

A Letter to Alumni and Friends from

Dr. Michael Goldman, Department Chair

Spring semester came to an exciting end. Among the many honors and awards our students received, three I want to mention. SF State President Les Wong's first commencement ceremony honored Biology graduate student **Katherine Danielson** who received the symbolic investiture of the University Hood on behalf of the entire graduating Class of 2013. **Christopher Lee** and **Angel Ku** (see page 6) were nominated for the College of Science & Engineering Hood. All three spoke at our 7th annual Baccalaureate and Masters Recognition Ceremony held in May which, with more than 1500 in attendance, was a raging success and a memorable time.

Professor **Leticia Márquez-Magaña** received the highly coveted Jefferson Award for Public Service for her work (see page 8). Our annual conference, Personalized Medicine 6.0, featured exciting speakers on the latest developments in next-generation DNA sequencing and their use in preventive medicine and diagnostics. Our alumni team, led by **Dan Maher**, is looking forward to Personalized Medicine 7.0 on May 22, 2014 when we will examine the role of the micro biome in health and disease. You'll want to mark the event on your calendar.

I'm always telling you how important science education at all levels is to the future of our nation. That's why the Department's motto is "Advancing Global Health and the Biosphere: Educating Generations of Scientists, Health Professionals, Teachers and Citizens." This summer twenty of our tenure-track faculty and fifteen of our lecturers gathered under the direction of **Dr. Kimberly Tanner** for a one-week intensive workshop on the latest developments in scientific teaching funded by the Howard Hughes Medical Institute (see page 2).

The economy of the state of California seems to be turning around, but we expect an ever-decreasing fraction of our funding to come from state sources. This situation is exasperated by the many years of deferred maintenance and decaying equipment that we have gone through. Yet we in the Department of Biology remain determined to preserve the quality of our teaching and research and the integrity of our infrastructure. Your unrestricted gift is needed now more than ever, and we can put your funds to work today.

Best wishes for the holiday season!



In October, **Mike Goldman** (right) was a spooky visitor in Lecturer **Heather Murdock's** (see page 3) classroom.

DEPARTMENT OF BIOLOGY

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INSIDE THIS ISSUE

- 2 **News Briefs**
- 3 **Heather Murdock:**
Leading a Study Abroad
Tour to Costa Rica
- 4 **In Memory: Dr. Ruth Doell**
and Alumnus Bob Breen
- 5 **Dr. Laura Burrus:**
Proteins Make a
Difference between
Life and Death
- 6-7 **Notable Alumni**
- 8 **Dr. Leticia Marquez-**
Magana: Fun and
Fearless Professor

**The Department of Biology
thanks alumni and friends
for your continued support.**

Your generosity
has changed the lives of
students. Please make a gift
today by visiting
<http://biology.sfsu.edu>
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"Make a Difference" link, or
use the enclosed envelope.

**One gift—and one
person—does make
a difference.**

News Briefs



Last June, more than thirty Biology faculty members attended a week-long Howard Hughes Medical Institute-funded workshop held in the Science Education Partnership &

Assessment Laboratory (SEPAL) and facilitated by **Dr. Kimberly Tanner** (photo above). According to Department Chair, Dr. Michael Goldman, "this unique workshop, and the broad support of faculty seen at no other institution, secures SF State's Department of Biology a position of national leadership in efforts to introduce innovative methods of scientific teaching into a curriculum based on the National Science Foundation/ American Association for the Advancement of Science campaign "Vision & Change in Undergraduate Biology Education."



The Department of Biology is pleased to welcome the new Director of the Dental Post Baccalaureate Program **Dr. Meena Tappouni**.

Dr. Tappouni earned a

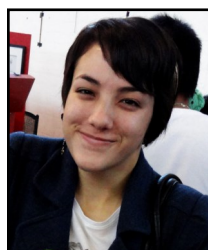
DMD degree and Certificate in Public Health from the Arizona School of Dentistry and Oral Health. Throughout her career, she has worked with underserved populations providing dental care in Costa Rica, Panama and Peru and in community health clinics across the U.S. including Asian Health Services in Oakland, California. Most recently, Dr. Tappouni helped develop a school-based dental program in Oakland which provides on-site dental treatment to students using portable dental units.

To learn more about the dental post-bac program, visit: http://online.sfsu.edu/brothman/reapplicant_program/reappstruct.html



JASON ANDERS (B.S. Ecology 2013) was awarded the **John Hensill Scholarship** which is helping to fund his undergraduate research endeavors in the Philippines.

