# A Letter to Alumni and Friends from Dr. Michael Goldman, Department Chair



Fall 2015 Issue 19

The Department of Biology continues to evolve, as transition, chance and necessity are ever changing the way in which we prepare the next generation of scientists, teachers, health professionals and informed citizens. We toasted and thanked our outstanding Dean Sheldon Axler, who stepped down in July after thirteen years, and welcomed Dean Keith Bowman to the helm. While Professor Barry Rothman has moved into half-time retirement, Professor Stan Williams is now fully retired, and we are thrilled to have Drs. Robyn Crook (*see page 2*), Rori Rohlfs (*see page 3*), and Felipe Zapata join our ranks as Assistant Professors. Long-time staff member Diane Elliott will retire in December, and we thank her for decades of hard work. Our amazing Operations Manager, Michael Fong, stepped in as Interim Executive Director for the College of Science & Engineering, as Mike Blagoyevich retired from that position, and Justin Chan stepped in for Michael. Professor Carmen Domingo has stepped down after serving as Associate Chair for Curricular & Undergraduate Affairs where she set a campus-wide standard for service, excellence and composure. Professor Christopher Moffatt will take on her role.

Incredible achievements by our students and alumni are highlighted in this issue. Professor Bob Patterson, who continues his tireless work for students, was honored by the California Botanical Society, and profiled in *BioOne.org*. Former Chair John Hafernik received a Distinguished Service Award from the California Academy of Sciences. Professor Tom Parker and alumnus Dr. Mike Vasey, instructor, and director of Tiburon's National Estuarine Research Reserve, (say *that* fast) have just published *Field Guide to Manzanitas: California, North America and Mexico. (see page 4)* Alumni Dan Maher, Ken Hitchner, John Wulf, and I are planning our next annual conference, "Personalized Medicine 9.0: Gene Therapy & Genome Editing – *This changes everything!*" for Thursday, 26 May 2016. And alumnus Vince Anicetti gave his inspiring remarks to College of Science & Engineering (COSE) scholarship winners and donors in November. (Ten Biology students received COSE scholarships.) Vince is also Chair of the University's Foundation Board, Senior Vice President for Global Quality and Compliance at Coherus BioSciences and one of the organizers of our conference.

Our Development Committee, under the able leadership of Professors Megumi Fuse (*see page 2*) and Ravinder Sehgal, is planning an exciting spring alumni and friends event, and I hope you'll watch for your invitation, or even join us to help. You can recognize any of our



faculty and staff members in your contribution to the Department by marking your mailed or online donation "Biology - Use where the need is greatest" and mentioning a name. Our "front-runner" is the late Professor Anthony (Tony) Catena, who was also mentioned in Vince Anicetti's address.

Thanks to all for your support, your spirit, your encouraging words, and for making us so proud!

#### DEPARTMENT OF BIOLOGY

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# Dr. Megumi Fuse Bringing Alumni Expertise and Energy Back to the SF State Science Community



**Dr. Megumi Fuse** has many roles at SF State including Professor of Biology (emphasis: Physiology). Before coming to SF State in 2001, Dr. Fuse earned a Ph.D. in Zoology from the University of Toronto (Canada) and was a Postdoctoral Fellow at the University of Washington. Her current research focuses on animal responses to external stresses and tissue damage from a physiological and developmental perspective using an insect model, the hornworm (*Manduca sexta*). Her work has both agricultural and biomedical applications, and her funding has come from the USDA and the National Institutes of Health.

Dr. Fuse is also interim chair of the Biology Development Committee whose members include Ravinder Sehgal (chair on sabbatical), Jennifer Breckler, Karen Crow, Arlene Essex, Michael Fong, Colleen Francis, Gretchen LeBuhn, Leticia Marquez-Magana, Blake Riggs and Andrea Swei. One of the Committee's goals is to bring Biology alumni back to the SF State science community to share their experiences and energy and create a network of alumni, scientists, teachers, health professionals and active citizens.



