



# CEA-CREST Quarterly

A Publication of the Center for Environmental Analysis-  
Centers of Research Excellence in Science and Technology

California State University, Los Angeles

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## The CEA-CREST office: an environmental internship clearinghouse

CEA-CREST encourages undergraduate and graduate students to pursue experiential learning through internships. By participating in a work experience that combines structured and supervised learning activities, students develop their skills while achieving personal and professional growth.



Last summer, **Carolina Reyes** (graduate, biology) attended the Summer Geobiology Course at Wrigley Marine Science Center on Santa Catalina Island, CA. The six-

week course offers intensive interactions between biology and earth science. She got hands-on training in modern geobiology research methods and participated in research groups to solve current environmental questions.

During summer 2003, **Mari Rosales** (graduate, biology) participated in the Southwest Fisheries Science Center's *Stenella* Abundance Research Project (STAR). It is a multi-year study designed



to assess the status of dolphin stocks which have been taken as incidental catch by the yellowfin tuna purse-seine fishery in the Eastern Tropical Pacific. She spent approximately one month aboard the *McArthur II* research vessel during the second leg of the journey between Honolulu, HI and Puntarenas, Costa Rica.

Internships, like those in which Reyes and Rosales participated, enhance academic study by giving students the opportunity to try out "in the real world" what they have learned in the classroom. Internships help students establish contacts and provide the work related experience that employers value and look for in job candidates. Students achieve personal growth and build confidence by taking on challenges through internships.

The CEA-CREST office acts as a clearinghouse, or central agency for the promotion of internships and to assist in job placement of students in the environmental sciences. **Michelle Stabio**, CEA-CREST's environmental science outreach coordinator does continuous research on available environmental internships to provide students with extensive information about those and environmental jobs available through other universities, government agencies and industry. For more information on environmental internships please refer to <http://cea-crest.calstatela.edu>

## CEA-CREST & NOAA collaborative agreement



The National Oceanic Atmospheric Administration (NOAA) Southwest Fisheries Science Center (SWFSC) is the research arm of the National Marine Fisheries Service

for the U.S. Southwest Region. The Center's headquarters and main laboratory is located in beautiful La Jolla, immersed in the Scripps Institution of Oceanography (SIO) campus, and sits atop a high cliff overlooking Black's beach.

**Sergio Escorza Treviño** arrived at SWFSC in 1993, as a Ph.D. student working on marine mammal genetics. He worked there for ten years, conducting applied research on cetaceans and pinnipeds of the Pacific Ocean for the Protected Resources Division. The research, principally guided by the Marine Mammal Protection Act and the Endangered Species Act, is designed to aid in the management and conservation of these protected species. The focus areas are the US Exclusive Economic Zones in the eastern Pacific, and the greater Eastern Tropical Pacific (ETP).

Mexico and Central America, large yellowfin tuna (*Thunnus albacares*) swim together with several species of dolphins (mainly pantropical spotted, *Stenella attenuata*, spinner, *S. longirostris*, and common, *Delphinus delphis*, dolphins). This ecological association of tuna and dolphins is not clearly understood, but it has had two important practical consequences: It has formed the basis of



NOAA vessel used by Escorza for dolphin research.

a successful tuna fishery, and it has resulted in the deaths of a large number of dolphins.

Research on molecular ecology, population genetics, systematics, and evolution of these species forms the basis of the CEA-CREST and SWFSC collaboration. Both not only share the same interests on these issues, but also resources and information. The research cruises conducted annually by the SWFSC provide samples and data necessary for such investigations. Escorza participates actively in the design of the cruises, and his CEA-CREST students have had the chance to conduct research both on board NOAA research vessels during international cruises in the ETP and during summer internships at SWFSC molecular facilities. CEA-CREST's collaborations with SWFSC have proven so beneficial and productive for all involved that there exists a firm commitment on both parts to continue them for years to come.



A school of Spotted Dolphins in the eastern tropical pacific ocean.

One of the most important issues for the Division, to this day, is the tuna-dolphin problem in the ETP: in the tropical waters of the Pacific Ocean west of

## Thoughts and advice from Alumni on pursuing the Ph.D.

The essence of a Ph.D., the aspect that distinguishes Ph.D. study from other academic work, can be summarized in a single word: research. To extend knowledge, one must explore, investigate, and contemplate. The scientific community uses the term *research* to capture the idea. But what does it mean to get a Ph.D. and how do you get there?

