

Bios

The Biology Department Newsletter
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Biology Dept., see www.csun.edu/biology

California State University
Northridge

California State University, Northridge

Biology Department Welcomes Two New Faculty Members

Dr. Mark Steele: Marine Ecologist

Joining the Biology faculty this fall is Dr. Mark Steele, a specialist in fish ecology. Steele's love for fishes and ecology started as a young child, he says. "As a kid, I was an avid angler and aquarium keeper. I didn't know it at the time, but when I was eight, I 'reinvented the wheel' when I attached a threadbare towel to two sticks and pulled the contraption through a stream to catch fishes, thus creating anew the seine net, a



commonly used tool for collecting fishes." By the time he was in high school Steele had more than 20 aquaria and was breeding, raising, and selling fishes to aquarium shops.

Steele did his undergraduate work at UC San Diego where he majored in Ecology, Behavior, and Evolution. He then moved up the coast to UC Santa Barbara to pursue a PhD studying the ecology of two common marine fishes, the bluebanded goby and the blackeye goby, at Santa Catalina Island. After receiving his doctorate in 1995, Steele first took a postdoc position at UCLA, then moved to the University of Rhode Island as a research assistant professor. Deciding that winters were too long in Rhode Island, he moved back to southern California to work as a research biologist at UC Santa Barbara.

Seeking teaching experience, in 2006 Steele took a part-time teaching post at CSUN, while keeping his research position at UCSB. Clearly, he did well as an instructor, for he was quickly asked to join the full-time faculty as an assistant professor.

This semester, Steele is teaching Ichthyology (BIOL 530), but he has also taught Marine Ecology (BIOL 529) and Ecology of Marine Fishes (BIOL 531). Moreover, he continues to teach Biology of Fishes in Moorea, French Polynesia, for Northeastern University's Three Seas (formerly East/West) Program, a year-long sequence of marine biology courses; he has been teaching this class for the past decade. In addition, Steele has taught Ecology at UCLA.

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Dr. Sean Murray: Microbiologist

CSUN is pleased to welcome Dr. Sean Murray as a tenure-track faculty member of the Biology Department. This fall, his first semester at CSUN, he is teaching microbiology lecture and laboratory (BIOL 315/L). In future semesters he expects to teach other courses, among them Molecular Genetics of Microorganisms (BIOL 561) and Genetics of Bacteria and their Viruses (BIOL 566).



Murray began his university studies at Montclair State University in New Jersey. There, he says, "... an undergraduate research experience on the effect of heavy metals on the growth of Cyanobacteria allowed me to discover my passion for research." Ultimately his investigations resulted in two peer-reviewed publications, an unusual accomplishment for an undergraduate.

After completing his BS in biology and psychology, Murray moved to Yale University for his PhD. There, working in collaboration with a biotechnology company, he focused his research efforts on the genetic engineering of *Salmonella* bacteria to selectively amplify the organism's effect in mammalian tumors, but not normal tissues, so as to inhibit tumor growth. While at Yale, Murray helped instruct biochemistry lectures and microbiology laboratories, and as a result also realized his love for teaching.

After completing his doctorate, Murray took a post-doctoral position at Stanford University in the laboratory of Dr. Lucy Shapiro, where he studied molecular mechanisms (including transcription, proteolysis, and subcellular localization) that regulate the bacterial cell cycle. At Stanford, he also saw first hand how scientists can use their expertise to help politicians. Shapiro served as a Whitehouse Advisor for President Bill Clinton and frequently consulted with American and European leaders on scientific issues. Discussions with Shapiro sparked Murray's

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Publications by Biology Faculty and Their Students*

Jonathan Williams (MS 2006), and Drs. **Larry Allen**, **Mark Steele**, and **Dan Pondella** have a paper in press in *Marine Biology*: “El Niño periods increase growth of juvenile white seabass in the Southern California Bight.”

Jacqueline Padilla-Gamino (MS 2005) and Dr. **Robert Carpenter** have a paper in the *Journal of Phycology* entitled “Thermal ecophysiology of *Laurencia pacifica* and *Laurencia nidifica* from tropical and warm-temperate regions.”

A new symposium volume—*Flora and Ecology of the Santa Monica Mountains*—has come out. In it is a chapter by graduate student **Ann Dorsey**: “*Dudleya*, with special reference to those growing in the Santa Monica Mountains.” Also included, by **Tarja Sagar** and Dr. **Paul Wilson**, is a chapter on “Bryophytes of the Santa Monica Mountains.” Wilson and coauthors from elsewhere have also published a paper in *The Bryologist* on “*Pleuridium mexicanum* new to the U.S.A. from California.”

Dr. **Steve Oppenheimer**’s lab is cranking out papers. *Zygot*e is publishing “Hyalin: An interspecies cell adhesion molecule” co-authored by **Maribel Alvarez**, **Jennifer Nnoli**, Dr. **Edward Carroll**, **Virginia Hutchins-Carroll**, **Ziba Razinia**, and Oppenheimer. Appearing in *Acta Histochemica* are three papers: “Cyclodextrin, a probe for studying adhesive interactions,” by Oppenheimer, **Sahar Sajadi** and **Patricia Rojas**; “Carbohydrate-based experimental therapeutics for cancer, HIV/AIDS and other diseases,” by Oppenheimer, Alvarez and Nnoli; and “Lectin binding and effects in culture on human cancer and non-cancer cell lines: Examination of issues of interest in drug design strategies” by **Karineh Petrossian**, Dr. **Lisa Banner** and Oppenheimer.

Dr. **Sean Murray** and four collabora-

tors at Yale and the University of Washington have had a paper published in the *Journal of Bacteriology* entitled “pmrA(Con) confers pmrHFIJKL-dependent EGTA and polymyxin resistance on msbB *Salmonella* by decorating lipid A with phosphoethanolamine.”

Dr. **Wendy Birky** and a colleague published a paper in *American Journal of Primatology* entitled “Within-group female–female agonistic interactions in Taiwanese macaques.”

Robin Elahi (MS 2006) and Dr. **Peter Edmunds** have a paper in *Journal of Experimental Marine Biology and Ecology*: “Indeterminate growth of the solitary coral, *Fungia concinna*: Does photosynthetic energy intake limit maximum size?”

From Dr. **Fritz Hertel**’s lab, **Diego Sustaita** (MS 2006) has a paper stemming from his MS thesis—“Musculoskeletal underpinnings to differences in killing behavior between North American accipiters and falcons”—accepted by the *Journal of Morphology*. A paper by Hertel and **Kenneth Campbell** will appear in *The Auk*: “The antitrochanter of birds: Form and function in balance.”