For the last three years, the Committee has hosted an annual spring time event 'Friends of Biology' designed to connect with alumni. This year, Dr. Fuse's third role as Co-Chair of SF State's Women in Science and Engineering (WISE) group allowed her to combine Development with WISE goals to feature alumna and Alexion Pharmaceuticals, Inc. Vice President **Judith Sernatinger** (MA Cell & Molecular Biology 1987) (photo left) who spoke on "Networking in the 21st Century" and the role of women in biotech.

SF State Department of Biology "Your Gateway to Biological Innovation"



## **Biological Art**

Professor Emeritus Greg Antipa's artistic interpretation of photomicrographs was on exhibit in the Sanchez Art Center's (Pacifica) small artworks "50/50 Show."

**Dr. Robyn Crook** joined the Biology faculty as an Assistant Professor in Physiology in August.



Before coming to SF State, Dr. Crook earned a Ph.D. in Ecology, Evolutionary Biology and Behavior from City University of New York, and was a Postdoctoral Fellow in the Integrative Biology and Pharmacology Department at University of Texas Medical School in Houston.

Dr. Crook's research is focused on understanding features of nociceptive neuron physiology that underlies pain, anxiety and agitation after injury. At SF State, she hopes to extend her research into areas that are of interest to animal behaviorists, comparative neurobiologists and evolutionary biologists.

In the classroom, Dr. Crook teaches science as a process, so that her students will learn to think critically about problems, evaluate their evidence objectively and form conclusions based on logic and sound reasoning. In Spring 2016 she will offer a seminar course on sensory physiology or neurobiology.

I like the Department's diverse research areas and strong focus on involving students in research."

Dr. Crook can be contacted at: rcrook@sfsu.edu **Dr. Rori Rohlfs** joined the Biology faculty as an Assistant Professor in Human Genomics in August.

Before coming to SF State, Dr. Rohlfs earned

a Ph.D. in Genome Sciences from the University of Washington, and was a Postdoctoral Fellow in the Department of Integrative Biology at UC Berkeley.

Dr. Rohlfs is a member of SF State's newly formed 'Big Data' team which includes researchers from the Health Equity Institute and the Department of Economics. Her research goal is to develop methods that can account for evolutionary relationships between species and population genetic variation over changing environments. According to Dr. Rohlfs, "Population and comparative genetic investigations have provided enormous insight into genetic signatures of adaptation. Yet, empirical investigation of regulatory evolution and adaptation has been stymied by the difficulty of consistently quantifying expression levels across species."

Her teaching goal includes cultivating a "respectful and open classroom where diverse students are empowered to ask questions and work through ideas." In Fall, she taught a seminar "Gene Expression: Exploring Variance" and in Spring she will co-teach Genetics.

> "SF State Biology is an outstanding department! I look forward to working in an environment with innovative teaching, fascinating research, collaborative colleagues, and brilliant students!

Dr. Rohlfs can be contacted at: rrohlfs@sfsu.edu Page 3

# **Dr. Vance Vredenburg**

Banning Pet Salamander Imports To Keep a Lethal Fungus Out of North America





Photo by Shruti Chaukulkar

The Vredenburg Lab published a paper in Science urging the U.S. Fish and Wildlife Service to impose an immediate ban on live salamander imports into the U.S. in an effort to prevent the spread of a newly discovered chytrid fungi, *Batrachochytrium salamandrivorans* (Bsal). The models developed by Dr. Vredenburg, graduate student Tiffany Yap and co-authors predict that wild salamanders in North America — where 48 percent of the world's known salamander species live — are highly vulnerable.

Researchers believe that Bsal originated in Asia where the fungus is thought to coexist with native salamander species including the firebellied newts or Vietnamese salamanders, the putative carrier species. But now through the growing pet trade the fungus has spread to wild salamanders in Europe. European species do not have a resistance to the fungus, and infected animals develop large lesions all over their bodies which bleed, resulting in infection and a 96 percent fatality rate. The Vredenburg Lab paper points out that millions of Asian salamanders are imported into the US, and their model shows that the top five ports of importation are located in geographic areas of predicted high salamander vulnerability to Bsal including the southern Appalachians, central Mexico, coastal California and the Sierra Nevada mountain range.

