

Bio News

A Newsletter for Alumni and Friends of the Department of Biology

SPRING 2007

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A WORD FROM THE CHAIR



Dr. Michael Goldman

We've got so much to tell you that we've had to double the size of Bio News!

I'm tremendously proud of our alumni and students! You'll see why when you read in Bio News about two of our students: Corrie Saux Moreau (BS'00, MS'03) and Hani El Shawa (MS'07). As I write these words, ten staff members and students are noisily and excitedly planning our first Biology Commencement Ceremony on May 26. This year we celebrate the graduation of nearly three hundred new professional biologists. Cell and Molecular Master's student, Diana Marina, will accept the academic "hood" on behalf of the College of Science and Engineering — the sec-

ond time in a row a Biology student has received that honor. Another Biology graduate, and SFSU's 2006 Alumnus of the Year, Dr. Kenneth Fong (BS'71) will speak at the first Biology commencement ceremony.

Professor Dennis Desjardin, who is not only a faculty member but an alumnus of Biology (BS'83, MS'85), was the first person ever to be honored by the San Francisco State University Academic Senate for his outstanding achievements in research. Dr. Desjardin recently became a fellow of the Mycological Society of America.

This semester, we welcomed Dr. Chris Smith from Lawrence Berkeley National Laboratory, as Assistant Professor in Bioinformatics. In the fall, we're expecting two new Assistant Professors of Animal Ecology and Evolution: Dr. Vance Vredenburg, from UC Berkeley, and Dr. Karen Crow-Sanchez from Yale University. Dr. Ravinder Sehgal, previously at UC Davis, will join us as Assistant Professor in Microbiology.

Sadly, we need to say good-bye to

two senior faculty members. Dr. John Stubbs came to us in the rowdy 1960s, and fought hard to bring the new molecular understanding of biology to the fore. He was pivotal in our move into recombinant DNA technology on campus, and into the secondary schools of California. He has continued as a popular teacher of genetics, and as an advocate and pioneer in the improvement of science education in the schools.

Dr. Nan Carnal has been a mainstay of our rigorous but enjoyable general biology undergraduate program since she came in 1986. She rebuilt our curriculum in her early years, and over the last year, as the Department's first Associate Chair for Undergraduate and Curricular Affairs, she set in motion a mechanism for sweeping change again.

I know I speak for all of my colleagues when I say how irreplaceable these two folks will be, and how much we will miss them. We hope they will stay in touch and come back often—and that goes for the readers of "Bio News," too!



Congratulations Spring 2007 Graduates!

DISTINGUISHED ALUMNI

CORRIE SAUX MOREAU (BS '00, MS '03)



SFSU Zoology Graduate, Corrie Saux Moreau, has a passion for molecular systematics, phylogenetic relationships, and ants. She is especially interested in the question of ant subfamily relationships. According to Moreau, resolution at the subfamily level has been attempted several times using morphological characters, but with limited success. "By using molecules instead of morphology," said Moreau, "we may be

able to shed light on a question that has been puzzling ant taxonomists for decades. Once the relationship of the major ant lineages has been resolved, we can begin to unravel the mysteries of this exciting and important group of organisms."

"Ants are one of the most ecologically and numerically dominant families of organisms in almost every terrestrial habitat throughout the world, though they include only about 1% of all described insect species."

While a SFSU Biology master's student working with Dr. Greg Spicer, Corrie won the College of Science and Engineering's Graduate Student Award for Distinguished Achievement — the highest honor the University grants to graduate students with only one student recipient from each college.

Her article "Phylogeny of the Ants: Diversification in the Age of Angiosperms" was published in the April 7, 2006 edition of Science. Her photograph (left) was featured on the cover.

Corrie will receive a Ph.D. from Harvard University in May, and was awarded a Miller Postdoctoral Fellowship at UC Berkeley to investigate the population genetics and phylogeography of Australian ants.