"I am very interested in Conservation Biology especially in Asia where rapidly increasing development is causing a major loss in biodiversity. I am currently working with Dr. Vance Vredenburg on the fungal disease known as chytridiomycosis which has been causing worldwide amphibian declines and extinctions. Although this fungus has been detected in various parts of Asia there has yet to be a reported outbreak. We need to figure out what is going on there that is preventing it from spreading like wildfire which is being seen in California, Australia, Central and South America, and determine if these animals are susceptible to the disease if the conditions become just right."



MATILDE MIRANDA is an undergraduate Cell & Molecular Biology major. She was awarded the **Felipe-Andres Ramirez-Weber Scholarship** which she "invested into my savings — since financial stability goes hand-in-hand with academic stability."

"I consider SF State a center for scientific and academic inspiration. It is the solid foundation for all my current knowledge as well as an invaluable source for mentoring and advice. Both faculty and staff have encouraged and challenged me throughout my undergraduate studies, and have prepared me for furthering my science career which will very likely include earning an advanced degree in stem cell biology and regenerative medicine. It is fascinating to observe and manipulate cell behavior which is the focus of my project in Dr. Laura Burrus' developmental biology research lab (see page 5). Having the opportunity to participate in laboratory research has taught me skills I will use in the future."



CHRISTINE TSANG (B.S. Microbiology 2013) was awarded the **Janis Kuby Memorial Scholarship** which she used towards paying tuition.

"I enrolled in SF State's Biology program because of the introductory biology courses I took as a freshman art major. I became fascinated with learning about life's composition, and now enjoy and appreciate science. I am currently in Dr. Taro Amagata's research lab investigating anti-cancer compounds extracted from marine bacteria and other organisms, specifically Actinomycetes. This is research that I want to be involved in because cancer is the leading cause of death, and it is very important to find cures or ways to efficiently inhibit or reverse its damaging effects. I am considering enrolling in SF State's Clinical Laboratory Science program or a pharmacy school."

Heather Murdock

Leading a Study Abroad Tour to Costa Rica

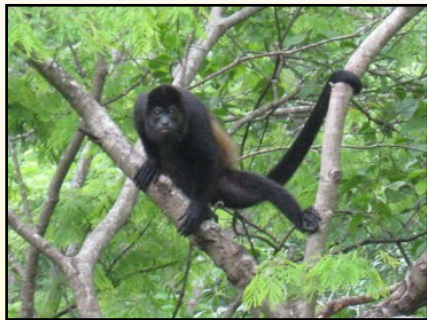
Biology Lecturer and alumna Heather Murdock (MA Ecology & Systematic Biology 1999) wrote to us about an ecology-themed study abroad tour to Costa Rica she led last June.



"Three thousand miles from home, a group of 26 students, four SF State Biology lecturers (including Holly Harris, Stephen Ingalls and Amber Johnson), and nine family members had an unforgettable nine day adventure in Costa Rica. Accompanied by an incredibly knowledgeable local tour director Freddy Davila (*photo left*), we explored five different ecosystems from the Caribbean to the Pacific Ocean, learning about countless species of plants, insects, birds, reptiles, mammals, amphibians and fungi that we saw along the way.



Let me explain how this came about. I started teaching for the Biology Department in 1997 when I was an undergrad. The classes I teach include the Introductory Biology Labs (BIOL 230 and 240), Nature Study and Human Biology. In Winter 2011, EF College Study Tours, an educational travel company, asked me to lead an international biodiversity tour. I chose Costa Rica because the country is one of the most environmentally conscious countries in the world, and ecotourism helps to fund conservation education in the schools.



Highlights of our time in Costa Rica included watching an endangered Hawksbill Turtle lay her eggs at midnight at Tortuguero, snorkeling with rays and eels in the Pacific Ocean, hiking through the jungle with howler monkeys above (*photo left*) and poison dart frogs below, and zip lining hundreds of feet above a tropical forest canopy where we saw Howler and Capuchin monkeys and blue jean frogs (*photo above*).



What I liked best about being a tour leader was seeing the excitement, amazement, and enthusiasm of the participants. This trip was such a great opportunity for them to broaden their horizons by being immersed in a different culture as well as learning about Costa Rica's rich biodiversity. I will definitely bring a lot of the information I learned in Costa Rica into the classroom. We saw examples in the field of many of the topics I cover in the BIOL 240 lab including symbiosis, mutualism, commensalism, and parasitism among species. Now I can use my personal observations to make the topics I cover come to life.