Salamanders are valuable components to both tropical and temperate ecosystems. They are important predators of insect and arthropod populations—many that are human pests. Salamanders are also important in carbon cycling, and in some North American ecosystems they are the most abundant vertebrate. Some species regenerate entire limbs and vertebrae, and are being studied to learn how to reverseengineer these abilities into human therapies.

The new species of pathogen is closely related to another chrytrid fungus, *Batrachochytrium dendrobatidis*, a pathogen that has infected over 500 species of amphibians, and is implicated in the extinction of over 200 species in the last four decades.

"The rapid discovery of this new pathogen combined with our predictive model of vulnerability of native species in North America shows that there is great hope that we may yet prevent a new pandemic, and thus help mitigate human effects triggering the world's sixth mass extinction." - Dr. Vance Vredenburg

> To learn more about Dr. Vredenburg's research visit: www.vredenburglab.com

## NEW FACULTY PUBLICATION A 'Gentle' Manzanita Field Guide





Field Guide to Manzanitas California, North America, and Mexico Michael Kauffmann, Tom Pirker, and Michael Vasey Photographs by Jeff Babee

Drs. Tom Parker (right) and Mike Vasey (left) co-authored "Field Guide to Manzanitas: California, North

America and Mexico." Their 170- page book includes color plates for identification, accurate and updated range maps, and directions to 28 manzanita field hot-spots.

Both authors have studied manzanitas —evergreen shrubs and small trees with smooth orange or red bark and stiff and twisting branches —for over 30 years.

Dr. Parker first became interested in manzanitas when he wanted to compare plants that resprout after fire (which includes manzanitas) with others that depend exclusively on their soil seed banks. "My first graduate student, Vicky Kelly, and I discovered after about a year of researching manzanitas that we were suddenly among the top five people who could identify them."

Dr. Vasey's interest began partially due to the number of identified species (95 out of 106 worldwide) that are local to California with over half living along the coast. "I was fascinated with the evolutionary mechanisms that drive local endemism."

"We've thought for a long time that there needs to be a gentle introduction of these plants for the general public, and even professionals. We translated botanical terminology into regular English. We broke up the key into seven regional keys which makes them much easier to decipher. We distilled what we have learned about the paleo-history of this group, its ecology and the evolutionary processes that have influenced it into a short introduction. And, the directions to places to see different species in different regions is very popular."





CHRISTIANA CONSER BS Ecology 1998 MS Ecology and Systematic Biology 2005

CHRISTIANA CONSER researches habitat restoration ecology and invasive

species management. "When I started at SF State in the 1990s," she recalled, "invasive species and restoration ecology were new fields. My coursework focused on ecology, botany and entomology. While an undergraduate, I worked for several graduate students in Tom Parker's lab which helped hone my native and invasive plant identification skills, and gave me the opportunity to do extensive fieldwork throughout California. I became fascinated with the massive iceplant (*Carpobrotus edulis*), a South African succulent, that has spread along California's coast, and could be changing the soil chemistry in a way that excludes native plants and threatens wildlife. I developed this idea in my master's thesis 'Assessing the Residual Effects of *Carpobrotus edulis* Invasion Implications for Restoration' which was published in *Biological Invasions*."

In 2009, Christiana was appointed to the California Invasive Species Advisory Committee which advises the Invasive Species Council of California on preventing the introduction of invasive species, providing for their control and minimizing the economic, ecological and human health impacts that invasive species cause. She has also worked as a project scientist for the Sustainable Conservation's PlantRight campaign to develop science-based strategies to prevent the sale of invasive ornamental plants in California.

Christiana is currently a Ph.D. candidate in Horticulture and Agronomy in UC Davis' Department of Plant Sciences where she works with weed scientist Dr. Joseph DiTomaso. They have developed the Plant Risk Evaluation (PRE) tool which PlantRight is using in working with the plant nursery industry to screen ornamental plants for invasiveness. Christiana has co-authored articles on PRE published in *Plos One* and *Acta Horticulturae*.

Developing practical science-based solutions to conserve biodiversity for future generations is Christiana's goal, and her education at SF State has helped her work towards that goal. "The classes I took at SF State gave me practical skills that I use in my everyday work such as plant and insect identification, ecological monitoring, experimental design and statistical analysis."