Dr. **Virginia Vandergon** has had an article, “Improve aptitude and attitude in science teaching,” published in the *Academic Exchange Quarterly*.

Recent Research Presentations at Scientific Meetings

Dr. **Paula Schiffman** and grad student **Ann Dorsey** gave talks at the meeting of the Ecological Society of America. Dorsey and **Jolene Pucci**, a recent graduate from Schiffman’s lab, also gave talks at a meeting of the California Botanical Society.

Maribel Alvarez and Dr. **Steve Oppenheimer** co-authored a poster at the American Association for the Advancement of Science meeting.

Eight graduate students in the Marine Biology program presented their research at the Benthic Ecology meeting in Atlanta: **Daniel Green**, **Stacy Krueger**,

Mairead Maheigan, **Nancy Muehllehner**, **Abigail Poray**, **Carly Ryan**, **Melissa Spitler**, and **Christina Vasquez**. Green, Maheigan, and Muehllehner work with Dr. Peter Edmunds; Krueger, Ryan, and Vasquez with Dr. Steven Dudgeon; and Poray and Spitler with Dr. Robert Carpenter. The students’ travel was sponsored by the Department of Biology and the Graduate Research and Sponsored Projects Office.

Nancy Muehllehner represented the Department of Biology at this year’s Emeritus Faculty Luncheon where she presenting her research on the effects of increasing carbon dioxide on the growth of stony corals.

Representing 17 other student co-authors of a poster presented at the American Society for Cell Biology meeting by Dr. **Steve Oppenheimer**’s lab were K–12 teacher **Greg Zem** and students **Laurie Goldstein**, **Erin McNicholas**, and **Harout Khanjian**.

The Oppenheimer lab presented five posters at Experimental Biology 2007 co-authored by 26 students, Greg Zem, a K–12 teacher, Drs. **Edward Carroll** (two posters) and **Lisa Banner** (one), **Virginia Hutchins-Carroll** (one), and Oppenheimer (all). Zem, **Laurie Goldstein**, **Maribel Alvarez**, **Jennifer Nnoli**, **Sahar Sajadi**, **Karineh Petrossian**, and **Ziba Razinia** were first authors or presenters of the following posters: • Microplate assay for quantifying developmental morphologies: Effects of hyalin on sea urchin gastrulation; • Analysis of lectin binding and lectin effects on human colon cancer and non-cancer cell lines; • A putative role for glucosyl groups in sea urchin gastrula cellular interactions; • Interspecies effects of sea urchin hyalin on archenteron elongation and attachment; and • New sugar inhibitors of immobilized concanavalin A binding.

Dr. **Maria Elena de Bellard** and students **Christopher Walheim**, **Matthew Somerville**, **Darwin Martinez**, **Deborah Nambi**, **Lino Kim**, **Martha Cornejo**, **Marianne Bronner-Fraser** co-authored a

* Readers will find full citations & often PDFs at www.csun.edu/biology/faculty.

paper at the VIII European Glial meeting in Health and Disease in London: "Neurotrophins and neural crest and Schwann cell migration." The paper will also appear in the meeting's proceedings.

In August, Dr. **Paula Schiffman** co-organized a symposium on grassland ecology at the annual meeting of the Ecological Society of America in San Jose, CA. She also gave a presentation entitled "The pre-European state of California grasslands: Hypotheses and challenges for reference community selection" for the symposium and participated in a lively panel discussion afterward.

Graduate student **Jarrod Percy**, Dr. **Tim Karels**, and UC Riverside collaborator Dr. Wendy Saltzman presented a poster at the Physiological Ecology Meetings in Bishop, CA. The poster was on the "Effects of glucocorticoids on anti-predator behaviors." Percy also presented a talk on "Alarm calling and elevated glucocorticoid hormones" at the UC Santa Barbara Sedgwick Reserve Research Symposium.

Drs. **Steven Dudgeon** and **Janet Kübler** and graduate student **Stacy Krueger** co-authored two papers at the European Physiological Congress in Oviedo, Spain: "Reproductive effort in the red macroalga *Mastocarpus papillatus* along a latitudinal gradient" (presented by Krueger) and "Estimation of differential viability in a seaweed that exhibits geographic parthenogenesis" (presented by Kübler). Dudgeon presented a paper, co-authored with Kübler on "Fertilization rate, genetic diversity and hypothesized effects on the evolution of macroalgal life cycles." Krueger also presented her *Mastocarpus* work at the Sigma Xi Student Research symposium where she won a second place award for an oral presentation.

Also presenting their work at the Sigma Xi Student Research symposium were: **Piotr M. Orzechowski**, who works with Dr. Rheem Medh, on "A modified quantitative method of real time reverse transcription polymerase chain reaction assay based on the Liu and Saint Kinetic Mode"; and **Tarja Sagar**, a student of Dr.

Paul Wilson, on "Flora and ecology of the Santa Monica Mountains' Bryophytes."

Dr. **Robert Espinoza** was an invited speaker at the Federation of American Societies for Experimental Biology (FASEB) Summer Research Conference symposium in Snowmass, Colorado titled "Guts, microbes, and the evolution of herbivory in reptiles. Gastrointestinal tract XII: The molecular & integrative basis for GI development, homeostasis & disease." He also presented a paper on "A hot knot of toads: The benefits of aggregating for metamorphic Andean toads" at the Physiological Ecology Meeting in Bishop, CA.

Christian Rodriguez, a graduate student in Dr. Virginia Vandergon's lab, presented his work on the "Evolutionary history of the chalcone synthase genes in Hawaiian silverswords" at the American Botanical Society meeting in Chicago.

Members of Drs. **Larry Allen** and **Mark Steele**'s labs attended the Joint Annual Meeting of Ichthyologists and Herpetologists where Steele and graduate students **Chris Chabot**, **Dawn Bailey**, **Jessica Bredvik**, and **Christiana Boerger** presented their research.

Faculty Become Journal Editors

Dr. **Paula Schiffman** has been appointed editor of *Madroño*, a quarterly journal of the California Botanical Society. The journal has been the outlet for research on the ecology, evolution, systematics, and floristics of western North American plants since 1915. She will have a 3-year term.

Dr. **Peter Edmunds** has been appointed to serve for four years as a contributing editor for *Marine Ecology Progress Series*.

Biology Faculty, Staff and Students Out and About

Dr. **Paul Wilson** participated in the west coast's first bioblitz—an inventory of all the organisms on a small patch of land, done in a very short time—at the Santa Barbara Botanical Gardens. Says Wilson, "The point of a bioblitz is

for the public and specialists to celebrate biological diversity. We found over 800 species on a rather ordinary 14 acres."