I will be leading a trip to Belize in June 2014, Australia/New Zealand in 2015 and the Galapagos and Spain after that. Biology Lecturer Amber Johnson will lead a tour back to Costa Rica in May 2014. We welcome all students, staff, family, friends and alumni to join us. For more information, contact me at hgmurdock@yahoo.com or Amber at briesach@sfsu.edu."

The Department of Biology thanks alumni and friends who attended the Spring "Open House." Thanks to all of you the event was a great success! Missed it? Plan now on attending our 2nd Open House coming this Spring. For more information, email: silver@sfsu.edu



In Memory

DR. RUTH DOELL

ADMIRER FOR HER INTELLECTUAL CURIOSITY
AND BREADTH OF KNOWLEDGE

1926-2013

Professor Emerita Ruth Doell passed away in her home in El Granada, California on February 22.

Dr. Doell earned a Ph.D. in Biochemistry from U.C. Berkeley, and was a research associate at Tufts University and Stanford University. She joined SF State's Biology faculty in 1967 where she researched cell biology using mouse models to study viral-induced thymic lymphoma.

Dr. Doell also taught in the pioneering interdisciplinary NEXA program which included a curriculum that emphasized the historical, philosophical, and ethical interactions among humanities, arts, and the physical and social sciences. "I remember Ruth as a fellow NEXA faculty member," said Dr. Ellen Peel, "and especially as a member of the Theory Reading Group. The group was based in what was then called the College of Humanities, and Ruth was the only scientist who attended, ably and rigorously crossing disciplinary boundaries. She introduced us to writers such as Antonio Damasio and Gerald Edelman. She had the rare ability to mix sharp critical insight with kindness and humor."

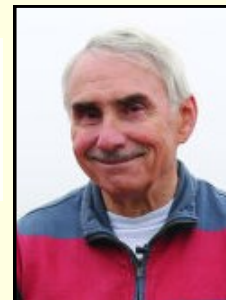
Dr. Doell was an outspoken critic of what she considered simplistic research into the biological causes of homosexuality. She wrote on gender bias in science, contributing an essay entitled "Whose Research Is This? Values and Biology" to a 1991 anthology on feminism in academia. Dr. Doell retired in 1992 after teaching for 25 years. She continued to be active in political and environmental causes, and was a hospice volunteer from 2002-2012.

Biology Professors
John Stubbs (left)
Ken Floyd (center)
Ruth Doell (right)
1968



Editor's note: To make a gift to the Department of Biology in memory of Dr. Doell, please use the enclosed envelope or visit <http://biology.sfsu.edu>. Click on the "Make a Difference" link, select "Biology Department" in the drop down list and write "In Memory of Dr. Ruth Doell" in the "Comments" box. Thank you.

BOB BREEN (M.S.
Marine Biology 2007)
died on June 19.



Bob was a longtime ranger who managed the Fish and Game Marine Life Refuge at the Fitzgerald Marine Reserve. He retired in 2004, and enrolled in SF State's graduate Marine Biology program to earn a second master's degree.

"Bob was such an impressive fellow!" said Dr. Sarah Cohen who met Bob when he was working in Dr. Tom Niesen's lab and finishing his M.S. in Marine Biology. "He worked so hard for the Marine Life Protection Act (MLPA) — the legislation that enabled the establishment of a California coast-wide Marine Protected Area which is the second largest scientifically based marine reserve system in the world." Dr. Niesen, who served on the Friends of Fitzgerald Marine Reserve Board with Bob, recalls "Bob began training docents to lead guided tours of the reef, one of the most diverse rocky intertidal habitats in Central California, in the 1970s. The docent program has become the model program for MLPA sites throughout the state."

Over his 41 years of service, Bob came to be regarded as the reserve's master naturalist and foremost advocate for its protection. Among his many contributions, Bob founded the Friends of Fitzgerald Marine Reserve, and the Half Moon Bay High School marine science program.

*"Climate change is a global problem.
But, addressing it will require an
all hands on deck approach.*

*Local protection of key biogenic habitats
is a key part of the solution."*

- Bob Breen

Proteins Make a Difference between Life and Death



Dr. Laura Burrus' research on proteins could shed light on the prevention and treatment of birth defects and diseases such as cancer. In Spring 2012, she received a National Science Foundation (NSF) grant to study proteins that help living cells communicate with each other, are essential for repairing damaged tissue in adults, and guide the healthy development of embryos. "These proteins can instruct neighboring cells to move, divide, die or become a particular kind of cell," said Dr. Burrus. She wants to understand how they function—and how they sometimes go wrong.