NATASHA CHANDIRAMANI BS Cell & Molecular Biology 2007

Natasha Chandiramani researches breast cancer in Pfizer's Oncology Research Unit post doctoral training program.



"I became interested in understanding breast cancer when my aunt was diagnosed with stage II breast cancer shortly after I graduated from SF State in 2007," said Natasha. "I was amazed at the ability of breast cancer cells to co-opt developmental and growth pathways to their advantage. Although there are treatment options available for breast cancer, a large number of patients succumb to recurrences and metastases."

Natasha's goal is to discover new therapeutic interventions to combat cancer. Because of her efforts on breast cancer research as a Ph.D. student in the laboratory of Dr. Paraic Kenny at Albert Einstein College of Medicine, Natasha received the 2015 American Association for Cancer Research's (AACR) Women in Cancer Research Scholar Award. Each year, 30 women recipients are picked from around the world based on research achievements and career goals. The awards support early career scientists-in-training who present meritorious research at AACR's annual meetings.

Natasha co-authored "Comparative Analysis of GATA3 Mutation Profiles between Asian and Western Patients with Breast Cancer: Is There Really a Difference?" published in *Cancer*.

#### Whose lab did you work in while at SF State?

"Dr. Wilfred Denetclaw was a very supportive mentor, and I am very grateful for the opportunity to work in his lab. I studied the role of nitric oxide on embryonic muscle development. I had some exciting results and presented them at the campus-wide CSU Research Competition earning First Place in the 'Biology Research' category.

#### Who at SF State inspires your work?

Dr. Diana Chu is an incredible scientist and role-model. She made molecular genetics so exciting. I was also mentored by Dr. Michael Goldman who nominated me for SF State's Phi Beta Kappa Chapter. I am also grateful to Dr. Teaster Baird (Chemistry and Biochemistry Department) for providing me with a strong foundation in Biochemistry which has helped me immensely.

Editor's Note: When Natasha received her doctoral degree in June 2015, her aunt — a breast cancer survivor—was in the audience cheering her on!

### FACULTY RESEARCH

**Dr. Kathy Boyer** received a CSU Council on Ocean Affairs, Science and Technology grant to work with Cal Poly San Luis Obispo researchers on "Conservation



Connections: Links Between Eelgrass (Zostera marina) and an Extremely Rare High Marsh Plant (Suaeda californica) in Two California Estuaries." She received an 'Outstanding Environmental Project Award' at the State of the San Francisco Estuary Conference for her work on evaluating oyster reefs and eelgrass for habitat and shoreline protection.

**Dr. Sarah Cohen**, an expert on a group of colonial invertebrates known as tunicates or 'sea squirts,' participated in a California Academy of Sciences' NSF-



sponsored dive survey of the Western Pacific's 'Coral Triangle' which has long been considered the center of the most biologically diverse marine ecosystem in the world. The goal is to compare patterns of diversity among different organisms in a continent-sized patchwork of habitats, populations and communities to discover processes promoting diversity and speciation. Learn more at: <u>http://</u> <u>blogs.scientificamerican.com/</u> <u>expeditions/2015/04/22/the-richest-reef-life-in-</u> <u>layers/</u>



**Dr. Pleuni Pennings** received a SFSU Office of Research and Sponsored Programs grant for "Is There Scientific Evidence for 'always finish antibiotics course'

Advice?" and a National Science Foundation grant sub-award for "Cityscape Genomics of Rats in New York City."



**Dr. Kimberly Tanner** received a National Science Foundation award for "Investigating the Influence of Informal Understandings about Biology on Formal Learning of

Biological Concepts."

# **NOTABLE ALUMNI**



#### HIBBA ASHRAF

(MS Physiology 2014) is an Associate Professor of Biology at Bakersfield College.



## KELCIE CHIQUILLO

(BS Marine Biology 2014) is a Ph.D. candidate in UCLA's Department of Ecology and Evolutionary Biology. She was awarded a National Science Foundation Graduate Research Fellowship.