Dr. **Paula Schiffman** gave an invited research presentation at UC Santa Barbara entitled "Relict analysis of California grasslands: Forbs, bunchgrasses and homogenization by non-natives." Schiffman also presented her work on grassland ecology and floristics at a meeting of the Santa Monica Mountains chapter of the California Native Plant Society.

Dr. **Tim Karels** gave a colloquium talk at UC Riverside on the topic of "Population regulation in a changing environment: The role of sociality."

Dr. **Robert Espinoza** presented a seminar at Cal Poly, San Luis Obispo entitled "Small, cold-climate lizards break the 'rules' of herbivory in reptiles." Undergraduates **Art Alanis** and **Nick Gutierrez**, and graduate student **Christine Bruno**, accompanied Espinoza on a visit to the University of Nevada, Reno for a recruitment tour sponsored by that campus's College of Science and Mathematics.

San Francisco State University invited Dr. **Jennifer Matos** to consult with them regarding their Graduation Requirements Task Force, a body charged with updating their General Education requirements. Matos, currently CSUN's Faculty President, previously spearheaded this campus's GE overhaul.

Dr. **James Hogue** gave presentations on "Production and publication of natural history field guides" to the Lorquin Entomological Society in Los Angeles, and on "Beetles of southern California and their relationship with native plants" to the Los Angeles/Santa Monica Mountains chapter of the California Native Plant Society. In August Hogue attended the North American Dipterists Society meeting in Silver City New Mexico, after which he made a collecting expedition that netted hundreds of insect and plant specimens for the Biology collections.

Dr. **Janet Kübler** gave a presentation on "Biomimicry" at the Lifestyles on Health
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The Students' Forum

*This space is used for students to report on particularly exciting activities they have done related to the Biology major. In this issue we feature three articles by students: **Jen Paur** works with Dr. David Gray, **Holly Hawk** with Dr. Mark Steele, and **Hollie Putnam** with Dr. Peter Edmunds. Other students who would like to contribute to this space in future issues are invited to contact the editor.*

The Neotropical Experience

—Jen Paur

We become scientists because we are curious. I've always been notably inquisitive; as a carefree child, I had full access to the Pacific Northwest forest and was free to follow distractions to my satisfaction. Last spring I took part in the Tropical Biology Semester offered by CSUN's Biology department, and for six weeks being distracted in Costa Rica was my job. And what awesome distractions they were.

One of the most wonderful aspects of travel is seeing with your own eyes things you've previously learned about only through textbooks and documentaries. Things like leaf-cutter ants marching carefully-cut leaf bits to their underground fungus colony, or capuchin monkeys chattering in the branches, venturing down to steal our watermelon. Costa Rica's natural abundance is inspiring.

Every day really was an adventure. I'm not a fan of waking up, but somehow in Costa Rica a 7 AM breakfast was tolerable. As soon as my conscious-self emerged from my sleeping-self, my plans for exploring caught fire, and I would remember just what that exploration entailed; traipsing through forest, following skittering lizards, messing with acacia ants, locating poison dart frogs by their call, and watching hundreds of land crabs hurrying about me as I lay on the beach. These things make waking up in the wee hours almost fun, and at the very least, exciting. Costa Rica turned this night owl

into an early bird.

If exploring these distractions was the joy, then focusing on just one for a research project was the challenge. Finding a question with a sufficiently narrow focus that I could design and carry out an interesting research project in six days is a tough skill to master. I was not alone when, in the fifth week, I was still looking for a good question. But this was the coolest stress I've ever had the privilege to complain about. Boo hoo, I have to come up with a good research project in Costa Rica.

The process of honing a research project allowed me to develop my skills in organizing an investigative question, and learn a little bit about myself as well. A steep learning curve, some would call it.

But in the end, it was the Oropendola birds that pulled me into their world and got me going. For hours each day I sat on the grass in an innertube, staring up into their tree and observing the birds' behavior, the comings and goings of the colony. Recording my observations I felt like a kid again, occasionally distracted from my studies by passing toucans, wild pigs, insects, and reptiles.

It's a tough job, but someone had to do it. I can't tell you how glad I am that it was me.

The water's fine...come on in!

—Holly Hawk

On August 28, 2006, about 5:30 in the morning, I left for the Southern California Marine Institute (SCMI) in Long Beach, there to meet up with 13 other ambitious undergraduates. On arriving, I unloaded my luggage, chugged some coffee, and my stomach churning with butterflies, anxiously awaited the others, all of us bound for the Wrigley Marine Institute on Catalina Island, our home for the next fifteen weeks. Months earlier, I had been encouraged to apply for the Catalina Semester, an intimate and intense 15 weeks of work where students take marine

biology courses and gain exposure to the fundamentals of scientific research. So, here I was, about to board a boat bound for Catalina Island with 13 perfect strangers. I couldn't help but wonder if everyone was going to get along, or if I would walk into the first lecture and feel like it was a foreign language.

The boat ride over was beautiful. The sun was shining but the ocean air was crisp. Dolphins played in the boat's wake as we began to get to know one another. At the island we were greeted by a friendly staff and given a tour of the Wrigley grounds nestled in Big Fisherman's Cove, a Marine Protected Area, and just a short walk or bike ride to the town of Two Harbors. On the tour we discovered that we had access to kayaks and bikes, lab rooms and equipment, snorkel gear and wet suits, and a computer lab, just to name a few of the many amenities. We were then paired up and sent to our dorms to unpack and get further acquainted.

The next day began with a lecture, which I discovered was in perfect English, as were all the later lectures. All of us were enrolled in three classes, but we took them in sequence, one at a time, four weeks each; the last three weeks were reserved for directed research projects involving observations or experiments on a topic of our choice. The classes were



short and intense with daily lectures, but we spent lots of time in the field where the information was imprinted on us by first-hand interaction with the subject matter. We didn't just hear about the dynamics of kelp forests; we snorkeled among the kelp. We didn't just see pictures of the organisms of the rocky intertidal zone and mud flats; at low tide we explored tide pools on the rocky shore and sifted through the mud looking at the organisms. And through it all we learned how to collect data, apply statistics to our data, and how to present what we had discovered to our peers—who in short order became our friends.

The Catalina Semester served as a springboard for my career as a student. As a result of that experience I was able to focus my interests. I also made important connections with like-minded students and faculty, connections that will support me on my path to a BS degree. The experience also opened me to educational opportunities I had not previously known or thought about. When I returned to CSUN, I began working in the Marine Fish Lab, collecting age and growth data for the Barred Sand Bass, *Paralabrax nebulifer*, for Dr. Larry Allen. And last summer I returned to Catalina Island as a student research assistant, SCUBA diving for Dr. Mark Steele and two of his graduate students.