After earning a Ph.D. in Biochemistry from the University of Wisconsin, Dr. Burrus joined the Biology faculty in 1997 where she teaches Introductory Biology and Cancer Biology. When asked why she wanted to work at SF State she said that the Biology Department "gave me the opportunity to participate in both teaching and in research" and "the students I met during my interview here were a big selling point. I feel fortunate that I get to work alongside such a gifted and engaged group of students from incredibly diverse backgrounds."

Dr. Burrus' began researching a group of signaling proteins known as "Wnts" while she was a post-doc. "I spent a tremendous amount of time trying to express and purify Wnt proteins, but I found that although these proteins had the classic hallmarks of secreted proteins, they were very poorly secreted from every cell type I used. This piqued my interest about the mechanism by which Wnt proteins are secreted."

To send the right signal to nearby cells, researchers think that a series of chemical reactions must happen first to Wnt proteins including getting an addition of a fatty acid with the help of another protein called Porcupine. Dr. Burrus and her students are examining the role of both proteins in the development of chick embryos, the biochemistry of these proteins, and how they interact with each other. Using an emerging technique called "Click Chemistry" in which molecular components are joined together, they can observe the chemical reactions in which the Porcupine protein adds a fatty acid to the Wnt protein. Her NSF grant provided the support for her students to each have their own line of research and funded the purchase of a state-of-the-art infrared scanner which allows the researchers to detect the fatty acid.

According to Dr. Burrus, in the nervous system alone there are 200 proteins that have a fatty acid added to them, and many of these could be targets for therapeutic interventions such as anti-cancer drugs. But, at the moment there is no good way to measure how fatty acids are added to proteins.

Dr. Burrus hopes to change that. She is currently validating exciting new discoveries made by her lab and preparing them for publication.



Student researchers in Dr. Burrus' Lab (l-r): *Carl Grim, Navid Zebarjadi, Sean Allen, Lisa Galli, Shea Feeney, Matilde Miranda, Davey Hernandez, Zoe Langbort, Chris Pineda, Raymund Bueno and Dr. Laura Burrus.*



Angel Ku

BS

Cell and Molecular Biology

2013

In 2012, Angel Ku joined two UC Berkeley graduates to launch Pre-Health Dreamers (www.phdreamers.org)— an online information sharing network and community for pre-health undocumented students across the country. Angel's focus is on providing peer support by answering questions about graduate level education, internship and job opportunities.

While an undergraduate at SF State, Angel worked in Dr. Leticia Marquez-Magaña's (see page 8) lab where his team investigated the genetics of triple negative breast cancer. He also worked as an undergraduate intern in the lab of UCSF researcher Nadav Ahituv investigating the function of non-coding DNA in human disease and development.

In 2012, Angel was profiled in a *National Journal* article "Education Key to High Attainment among Immigrants."

"I began investigating the barriers undocumented students face after graduating college as a result of my personal experiences and my work with community and academic organizations. The work I'm doing with Pre-Health Dreamers combines my passion for science and education equity."

This Fall, Angel began a Ph.D. program in Pharmaceutical Sciences and Pharmacogenomics at UCSF.

Notable Alumni

HAYLEY CARTER

(M.S. Marine Biology 2012)

is a 2013 California Sea Grant Fellow with the Ocean Science Trust in Oakland and is working towards establishing a science panel to inform resource managers as they plan for the threats of ocean acidification and hypoxia.



ROBERT FURLER

(BS Cell & Molecular Biology 2004)

is a Microbiology Professor at Edison State College, and researcher at the UCLA AIDS Institute.



MIA HILES

(BS Zoology 2012)

is a 6th grade science teacher at Ralston Middle School in Belmont, California.



QUINN MCFREDERICK

(MA Conservation biology 2003)

is an Assistant Professor in Fresno State University's Department of Biology.



SUSAN MIRSOIAN

(MS Cell & Molecular Biology 2008)

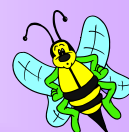
received a Doctor of Pharmacy degree from the University of California, San Francisco.



Professor Emerita **JAN RANDALL** was elected a Fellow of the Animal Behavior Society (ABS) and received the Fellows Award at the ABS' 50th anniversary meeting in recognition of her long-term research which demonstrated the importance of a social structure in species once considered asocial.