#### **RICHARD COLEMAN**

(BS Marine Biology & Limnology 2010) is a Ph.D. candidate at the University of Hawaii, Manoa. He was awarded NOAA's Dr. Nancy Foster scholarship to fund research conducted in a National Marine Sanctuary.



#### KATHRYN DANIELSON

(MS Marine Biology 2013) is a California Academy of Sciences' Educator. She co-authored "Investigating Undergraduate Science Students' Conceptions and Misconceptions of Ocean Acidification" published in CBE Life Sciences Education.



#### JAMES MCLAUGHLIN

(MA Biology 1967) is President of the Diagnostic Microbiology Development Program and Professor Emeritus in the University of New Mexico School of Medicine's Department of Pathology.



#### MATILDE MIRANDA

(BS Cell & Molecular Biology 2014) is a Ph.D. candidate in UCLA's Bioscience Cell & Developmental Biology program. She was awarded a National Science Foundation Graduate Research Fellowship and Ford Foundation Fellowship.



#### LAURA BOYKIN (MS

Ecology & Systematic Biology 1998) is a 2015 TED Fellow and a Chemistry and Biochemistry Research Fellow at the University of Western Australia. Funded by the Bill and Melinda Gates Foundation, she along with a collective of international



researchers, are working to increase global food security.

Dr. Boykin (right in above photo) is a computational scientist (trained as a plant taxonomist) who uses genomics and supercomputing to research the African whitefly (*Bemisia tabaci*) —one of the most pervasive pests on earth—with the goal of helping East African smallholder farmers whose cassava crops can be destroyed by these insects. Cassava (also called manioc, arrowroot or tapioca) is a staple food source in Africa and an important food worldwide with more than half a billion people relying on it for their daily meals.

When asked why she chose this area research, Laura replied "I want to do research that has a real impact. Helping smallholder farmers in East Africa increase their cassava yields so they have enough to feed their families is what gets me out of bed."

Previously it was thought there was only one species of whitefly, but Laura has identified at least 34. Her data is publicly available through www.whiteflybase.org/

Dr. Boykin is training African scientists and students to analyze the data, so that they can breed new strains of cassava that resist the whitefly as well as tackle future insect outbreaks.

While a graduate student at SF State she worked in Dr. Robert Patterson's lab in close collaboration with Drs. Greg Spicer, Tom Parker and Mike Vasey. "Bob Patterson taught me the importance of precision in science communication. He taught me that my slide presentations (at the time 35mm slides) needed to be formatted correctly from font size, color, spelling, to the italics of scientific names. Attention to detail sets the tone when interacting with people about your science—it shows you take great pride in the work by making sure it is as perfect as possible."

"Dr. Greg Spicer is an amazing teacher who introduced me to and inspired my love of phylogenetics," said Laura, "and he is one of the reasons I am working on the systematics of whiteflies."

To learn about Dr. Boykin's research, visit: www.lauraboykinresearch.com

# RESEARCH



**Gretchen Coffman** (MA Ecology & Systematic Biology 1998) is an Associate Professor of Environmental Science at the University of San Francisco. Dr. Coffman, a restoration ecologist, is leading an international effort to save an

endangered cypress tree on the verge of extinction. Only about 250 of the swamp cypress were known to live in the wild, all of them in Vietnam, until Coffman and her student Robin Hunter tripled that number on an expedition to Laos. "I literally tripped over the trees' roots. And, when I stood up to look, I knew it instantly," Coffman said. A DNA sample confirmed it was *Glyptostrobus pensilis*. The discovery included a stand estimated at more than 500 years old with trees 145 feet tall and more than three meters in diameter.

Coffman first discovered the swamp cypress in Laos on a trek to explore the Nakai-Nam Theun National Protected Area in 2007. The species is listed as critically endangered, one step from extinct in the wild, by the International Union of Conservation of Nature and Natural Resources. It is thought to be extinct in China in the wild where it once flourished. The 200-plus trees in Vietnam are in decline and no longer bear viable seeds. So, Coffman's rescue mission, seven years in the making, may be the species last chance at survival.

