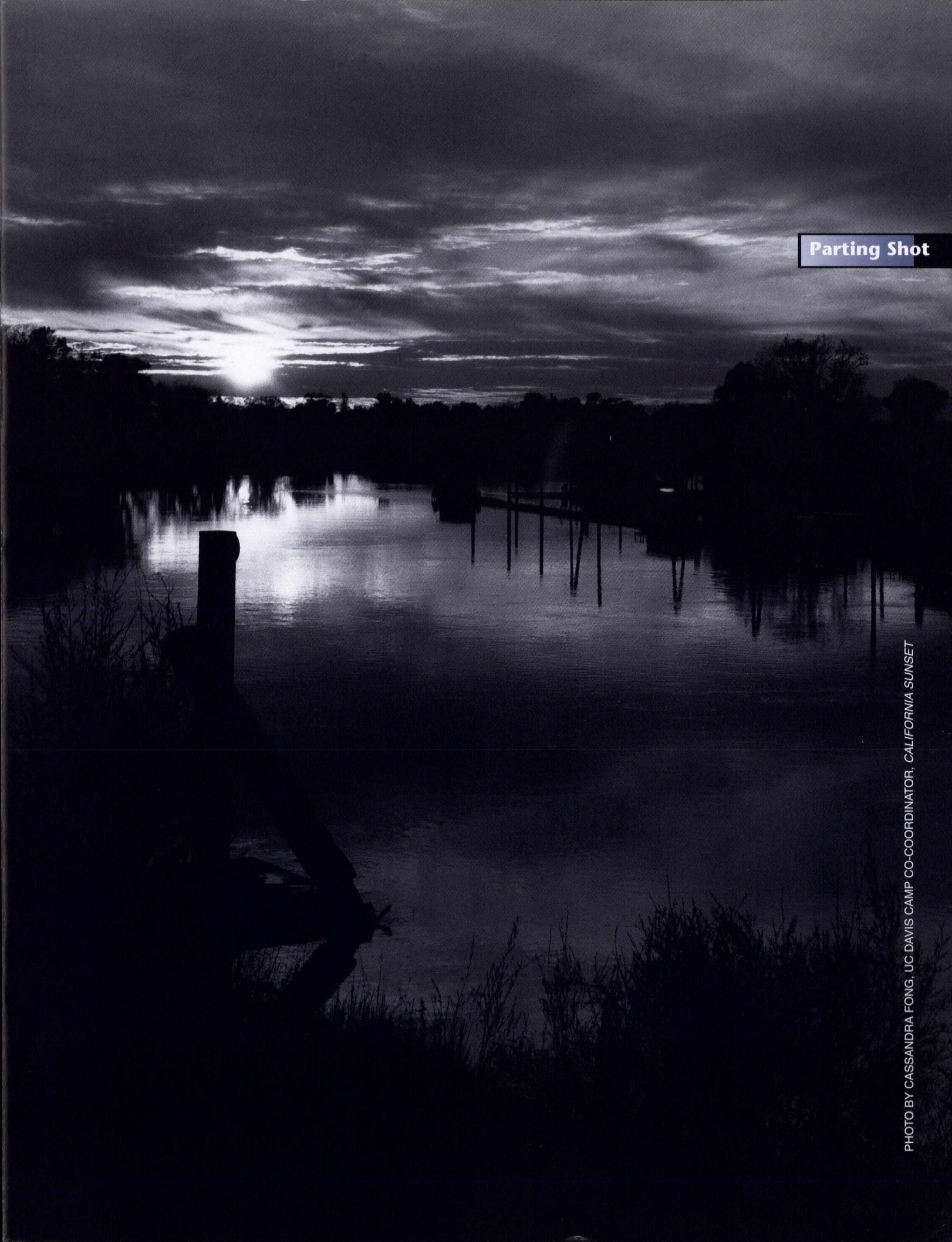
- *B.S. Animal Physiology/ Neuroscience 2000*
- *Master’s of Public Health expected 2002*
- *Achievement in Undergraduate Research Award, CAMP Statewide Symposium, 1999 and 2000*

“My interest in public health was spurred as an undergraduate while working on a research project and taking classes on the subject at the same time. My participation in both the Faculty Mentor Program and CAMP were instrumental in developing this interest. Both programs expanded my knowledge in public health beyond the limits of the classroom. They gave me the opportunity to involve myself in research and present at pre-professional conferences, experiences that were very valuable. I am now finishing my first year at San Diego State University in the Master’s in Public Health program, and am extremely grateful that I had the preparation that I did as an undergraduate. The programs offered through CAMP left me well prepared for graduate school. I am also preparing to apply to a Ph.D. in epidemiology. In particular I would like to concentrate in behavioral epidemiology research.

I recently received a minority research supplement from the National Cancer Institute which will fund my research both as a master’s and as a Ph.D. student. My current research involves applying behavioral psychology principles to decrease risky health behaviors, such as smoking. The grant is a five-year grant funded by the National Institutes of Health. I am in charge of coordinating the evaluation component. It is my hope to continue working in this same field as a Ph.D. student, and also hopefully with the same professor. My research will stay focused around health issues that are affecting the Latino community.”

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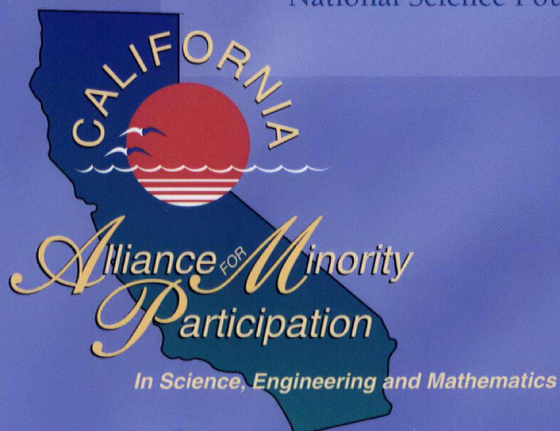
—Alumni profiles were facilitated by the CAMP coordinators on each campus. The Berkeley profiles were facilitated by K. Wayne Yang, Physics Scholars Program, supported by CAMP, UC Berkeley.



Parting Shot

PHOTO BY CASSANDRA FONG, UC DAVIS CAMP CO-COORDINATOR, CALIFORNIA SUNSET

Faculty mentorships and research opportunities greatly increase the participation and success of underrepresented students in the sciences and engineering. The culture in the sciences, and especially in the laboratory, has evolved to one that accepts, fosters, and expects high achievement for these students. Working synergistically with affiliated programs since 1991, CAMP at the University of California has helped to graduate 9,022 B.S. degree recipients in science, mathematics, engineering, and technology majors. The partner campuses engage in the goals as established by the National Science Foundation, which represents a systemwide priority.



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