For me, the Catalina Semester was an experience like no other, and I would recommend it to anyone interested in Environmental or Marine Biology. I gained life-long friends and had a life-altering

experience that will carry me through to a Master's degree and beyond.

A Taiwan Adventure

—Hollie Putnam

Chicken feet. Duck tongue. Chicken butt. Pressed fish meat. Tofu. As I looked at the food cart, those were my choices ... just one of the exotic and exciting new experiences I faced on my seven-week stay in Taiwan this past summer, a part of the National Science Foundation's East Asia and Pacific Summer Institute Program. I was fortunate to be one of 19 students from the US and Canada who conducted research in marine biology, nanotechnology, engineering, psychology and other fields, all of it supported by NSF and the Taiwanese National Science Council. After a weeklong orientation at National Tsing Hua University, each of us spent six weeks working at our respective host institutions.

Under the guidance of Dr. Tung-Yung (Tony) Fan I studied the effects of thermal fluctuations on adult and larval coral at the National Museum of Marine Biology and Aquarium at the southern tip of Taiwan, a world-class institution with facilities for housing and culturing coral, examining their reproductive status, and conducting experiments on freshly released corals. The coral reefs of nearby Nanwan Bay include a variety of thermal regimes, with areas of low-to-high fluctuation in temperature due to periodic strong upwelling of cold waters, an ideal situation for me. Working there allowed

me to utilize the strengths of the facilities, the expertise of my host, and the physical parameters of the surrounding coastal waters to add a whole new facet to my research.

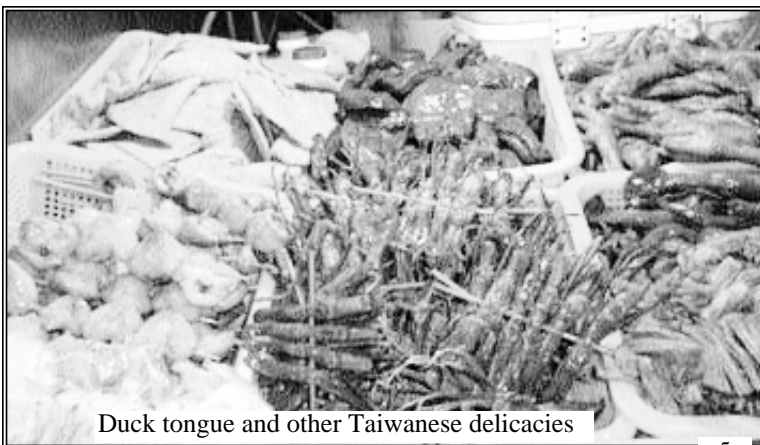
Although I spent most of my time at the Aquarium, I was able to take in some tourist sites and experience the culture with other students in my lab. Despite the language barrier (I speak neither Mandarin nor Taiwanese), I made many friends at the lab and traveled and visited with them outside of work. I spent one memorable weekend at Green Island, just southeast of mainland Taiwan, a beautiful place and home to one of the largest coral colonies in the world, a massive ~15 meter high *Porites*; a newly discovered pygmy seahorse, one of the smallest seahorses in the world; and a multitude of sea snakes, the first I had ever seen in the wild. I also had a chance to visit the night markets and, of course, sample the foods at various restaurants.

I ended my trip with a new found appreciation for working in a foreign country. The culture, so different from what I'd experienced in southern California, was an eye-opener, and so was the climate. In my last three weeks, the island was struck by three typhoons that dumped enough rain to wash away boulders, cars, and houses. But, perhaps as a good omen, the sun broke through on my last day, refreshing my thoughts of the wonderful interactions I had in Taiwan, with scientists and with students. All in all, the trip made a lasting impression on me and I hope to return in the future.

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and Sustainability Conference in Marina del Rey. In addition, she and Dr. **Steve Dudgeon** were invited participants in a workshop at UC Berkeley on "Improving Biology Education" that explored novel approaches to teaching introductory biology. Dudgeon and students, **Carly Ryan** and **Christina Vasquez** traveled to Cape Cod in June for fieldwork on colonial hydrozoans in Barnstable Harbor. Vasquez returned to Barnstable in August to complete an experiment.

After presenting her research at the Physiological Congress in Spain, **Stacy**



Duck tongue and other Taiwanese delicacies

Krueger remained in Europe to give invited seminars on her thesis research at the University of Cologne, Germany, where she worked last summer, and at the French Station Biologique de Roscoff, where she begins a research internship. Her new research, developing microsatellite markers for two species of red algae, is funded by a Sally Casanova California Pre-Doctoral Scholarship Program. While in Europe, she also plans to check out possible doctoral programs, including, among others, Roscoff and the Queen's University of Belfast.

Dr. **Sean Murray** has been invited to speak at the Southern California American Society for Microbiology Meeting on "Scientific serendipity: From tumor-targeting *Salmonella* to outer membrane barrier function." He also will represent the Biology Department at the National Science Foundation's Quality Education for Minorities BIO Workshop in Washington, DC.

In June, Drs. **Paula Schiffman** and **Jennifer Matos**, along with several biologists from other institutions spent more than two weeks in the Galapagos Islands where they walked in the footsteps of Charles Darwin and observed fantastic wildlife and plants. Both came home with thousands of photographs, many of which will find their way into PowerPoint presentations for their classes.

Dr. **Jeffrey Thomas** presented information on "Perception and the design of sensory systems" to the UCLA Science Project, a program in that university's Graduate School of Education that offers instructional development and science content for LAUSD high school science teachers.

Thomas also talked on evolution to AP biology students at Hamilton High School.

Dr. **Robert Espinoza** is in Salta, Argentina for a one-year research sabbatical leave supported, in part, by the Fulbright Scholar Program. He is accompanied by his wife and two children, and graduate student **Christine Bruno**, who is doing her thesis research there under _____ Espinoza's guidance.

Biology Students Garner Awards

Each year the Biology Department, the College of Science and Mathematics, and the University honor outstanding graduates with special awards.

The 2007 Biology Prize honoring the Department's Outstanding Graduating Senior and the College's Heald Outstanding Senior Award went to **Yasuko Hirakawa**. A major factor in her selection for the two top awards was completion of a senior thesis on the "Role of modulatory calcineurin interacting protein isoform 1 (MCII1) in apoptosis of human leukemic CEM cells" under the direction of Dr. Rheem Medh, and earning Honors in Biology.

The Biology Department's Bennett-Bickford award, given to an outstanding scholar who intends to enter teaching, went to **Jessica Beach**. Beach's exemplary academic performance, her outstanding athletic prowess, and her community service also resulted in her receiving the 2007 Wolfson Scholar Award, CSUN's highest, most prestigious student award.