CEA-CREST alumna and Ph.D. candidate at Pennsylvania State University's department of rural sociology, **Natalie Jolly**, recommends, "Do your homework and research which faculty members you'd be interested in working with and send them an email. Introduce yourself and tell them about the work you're interested in doing and ask them how well they see such work fitting into the overall scope of the department. It's a great way to meet faculty before they see your application and to potentially have an advocate during the selection process."



**Andrew Moyes**, first-year Ph.D. candidate at the University of Utah's biology program, agrees with Jolly's advice, "Who you'll work with is at least as important as where you'll go, and you should look for a mentor who shares your interests, has a compatible personality, and happens to be accepting students in the upcoming year. You can find out much of this with a phone call or an email."



I remember being nervous about 'bothering' professors, but keep in mind that they need students and will probably appreciate your interest in their work."

Students who pursue the Ph.D. must possess certain characteristics to be successful during the several years it takes to complete the degree. Students must enjoy learning for learning's sake, and be willing to work very hard for many years with only a possible monetary payoff in the future.

The first year of graduate school is intense, extremely intense. While the Ph.D. is a research degree, first year grad students usually concentrate on courses, not research. Despite the long hours and low pay, people stay in doctorate programs because they enjoy learning for learning's sake. They love intellectual stimulation, and they find academic work fun and fulfilling. With few exceptions, people do not become wealthy by using their Ph.D. training. If your American dream is to work hard for intellectual fulfillment rather than financial success, you probably have what it takes to get a Ph.D.

## Welcome aboard



**Alexandra Carlton** (undergraduate, chemistry) was admitted to the CEA-CREST in fall 2004. She has a B.S. in English, and is now pursuing a second degree in chemistry. She currently is involved in the design and development of a phosphite chemical sensor for low level measurements in natural waters under the mentorship of **Grady Hanrahan**.



**Alejandra Lopez** (undergraduate, geology) was admitted to the CEA-CREST in fall 2004. She is working with **Barry Hibbs** on the Texas/Mexico border watershed project. She is interested in research relating to the conservation of natural resources, specifically on watersheds and forestry. She feels that there is a need to maintain a high quality supply of water for the prevention of disease, and that all communities need natural areas to maintain the natural ecological balance.



**Noe Ramos** (graduate, hydrogeology) was a UMEB undergraduate fellow and earned his B.S. in chemistry spring 2004 while working in **Krishna Foster's** atmospheric chemistry lab. In fall 2004 he started the M.S. in hydrogeology program a LSAMP-BD fellow and will continue working in Foster's lab under the supervision of **Laura Rademacher**. He plans to pursue a Ph.D. in environmental science.



**Valerie Rodriguez** (graduate, biology) was admitted to the LSAMP-BD program fall quarter 2004 and is working with **Patrick Krug**. She has a B.S. in biology from UCLA. Rodriguez's goal is to become a professor and continue doing research in a realm that has a significant impact on marine communities contributes to conservation and restoration ecology. She is concerned with the anthropogenic effects on marine communities and how various communities react to both sudden and gradual habitat changes.

CEA-CREST  
California State University, Los Angeles  
5151 State University Drive, BS 140  
Los Angeles, CA 90032-8970  
661000-900-22000-2002-220934

## Faculty spotlight: Grady Hanrahan



**Grady Hanrahan** joined the Department of chemistry in summer 2003. His research interests are in the area of Analytical Chemistry, with particular focus on environmental and bioanalytical in-

strumentation development. He is involved in the design and deployment of automated analytical field-based and submersible systems along with the development of complimentary lab-based techniques including flow injection-capillary electrophoresis (FI-CE) and FI-ICP-MS. Hanrahan also employs Chemometric techniques for data analysis and experimental design and optimization.

**Q: Why did you choose this field?**

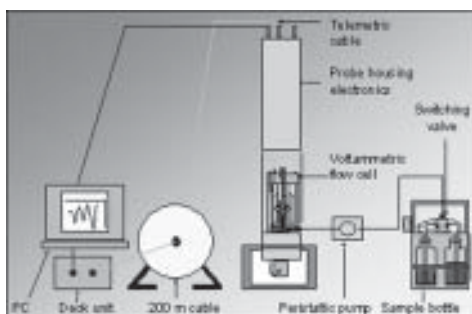
**A:** I have always had an interest in Analytical Chemistry and the natural environment. Combining these two areas in an academic setting seemed a natural fit.