Corrie believes her passion for ants will continue to grow. As she sees it, "the ecological dominance and fascinating biology of *Pheidole* poses many questions about life history evolution; by answering them, I hope to understand not only those factors leading to diversification of this dynamic genus, but of all other ants as well."



Corrie Saux Moreau collecting ants in Madagascar

Congratulations to the 2007 Student Award Winners!

Biology Hensill Endowment Scholarship

Bianca Dailey, Sabrina Kim

Janis Kuby Memorial Fund Scholarship

Rebecca Mendez

Nelson Scholarship for Conservation Biology

Vikash Jethwani, Briana McCarthy, Emily Merchasin, Bichloan (Michelle) Nguyen, Amelia Ryan

21st Annual CSU Student Research Competition— Biological and Agricultural Sciences

Natasha Chandiramani

2007 Student Project Showcase Graduate Life Science Division

Roberto Barrozo, Anya Burdick, Tara Cornelisse, Amanda del Rosario, Hani El Shawa, Hyunsoon Kang, Antonio Luna Jr., Molly Klein-McDowell, Wendy Rosenthal, Jeffrey Schinske

2007 Student Project Showcase Undergraduate Life Science Division

Izhar Batth, Karen Berry, Allison Dias, Amelia Rodelo, Michael Sanchez

Biology Education



SEPAL Director: Dr. Kimberly Tanner

How do students learn biology? What is particularly difficult for students to learn in Biology? How can teachers and scientists work together to make science teaching and learning in schools more like scientists practicing science in their laboratories?

Currently, the SEPAL (Science Education Partnership and Assessment Laboratory) research group is focused on two main lines of inquiry in science education:

First, they are interested in understanding the role of partnerships between scientists and teachers in influencing K-12 science education. They want to understand how interactions with scientists in classrooms affect students' perceptions of science.

Second, Tanner and her group want to

understand how science novices such as young children, non-science majors, and elementary and middle school teachers think about biological concepts.

According to SEPAL Director and Assistant Professor of Biology, [Kimberly Tanner](#), the SEPAL research group is "just like other science research groups. We ask questions about what we're interested in, design ways to collect evidence to address our questions, and analyze and share the data that we collect with other researchers."

SEPAL's goal is to bring together scientists and teachers to improve science teaching and learning for students kindergarten through college. To achieve this objective, the SEPAL program offers a variety of short and long term opportunities in partnerships, coursework, and research projects.

"...research in biology education holds the promise of revealing insights into novice pre-conceptions in biology that can guide strategies for curriculum development, teaching and learning."

Dr. Tanner teaches several courses including: BIOL 652, Science Education Partners in Biology. This 4-unit course partners SFSU undergraduate students with San Francisco elementary and middle school teachers to co-plan and co-teach hands-on science lessons.

SEPAL is also developing a Master's Degree Concentration in Biology Education Research, and a Summer Laboratory Research Partnership which would provide opportunities for teachers to participate in biology research projects with SFSU scientists.

SEPAL RESOURCE CENTER

The SEPAL Resource Center houses hands-on, minds-on science education materials that are available for checkout by any SFSU student, staff or faculty, or by any Bay Area science teacher. Materials include: books, videos, equipment, models, specimens, charts, posters, slides, and activity kits. The Resource Center staff can also provide supportive planning help for science lessons.

To visit the Resource Center call 415-338-6968. For more information, drop by Hensill Hall 245 or visit <http://www.sfsu.edu/~sepal> or email: sepal@sfsu.edu

If you would like to contribute support to the SEPAL program, email bionews@sfsu.edu

Partnering scientists and teachers to improve science teaching and learning for students kindergarten through college.

Germ Pose Hidden Threat for Students adapted from Claudine Morgan, Golden Gate XPress



PHOTO BY TED MENDOZA

Darlleen Franklin, SFSU's Microbiology Media Kitchen supervisor, was commissioned by [X]press to discover what types of bacteria and fungi live in the University's Gym.