Three Biology graduate students were recognized with departmental awards. **Chris Chabot** was named Outstanding Biology Graduate Student. **Laura Nary** received the Outstanding Graduate Research Award. And **Sahar Sajadi** garnered the Outstanding Graduate Teaching Award.

Biology students took both Hugo and Irma Oppenheimer Awards. The Departmental award went to **Karineh Petrossian**, the College award to **Hollie Putnam**.

Lut Hang (Alex) Li, a graduate student working with Dr. Paula Schiffman, was awarded a Teaching Associate Fee Waiver by the Biology Department for fall, 2007.

Azalia Contreras, a student working with Dr. Steven Oppenheimer, was awarded a Sally Casanova Pre-doctoral Scholarship. She also spent the summer at UC Santa Barbara on a pre-doctoral fellowship. _____

Faculty and Students Receive Research Grants

Two Biology Faculty have been awarded 3-year grants of \$150,000 each from the National Institutes of Health. Dr. **Cindy Malone** will use her funds to study the control of the "on-off switch" in essential genes of white blood cells. The funds awarded to Dr. **Rheem Medh** will further her investigation on the genetics of lymphocyte apoptosis.

The Newhall Land Trust Grant for Southern California Ecology went to **Jessica Dooley** to support her study of Bald Eagles. Immediately thereafter the Bald Eagle was taken off the endangered species list (though evidence of a causal relationship is lacking).

Eight students received Peter Bellinger Student Research Awards: **Taylor Anderson-McGill**, **Christine Bruno**, **Jessica Dooley**, **Karen LeGrand**, **José Monzón**, **Christopher Rodriguez**, and **Melissa Spitler**. The grants, derived from indirect cost funds from external grants awarded to faculty members, will support a variety of studies being undertaken by the students.

Graduate student **Jarrod Peercy** received a \$500 student research grant from the Animal Behavior Society. Peercy works with Dr. Tim Karels.

Graduate student **Stacy Krueger**, a student in Dr. Steve Dudgeon's lab, was awarded a Women's Environmental Council scholarship (\$1000 plus 1 year membership in the Los Angeles Chapter). The award is intended to support young women preparing for a career in the environmental sciences. Krueger also received a \$2000 scholarship from the Marine Technology Society and £250 (~\$500) from the British Psychological Society, the latter to support her attendance at the European Psychological Congress.

Graduate students **Nancy Muehlechner** and **Hollie Putnam** received \$800 and \$1000, respectively, from CSUN's Associated Students to support their research in Moorea, an island near Tahiti. Both work with Dr. **Peter Edmunds**, who

received a \$6000 Research Experience for Undergraduates grant supplement from the National Science Foundation; the funds will support undergraduate **Nick Colvard**'s summer research experience in the U.S. Virgin Islands.

Graduate student **Hollie Putnam** was awarded funds from the NSF's East Asia and Pacific Summer Institute program and the Taiwanese National Science Council, to support her research in Taiwan with Dr. Tung-Yung Fan this past summer.

Drs. **Jeffrey Thomas** and **Cindy Malone** were awarded a Judge Julian Beck Learning-Centered University Mini-Grant for \$5000 entitled: "Re-envisioning Biology 100: A new approach to teaching non-majors biology."

Nine members of the Biology faculty received Research, Scholarship, and Creative Activity Awards, each worth about \$5,000: Drs. **Lisa Banner, Randy Cohen, Steve Dudgeon, Bobby Espinoza, Dave Gray, Fritz Hertel, Tim Karels, Cindy Malone, and Mary-Pat Stein**. Karels' funds will be used to study the demography of an endangered grassland rodent, the giant kangaroo rat in the Carrizo Plain National Monument. Espinoza will study the "Geographic variation in photolyase activity and the sublethal effects of UV-B exposure in the Andean toad."

Five Biology faculty members were awarded research funds by the National Institutes of Health: Drs. **Maria Elena deBellard, Steven Dudgeon, Steven Oppenheimer, Michael Summers, and Virginia Vandergon**. All are part of a professorial team from the Departments of Biology, Psychology, Chemistry and Physics that collectively was awarded more than \$1.2 million for 2007-08. Dr. **Maria Elena Zavala**, program administrator, expects funding to continue at the same level until 2010.

Dr. **Steven Oppenheimer** received \$100,369 from the National Institutes of Health to study mechanisms of adhesive interactions.

Dr. **Steve Dudgeon** was awarded

Biology Clubs Tout Activities, Welcome New Members

Microbiology Student Assoc.

The MSA (Microbiology Student Association), recognized by the National Chapter of the American Society for Microbiology as an official student chapter, has been active since 1984.

According to the group's president, **Odette Arman**, "The MSA offers students a chance to engage in activities that will expand their knowledge of the microbe world. This is important since microbes are of critical importance in practically all areas of science, from medicine and immunology to genetics and ecology."

At its meetings the MSA has speakers who talk about current research, microbes in medicine, and related topics. "Our most important events," says group VP **Narine Arabyan**, "are the local and national conferences where we make poster presentations, attend seminars on the latest research, meet one-on-one or in small groups with professionals, and learn about career opportunities."

Club meetings are open to anyone seeking a learning experience, career information, or simply camaraderie. For more

information ask MSA's adviser, Dr. Larry Baresi or go to <http://csun.msa.googlepages.com>.

BEER Club

The **Biology Ecology and Evolution Reading Club** invites interested students and faculty to attend its weekly meetings and join in the fun and educational experience the club provides.

According to club president, **Jarrold Peercy**, "The primary purpose of the club is to provide students and faculty a forum for discussing project ideas in the fields of ecology and evolution." Through the give and take among attendees, he says, "Everyone has a chance to hone their critical thinking skills and at the same time become more familiar with pertinent scientific literature."

The club meets Fridays at 3:30 PM in LO1322. Pizza and soda are available for a small charge. The group also sells sodas and snacks during the week and uses the proceeds to fund club events.

For information, or to be added to the club's e-mail list, contact Peercy at 677-6385 or at jarrod.a.peercy@csun.edu.

\$111,104 to continue his MBRS-SCORE project funded by the National Institute of Health. He also received \$5000 from the CSUN Research Competition to support work in the laboratory by **Carly Ryan**.

The National Science Foundation has awarded Dr. **Peter Edmunds** and his UC Santa Barbara colleague, Dr. Sally Holbrook, \$20,000. The funds will be used to send eight professors and students from CSUN and UCSB to Taiwan where they will develop collaborative marine biology programs.