**Q: What are your current research projects?**

**A:** I have four on-going projects: 1) the study of reduced inorganic phosphorus species in the natural environment. I am currently collaborating with **Krishna Foster, Tina Salmassi and Crist Khachikian** of CEA-CREST on a study determining the levels of phosphite in Hot Springs, Mammoth, CA. Complementary efforts are also underway in our laboratory to design and build sensitive field-based and submersible sensors for enhanced study of this species.

2) The design and development of automated flow injection-capillary electrophoresis (FI-CE) instrumentation for the separation and analysis of enzymatic reactions and environmentally relevant species.

3) The deployment of a voltammetric *in situ* profiling system (VIP) incorporating gel-integrated microsensors in natural water environments subject to anthropogenic pollution inputs for the mea-



*Schematic of the VIP showing internal workings and telemetric setup.*

surement and transport study of dissolved Cu(II), Pb(II), Cd(II) and Zn(II).

4) The use of Chemometrics for the analysis of the vast amounts of data collected from the instrumentation discussed. We also use the Chemometric approach for experimental design and optimization studies.

**Q: What do you like best about your work?**

**A:** I find the daily interaction with the students the best part of my work. Students are naturally inquisitive and seeing them learn motivates me to become a better mentor, teacher and researcher. I am also challenged by the field-based studies that I perform as part of my research. Working in the field is truly unique and differs significantly from laboratory-based studies. In addition, I always manage to get a well deserved hike while working in the field!



*Grady Hanrahan field sampling at Hot Creek, Mammoth, CA.*

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Production

Writer/Graphics: Maria de Lourdes Pelaez

For comments, questions or more information, please contact:

CEA-CREST

Phone: 323-343-5799

FAX: 323-343-5795

E-mail: [ceacrest@calstatela.edu](mailto:ceacrest@calstatela.edu)

Web Site: <http://cea-crest.calstatela.edu>

**Q: What is the future of your research?**

**A:** A greater emphasis will be placed on the development of FI-CE laboratory-based instrumentation for use in biological and pharmaceutical analyses. There is a great need in these areas for sensitive analytical instrumentation capable of enhanced separation and high-throughput analysis. Future research efforts will also continue with the development of field-based devices to measure trace metal and nutrients in environmental samples, especially submersible chemical sensors. This will result in more field-based research and potential oceanographic cruises.

**Q: What is your mentoring philosophy?**

**A:** For me, mentoring is an integration of responsibilities. Expertise is essential, but one also must possess innovation and be able to develop methods and strategies to effectively communicate this expertise to students. I feel a healthy relationship between the mentor and students is also paramount. I try to build good rapport with

my students by being there not only as mentor, but also as a friend.

Once accepted into the group, I work closely with students and provide the objectives of their projects. Contact with beginning students is daily and I monitor their progress through private conferences and in group meetings. As their experience broadens and skills sharpen I take a somewhat less active role. The goal is to have the students become personally responsible for analyzing and solving problems related to their projects.

**Q: What can you tell us about your CEA-CREST student?**

**A:** I currently have one CEA-CREST funded student, Alex Carlton, in my laboratory. Although Alex only recently joined my group, she is very motivated, a great student and has tremendous potential as a researcher. Alex will be involved in the development of a chemical sensor based on molecular recognition for the determination of phosphate in natural waters.

## Undergraduate student: Alexandra Carlton



**Q: Why did you come to Cal State L.A.?**

**A:** I came to Cal State L.A. as part of the Early Entrance Program for my first degree, and stayed here for my second degree.

**Q: What is your goal?**

**A:** My immediate goal is to expand my knowledge, especially in chemistry, and then to do something useful with it. So I expect that I will try to get a doctorate and teach as well as research.

**Q: What can you tell us about your advisor?**

**A:** Dr. Hanrahan is very nice. I enjoyed having him as an instructor and look forward to working in his lab. He provides a lot of support, but also encourages independence, which is a good combination.

**Q: Why did you choose this field?**

**A:** I chose Chemistry, because I enjoyed the classes I'd taken in it, and wanted to learn more about how it worked, both on an atomic level and on a more macroscopic one.