Biology's ZomBee Watch webpage
(<https://www.zombeewatch.org>) logged in its
100,000th visitor in September! Thanks to all
the citizen scientists whose contributions
have made this project so successful.





DAVID LINDBERG

BA
Marine Biology
1977

Dr. David Lindberg is a professor of Integrative Biology at UC Berkeley. His first paper was published with “SFSU Biology” as his byline causing the Department Chair at the time to call David into his office, and castigate him for being so presumptuous as an undergraduate to use the Department as his sponsoring research organization. Today, we honor our undergraduate researchers, and are proud to name Dr. Lindberg as one of our illustrious alumni, and his initial SF State paper was but the first of many...and, still counting.

After his undergraduate work with SF State Biology emeritus professor, Dr. Tom Niesen, and with continued collaboration with the California Academy of Sciences, Dr. Lindberg earned a Ph.D. at UC Santa Cruz. His initial interest in mollusks, particularly limpets, led him to become a world authority on the evolution and taxonomy of this diverse group. His work now spans from paleobiology to molecular biology and ecology of molluscs.

For all his success as an academic, David looks back as he approaches retirement, and feels the success of his many graduate students is his greatest and most satisfactory achievement.

Submitted by Drs. Sarah Cohen, Tom Niesen and Dianna Padilla

Dr. Debra Shier earned a Ph.D. in Animal Behavior with an emphasis in wildlife conservation from UC Davis in 2004.

In 2006, she joined the San Diego Zoo Institute for Conservation Research. She is a Brown Endowed Scientist in the Applied Animal Ecology Division, and directs a local field program on threatened and endangered small mammals including the Pacific pocket mouse and Stephen’s kangaroo rat.

Dr. Shier’s research focuses on ways animal behavior can be applied to conservation strategies such as reintroductions and translocations. She is a member of the International Union for Conservation of Nature Reintroduction Specialist Group which provides reintroduction practitioners with guidelines, networking resources and publications.

Debra is also an adjunct professor in UCLA’s Department of Ecology and Evolutionary Biology. She is the recipient of numerous grants and awards.



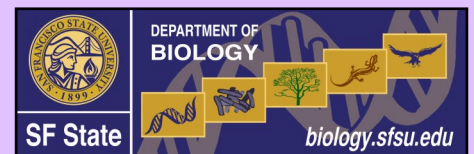
DEBRA SHIER

MA
Ecology &
Systematic
Biology
2003

“I am extremely proud of getting my master’s from SFSU. It was a critical step for me.”

We value the accomplishments of Biology alumni, and want to hear from you! Let us know about your latest professional or academic achievement.

Email:
silver@sfsu.edu



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Advancing Global Health
and the Biosphere
Educating Generations of
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A Fun and Fearless Professor

Dr. Leticia Márquez-Magaña was awarded the prestigious Bay Area Jefferson Award for Public Service for her tireless efforts to increase the number of underrepresented minorities and women in science. Established in 1972 by Jacqueline Kennedy Onassis, the Jefferson Award is considered the Nobel Prize for public service.

Dr. Márquez-Magaña received her Ph.D. in Biochemistry from the University of California, Berkeley, and was a Patricia Robert Harris Fellow at Stanford University. She joined the Biology faculty in 1994 and developed a research program in microbial genetics which lead to numerous publications, grants and the training of more than seventy underrepresented minority students. In 2006, she became affiliated with SF State's Health Equity Institute for Research Practice and Policy where she works with scientists, health professionals and policy makers to reduce health disparities. This past year she became the founding Director of the Health Equity Research Laboratory that is housed in the Biology Department, and that aims to engage in research and outreach to link basic science to community health.

The first-born daughter of Mexican immigrants who began her education in the U.S. as a Spanish speaker, Dr. Márquez-Magaña is today a highly visible role model, mentor and advocate for Latino and other minority science majors. Her role as a mentor has been the subject of magazine and newspaper articles. *Hispanic Magazine* named her one of America's "Top 100 Most Influential Hispanics." In 2001, she won the American Association for the Advancement of Science Mentor Award for demonstrating extraordinary leadership in mentoring and developing research opportunities for underrepresented students in science.

Last June, Dr. Márquez-Magaña received yet another accolade when she was awarded the "Fun/Fearless Award" in Science from *Cosmo for Latinas*. To learn more about Dr. Márquez-Magaña, visit: <http://userwww.sfsu.edu/~magana/>