Four grants have accrued to Dr. **Virginia Vandergon** recently: a California Post-secondary Education Commission, Teacher Retention Initiative grant for \$100,000; two University Service Learning grants totaling \$3,500 for the Tomor-

row's Scientists program; and with co-principal investigators Drs. **Steven Oppenheimer** of Biology and **Gerry Simila** from Geological Sciences, a California Science Project grant (San Fernando Valley Science Project) for \$100,000.

Christopher M. Rodriguez, a graduate student working with Dr. Robert Espinoza, received a \$700 Student Research Grant from the Southern California Academy of Sciences to study "Why are rattlesnakes on islands smaller than on the mainland?"

—Steele, con't from p. 1—

Over the years, Steele has engaged in research on temperate marine and estuarine fishes off the coast of southern California, on subtropical reef fishes in Baja California, Mexico, and on tropical reef fishes in the Bahamas and Caribbean. His primary interest is population ecology of fishes, but he has also published work on community ecology, and on basic fish biology, for example, age, growth and reproduction.

Already Steele's research efforts at CSUN have a head of steam, providing opportunities for students in several local projects, some in the lab, some in the field. In particular, he could use students who are trained SCUBA divers to help with his sub-tidal research. Over the years, he says, "More than 50 undergraduates have assisted in my research as SCUBA divers."

"My first two years at CSUN have been all that I had hoped they would be," says Steele. "Both students and classes have been a joy, and I especially enjoy the emphasis on hands-on learning in the lab and field, something not emphasized in the UC system. When I was an undergraduate at UCSD, getting into nature was a rare treat. But here many classes have field trips—lots of them—and it's on those trips that students really begin to appreciate the big picture of biology."

Steele offers high praise for CSUN's Marine Biology Semester on Catalina Island, in which he was a participant last year. "It was the best teaching experience of my career—and that includes years of teaching field classes in Jamaica and Moorea!" Not surprisingly, he strongly recommends that marine biology students seriously consider the Catalina Semester the next time it is offered.

Steele can be found in MG 4112, or contacted at msteele@csun.edu.

—Murray, con't from p. 1—

interest in science policy.

As a result of his scientific training, Murray has become dedicated to investigating some basic biological mysteries. One such enduring mystery is how all cells in our body have the same genetic information and yet are very different in various tissues. For example, skin cells are very different from cells in the heart or eye, although they all contain the same genetic information. Murray's investigations at CSUN will focus on solving such mysteries using bacteria as a model system to study cell differentiation.

According to Murray, students working in his lab at CSUN "...will have an opportunity to study a safe, non-pathogenic, aquatic bacterium, *Caulobacter crescentus*. The organism is an interesting one to study because it has two distinct cell shapes, each with a very different physiology, and its genetics can be easily manipulated." Murray said his student researchers "...will seek to unravel the molecular basis for cellular differentiation and look at how modifications of the bacterial membrane affect sensitivity to various antibiotics and anti-microbial compounds." In their investigations, students in his lab "...will use state-of-the-art technology to visualize fluorescently-labeled proteins and genes dynamically moving through living cells."

Murray welcomes student inquiries about his research. "I especially look forward to giving students an opportunity to involve themselves in original research. For some, the experience may prove a turning point in their academic career, just as my undergraduate research experience did for me." Students interested in joining Murray's research efforts may contact him at sean.murray@csun.edu.

Wilson Honored for his Research

The College of Science and Mathematics bestowed its 2007 Donald E. Bianchi award, given for outstanding scholarship by a faculty member, on Dr. **Paul Wilson**.

Wilson's main work has been on pollination. "I and my colleagues," he says, "have formulated a theory of sexual selection acting on flowers through male function. In recent years this has been used to explain evolutionary shifts between pollination by bees versus by birds."

In addition, Wilson has supported the interests of students not working on pollination. His students have studied organisms as disparate as bobcats, crawdads, and jellyfish, and the topics have been wide-ranging, including such subjects as foraging, niche conservatism, the spread of invasive populations, and speciation.

Currently, Wilson is on sabbatical leave at UC Berkeley, where he is studying mosses. Says Wilson, "There are plenty of people working on pollination, and I'll still accept student who like flowers, but it's time for me to expand into a field where I'm more needed. I've loved mosses since I was a kid, and they are excellent organisms for studying stasis versus evolutionary shifts, which is where my pollination work was headed anyway."

Wilson's first publication appeared in 1989, and his work has continued apace. His current publication list is at 32, and many of his articles have been cited by other investigators more than 30 times, a few more than 70 times.

Faculty and Staff Recognized

This year, Drs. **Jeff Thomas** and **Michael Summers** received Polished Apple Awards, a recognition bestowed on faculty by students for “making a difference in their academic careers.”

The Detroit Free Press has named Dr. **MariaElena Zavala** a *Multicultural Women of Achievement*, putting her in the company of such other luminaries as women’s soccer champion Mia Hamm, former Supreme Court Justice Sandra Day O’Conner, medal-winning skater Kristi Yamaguchi, and entertainer and talk-show host Oprah Winfrey. Moreover, *Flora y Ciencia*, a book about Chicanas in science, math and engineering that she and several colleagues authored, received a bronze award in the “adult, multicultural, non-fiction” category in the Independent Publisher Book competition.

Brenda Kanno, long-time employee of the Botanic Garden and Greenhouse, was recently appointed director of the facilities, replacing Brian Houck who took a position in Chicago. The horticultural talents Kanno brings to the position were evident at the International Fern Society Show in June where one of her ferns, with the intriguing moniker of *Elaphoglossum luridum* (meaning “yellow deer’s tongue”), was awarded a trophy for Most Unusual Fern of the Show, surpassing its previous accomplishment as mere Division Winner.

How Did You Spend Your Summer?

According to Dr. **MariaElena Zavala**, summer is great time for Biology students to immerse themselves in a research project. “There are numerous summer research opportunities for students out there, and they often don’t cost anything. Many programs, for example, offer free room and board and pay travel costs of participants. Some even provide a monthly stipend. You can’t beat that!”

But even more important, says Zavala, is the fact that “The programs provide invaluable experience in how to do scien-

REMINDERS FROM THE ADVISEMENT CENTER

Advisement Center hours

Students are invited to stop by the Biology Advisement Center in EH 2133 to have academic questions answered. Faculty advisors Drs. **Joyce Maxwell** and **Daniel Odom** are assisted this semester by graduate student **Alex Li**. Maxwell sees students by appointment Monday and Wednesday, noon–5 PM. and Friday noon–4 PM. Walk-in advisement (no appointment needed) is available with Odom Tuesday and Thursday, 3–5 PM or with Li Tuesday 11:30 AM–5 PM and Thursday 12:30–5 PM. The advisement office is closed in the mornings and after 5:00.