It's a race against time and a growing list of threats. An unknown number of the cypress trees recently drowned in Laos under a newly constructed reservoir built to generate hydroelectric power. Others have been cut down to build homes and expand rice paddies, and poachers sell the wood at exorbitant prices. "The wood is treasured for its unique scent and for constructing high-end furniture because it is resistant to water, weather and rot," Coffman said.

With early-stage research funding from National Geographic, Coffman and her team of 30 scientists and local leaders travelled to Laos where they mapped, measured and gathered data on 500 previously unknown cypress trees and seedlings. "We worked with scientists from the Laos federal government, the National University of Laos and the Royal Botanic Garden of Edinburg, as well as local villagers," Coffman said. Her team has begun to implement a national conservation plan to educate locals about the cypress and propagate the tree in nurseries so that a new generation can carry the species forward.

Reprinted from "USF Ecologist Races to Save Endangered Cypress from Extinction" by permission of Ed Carpenter, Office of Communications and Marketing, University of San Francisco. To read the entire article, visit: http://www.usfca.edu/Newsroom/Global\_Perspective/ USF\_Ecologist\_Gretchen\_Coffman\_Races\_to\_Save\_Endangered\_Cypress\_f rom Extinction/

## **NOTABLE ALUMNI**

LISA POTTER

(MS Ecology, Evolution & Conservation Biology 2015) graduated from the UC Santa Cruz Science Communication Program. She has authored science articles published in The Salinas Californian and Inside Science News Service. Learn more about Lisa at: www.lisamariepotter.com



#### CARISSA SHIPMAN

(MS Marine Biology 2013) is a Ph.D. candidate at the University of Philippines Marine Science Institute. She co-authored "Molecular and Morphological Systematics of Doto Oken, 1851 (Gastropoda: Heterobranchia) with Descriptions of Five Species and New Genus" published in Zootaxa.

#### **KRISSIE TELLEZ**

(BS Cell & Molecular Biology 2014) is a Ph.D. candidate in the Developmental Biology program at Stanford University, and was awarded a National Science Foundation Graduate Research Fellowship.



#### DON WICKLOW

(BA Biology 1962; MA Biology 1964) retired from USDA's National Center for Agricultural Utilization Research. The fungus Wicklowia aquatica was named after him for his outstanding studies of the nature and role of fungal secondary compounds.





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Dr. Margaret Bradbury



Dr. Bernie Goldstein



Dr. James Mackey

Thanks for the Memories

I started at SFSU with the intent to major in Biology, but the lines were long (we lined up to sign up for classes) and I ended up with only dance classes. I succeeded and stayed in the Kinesiology Department where requirements were heavy in anatomy and science.

A tussle with gravity led to the end of my athletic career, and I returned to SFSU to change to a more sedate career as a biology instructor. I was recruited by **Dr. Larry Swan** to teach Human Anatomy labs, and by **Dr. Bernie Goldstein** to teach General Zoology. Dr. Goldstein, probably one of the zaniest of fellows, was really a pleasure to know. Dr. Swan, a total, incredible genius, became my mentor, showing me how to excel and have a great deal of fun at the same time. Our infamous paper on "The Incidence of Knee Injuries in Genuflecting Religions" was a highlight. **Dr. Jim Mackey** was another fabulous instructor in field biology — versatile, energetic and totally professional. It was fun to watch **Dr. Margaret Bradbury** get all slap happy over her fishes. I enjoyed tromping through Baja, Mexico with **Dr. Harry Wessenburg** and his wife as well as his superb lectures. Ditto for **Dr. Stan Williams**, crawlies and all. Fellow grad students were the best of the best during that grand era.

I went on to teach Biology, write curriculum at the Lawrence Hall of Science, teach summer anatomy classes at SFSU and Feather River College, participate in field

research in Peru, French Polynesia, Nigeria and Panama. Got involved with the US Forest Service to promote more women and minorities in science. Retired (ha ha) to Healdsburg to raise thoroughbred sport horses, and major in equine scatology.

> JACKIE LANGRIDGE-SAHUD BA Kinesiology 1966; MA Kinesiology 1977

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Dr. Larry Swan



Dr. Harry Wessenburg



Dr. Stan Williams