Upper-division Writing Exam required for graduation!

Students expecting to graduate must attempt the Upper Division Writing Proficiency Exam no later than the semester in which they complete 90 units. Students planning to graduate in fall 2007 must pass the exam no later than January 19, 2008. Students planning to graduate in spring 2008 must pass the exam no later than May 31. For more information

call the Testing Office, 677-3303.

Expecting to graduate this spring or next year?

The deadline for filing a Graduation Evaluation and Application for spring or summer 2008 graduation was July 6, 2007. Late applications are accepted at Admissions and Records with a higher filing fee. Students may have their forms completed at the Biology Advisement Center. When completed, the forms must be submitted to the Admissions and Records Office.

Accessing advisement info

A free Biology Advisement Handbook provides invaluable information on program requirements and course equivalencies. The handbook can be obtained in the Advisement Center.

Career information available

Career sheets are available in the Advisement Center. Each sheet describes career opportunities associated with each option in the Biology major.

tific research. Past students have invariably said they wouldn’t trade the experience for anything. And there is nothing like hands-on research experience to give a student the edge when applying for graduate or professional school.”

Among the Biology students who took advantage of such opportunities this past summer were **Karen LeGrand**, who went to Cambridge University in England; **Marisabel Olivares**, Dartmouth College; **Jennifer Wakefield**, Chiang Mai University in northern Thailand; **Michael Dancel**, University of Connecticut; **Brandon Davis**, University of Illinois; **Veronica Lopez**, USC; **Dave Bungayong**, UC San Diego; and **Adrian Paz**, Duke University. “The students’ research projects ranged from community medicine to

molecular modeling,” says Zavala. The students listed are in either the MARC or the MBRS RISE program for minority students, but most summer research programs are open to students of any ethnicity.

The CASA office in EH 2128 keeps a large file of information on summer research programs, and interested students are encouraged to stop by. Links to many programs are also available on the MARC/MBRS website. Application deadlines usually are in February or March, and two letters of recommendation from faculty members are required.

Professors Seek Student Help

Dr. **MariaElena Zavala** is always looking for hard-working students to join her investigations, using molecular biology tools, of plant root development and physiology. She can be reached at mariaelena.zavala@csun.edu.

Dr. **Tim Karels** has a position opening in spring 2008 for a graduate student to conduct field research on the giant kangaroo rat (*Dipodomys ingens*) in the Carrizo Plain National Monument. The work would complement a collaborative study with UC Berkeley researchers on the relative influences of kangaroo rats and cattle on the structure and diversity of the Carrizo grassland communities. Karels can be reached at karels@csun.edu.

Dr. **Steve Oppenheimer** welcomes students interested in conducting cancer or developmental biology research. His base-ment lab is in EH 2005.

New BIOL 100 Hybrid Labs

A completely new set of BIOL 100 labs was instituted this fall. With the new format, students explore fewer topics, but in greater depth. Evolution is a principal theme throughout, and the use of the scientific method as a way of knowing is emphasized.

Students in the new labs alternate a hands-on wet lab one week with a computer exercise the next week involving simulations, data gathering, interpretation of results, and, of course, a quiz. Topics studied include the scientific method, structure and function of living cells, plant organization and photosynthesis, respiration, mitosis and meiosis, evolution, and taxonomy. Capping the semester is an experimental study of the relationship between plants and animals, a chance to actually practice the use of the scientific method.

Says **Karen Moore**, the Biology technician responsible for overseeing the introductory labs, "The students seem to be adjusting well to the alternating wet lab and computer weeks. The first wet lab on the scientific method went very well and

the students appeared to like the flexibility of the computer portion. Some glitches have occurred, but the prep lab staff is working hard to make things work right."

According to Dr. **Janet Kübler**, who with Dr. **Jeffrey Thomas** created the new format, "The new labs include some very interesting experiments. In one involving 'C-ferns,' sperm are released when students add water and they then get to see the sperm swim to and fertilize a fern egg cell. Pretty cool stuff." Students then watch the fertilized egg become a new fern prothallium, some of them showing normal, others polka dot phenotypes.

In another of the labs, students put red blood cells in isotonic, hypertonic and hypotonic solutions and watch what happens. Students will also do bioassays with radish seeds and *Artemia* (brine shrimp) to test various hypotheses. And finally, near the semester's end, the daytime lab sections will take field trips to Placerita Canyon Natural Area and to Malibu Creek Lagoon.

Course Offerings for Spring 2008

A new course, **Wildlife Ecology and Management** with field studies (BIOL 428/L; BIOL 492W), will be offered by Dr. **Tim Karels**. Intended for seniors and graduate students, the class will first learn the basic principles of ecology and then explore how those principles apply in the conservation and management of wildlife. Students will become familiar with the tools and techniques of wildlife managers—distance sampling, mark-recapture methods, survival analysis, home range analysis, population growth and harvest modeling—with a focus on the use of computers to monitor, measure and analyze wildlife populations.

Dr. **Paul Tomasek** will offer **Food Microbiology** (BIOL 496FM/FML). The class, which is available for graduate credit, will explore the biology, ecology and physiology of microbes associated with food and beverage production, preservation, and spoilage; food-borne illness and contamination control; means of prevent-

ing and controlling microbial contamination of food; techniques for isolating and identifying food microorganisms.

Dr. **Paula Schiffman** will offer a graduate seminar (BIOL 615C) on **Island Ecology**. Topics will include dispersal, species-area relationships, community assembly, speciation, adaptive radiation, endemism, metapopulations, biodiversity, and conservation, each topic addressed in the context of both oceanic islands and isolated continental environments.

Conservation Speakers Planned: Students and Faculty Welcome

Several special guest presentations are scheduled this semester for Dr. **Paula Schiffman**'s Conservation Biology course (BIOL 533/592C). Interested students and faculty are invited to attend the 10:30 AM presentations in LO 1325.

- Sept. 20—**Ileene Anderson** (Biology alumna and ecologist, Center for Biological Diversity): "Environmental consulting and advocacy in southern California."
- Oct. 11—**Jessica Dooley** (Biology grad student): "Channel Islands bald eagle restoration program."
- Oct. 25—Dr. **Stephen Schneider** (biologist and climate scientist, Stanford University): "Global climate change." At 12:30 PM, Schneider, a renowned scientist and government advisor, will talk to the entire campus community in the Plaza del Sol Performance Hall; free tickets for the presentation are available at the USU.
- Nov. 1—Dr. **Marti Witter** (fire ecologist, National Park Service): "Fire ecology and management in southern California."
- Oct. 18 or Nov. 15 (date not yet finalized)—Dr. **Craig Rudolph** (ecologist, U.S. Forest Service): "Endangered species management."

For more information, contact Schiffman at paula.schiffman@csun.edu.

Biology Staff Members Honored

Two members of the Biology staff were accorded high honors last spring for their service to the University, recognition that none doubt is well deserved and overdue.

The College of Science and Mathematics bestowed on **William (Bill) Krohmer** its first ever **Staff Recognition Award** for his more than 30 years of dedicated service, the past 20 as Biology's Manager of Technical Services. In that capacity, he oversees the dozen-plus technicians who collectively, mostly behind the scenes, make the department hum. In their letters, Krohmer's supporters cited, among many other attributes and accomplishments, his "extensive knowledge of computer technology," of "health and safety issues," and of "contracting regulations," all vital to the functioning of the department. Also identified for praise were his invaluable contributions in the design of the new science building, his ability to navigate the sometime labyrinthine university bureaucracy, and his resourcefulness at obtaining critical equipment.

The very impressive contributions over the years of **Linda Gharakhanian** were recognized with the University's very prestigious **Merit Award of Excellence**. A University employee of more than 20 years, for the past three she has served as Biology's Administrative Analyst, responsible for much of the day-to-day running of the Department, including budget, payroll, scheduling, program planning and oversight of the office staff, student assistants and advisement office. Says Department Chair, Dr. Larry Allen, "Hers is a huge responsibility, and in my 25 years here I have never seen it done better. And she does it cheerfully and with incredible efficiency. I could not function without her!" In commenting about the office staff she manages, another supporter heaped reflected praise on Gharakhanian saying the office staff "...is the most competent, reliable, helpful, and downright pleasant group...that I have had the pleasure of interacting with during my

entire academic career....I can't imagine working without them." Surely, such a smooth, people-centered operation reflects extremely well on the woman responsible for directing it all, a person one supporter labeled a "natural leader."

Recent Alumni Placements

Two students from Dr. Larry Allen's lab have moved on to PhD programs. **Bridgette Froeschke** started her doctoral program this fall at Texas A&M University and **Chris Chabot** has been accepted at UCLA.

Stephanie Talmage, who did her MS under Dr. Robert Carpenter's guidance, has been accepted in the Marine Sciences PhD program at Stony Brook University in New York.

Three of Dr. Steve Oppenheimer's student are in doctoral programs. **Karineh Petrossian** was admitted to the City of Hope with a full scholarship, having declined an offer from UCLA. **Jennifer Nnoli** has opted to enter the Memorial Sloan-Kettering Cancer Center program. Former RISE student **Maribel Alvarez** will be attending UC Irvine with full fellowship support.

Two of Oppenheimer's students, **Juliana Djokakelian** and **Karolin Abedi**, were admitted to Western University School of Pharmacy.

Two graduate students of Dr. Randy Cohen were accepted into PhD programs: **Brandie Cross** will attend Johns Hopkins University, and **April Ochoa** will attend City of Hope.

Dr. Rheem Medh's students are moving on to doctorates: **Nomiki Kolettis** will be attending UC Riverside; **Cassandra Williams**, a former MARC student, is at New York University.

Tamara Johnson, a MARC student in Dr. Aida Metzenberg's lab, is now at Johns Hopkins University.

Rebecca Kordas, a former student of Dr. Steve Dudgeon, is pursuing doctoral work in marine biology at the University of British Columbia.

An Aspiring Teacher of Science? Check out Noyce Scholars

Students aiming towards a career as teachers of high school science or math are invited to apply for a Noyce Scholarship. Says Dr. **Virginia Vandergon**, "The scholarship pays awardees as much as \$7,500 yearly for a maximum of two years, money intended for use to help defray educational expenses." Criteria for a successful application include academic performance, as indicated by GPA, and financial need.

To find out more about the program, check the College of Science and Math website for announcements of seminars and meetings or contact Dr. **Virginia Vandergon** in Biology (virginia.vandergon@csun.edu), Dr. **Gerry Simila** in Geological Sciences (gerry.simila@csun.edu) or Dr. **Kellie Evans** of Math (kellie.evans@csun.edu).

Student Journal Recognized

The *Journal of Student Research Abstracts*, edited by Dr. Steve Oppenheimer, won a major award in the education area from Airports Council International. The journal, which is listed by the Library of Congress, publishes information about research projects performed by K-12 students.

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Bios:

The Biology Department Newsletter

Programs Bring Science to Local Teachers, K-12 Students

SCALE Project

How fast is fast? Why do populations differ? Which decomposes better, a newspaper or Styrofoam? These and many other questions were addressed last summer during an eight-week professional development institute for Kindergarten, 4th–8th, and 10th grade teachers from LAUSD.

Says Dr. **Virginia Vandergon**, program director, “The institute was intended to familiarize teachers both with science content and how to use the scientific method. Using an inquiry-based model, teachers focused on units related to the California teaching standards for their grade level.”

The project was a continuation of a collaborative effort among three CSU campuses (Dominguez Hills, Los Angeles, Northridge), the University of Wisconsin, Madison, and the LAUSD. The workshop was team taught by representatives of all participating institutions including four CSUN faculty members: Drs. **Norm Herr**

(Secondary Education), **Elizabeth Nagy-Shadman** and **Gerry Simila** (Geology), and **Vandergon** (Biology).

The program, now in its fourth year, “...has proven so successful among in-service teachers that it is now being integrated into pre-service science courses among teacher trainees, with the goal of increasing student understanding of science.”

SF Valley Science Project and Teacher Initiative Program

CSUN hosted summer institutes for 4th–8th grade teachers again this summer, focusing on topics delineated by the California science standards related to each grade level and in developing connections from year to year. A major goal was to provide support for and help in retaining science teachers in the lower performing middle schools. Highlighting the two-week experience was a field trip to Malibu Canyon and Lagoon, and the beach at Point Dume, giving participants a first-

hand, up-close look at nature.

Team-teaching the workshop were Drs. **Michael Franklin**, **Steven Oppenheimer**, **Jeffrey Thomas** and **Virginia Vandergon** of Biology; **Vincent Devlahovich** and **Gerry Simila**, Geological Sciences; **Dorothy Nyguen-Graff**, Chemistry; **Brian Foley**, **Norm Herr** and **Mike Rivas**, Secondary Education; and **David Kretschmer**, Elementary Education.

K-12 Science Symposium

The Center for Cancer and Developmental Biology, directed by Dr. **Steve Oppenheimer**, organized another year’s K-12 Student Science Research Poster Symposium. Hundreds of students, parents and teachers participated. Says Oppenheimer, “The symposium showcases the research of K-12 students and is an important approach in developing the next generation of U.S. research scientists.”