Franklin swabbed the shower floor in the women's locker room, a barbell from the weight room, a bathroom door handle in the men's locker room, and a workout mat.

On the workout mat, Franklin found mold, a fungus, *Micrococcus* -- a common bacteria found on human skin or in water, dust and soil -and *Staphylococcus* -- another common

type of bacteria that can live harmlessly on skin, in the crevices of the ears, and in the nose.

What concerns Mitch Wasik, the head athletic trainer at SF State, is staph infections. *Staphylococcus aureus* can cause skin infections, but most are minor and can be treated without antibiotics.

But in the past few years, resistant *staphylococcus*, called methicillin-resistant *staphylococcus aureus* (MRSA), is becoming increasingly common in student athletes participating in close-contact sports, like basketball, wrestling and soccer, and in gyms.

MRSA is spread through direct physical contact or indirect touching of contaminated objects. It usually presents itself as some type of skin or soft tissue infection, such as pimples, abscesses or boils.

Wasik said they educate the student athletes, especially the ones in close contact sports, about what MRSA is and what it looks like. And to prevent the spread of infections, they educate student athletes about proper hygiene. The athletic department also takes

preventive measures, like cleaning the athletic equipment and the wrestling mats with germicides.

"A warm environment full of sweating bodies and exposed skin makes the gym a haven for bacteria and fungi growth."

The shower floor in the women's locker room showed the most types of bacteria. Among the common *staphylococcus*, *bacillus*, a common bacteria resistant to extreme heat or cold, was present.

"That's why we need to wear slippers," Franklin said, referring to the abundance of bacteria on the floor of the showers. Students are also advised to not touch their faces while working out, bring their own towels or even bring antibacterial wipes to wipe down the equipment before each use, and, above all, students need to wash their hands, thoroughly and frequently.

(Editor's note: Darlene performed a second test and found no MRSA in the Gym.)

MARTIN GRANTHAM

Before coming to SFSU in 1998, Greenhouse Manager, Martin Grantham, earned a degree in Botany from UC Davis, and worked for ten years at the [UC Botanical Garden](#) in Berkeley where he developed an outdoor collection of Mexican and Central American plants, and assisted UCBG's Curator with the scientific use of the collections. "I was attracted to SFSU's greenhouse managing position because I enjoy growing the wide array of plants -- from liverworts to orchids -- useful in illustrating plant structure and evolution. Also, I like being near active plant research."



PHOTO BY JUSTIN CHAN

The Department of Biology offers a major in Botany with emphasis in plant systematics and science. Biology's living plant collection (which includes 20 fern and fern ally families, 10 conifer families, and 150 flowering plant families) provides fresh material for supporting classes within the department, and for other departments as well such as Chemistry. Although no horticulture program exist at SFSU, the Greenhouse provides opportunities for student workers and members of the student organization, [Friends of the Greenhouse](#), to have hands on experience growing plants. However, managing the collection has been challenging. Until the new 8,640 sq. ft greenhouse (to be located on the north side of Hensill and Thornton Hall) is built, Martin must house most of Biology's collection in a temporary 800 sq. ft. greenhouse outside the Science Building. Because of the lack of space, Biology's tropical plant collection is being boarded at UC Berkeley's Oxford Tract and City College of San Francisco.

"I like to combine theoretical background with practical experience."

When not managing the greenhouse, teaching orchid cultivation at City College of San Francisco, and writing articles for "Pacific Horticulture," Martin travels to South Africa once a year to study woody irids. In the future, he would like to offer a basic skills course for student researchers on the growing of research plants.

GRETCHEN LEBUHN

Gretchen LeBuhn earned a B.A. in European Studies from [Vanderbilt University](#) before working on Wall Street. While she loved the immediacy of business, she wanted to learn more about the natural world, so she volunteered to study scorpions in Baja California with the late Dr. Gary Polis.



Dr. Gretchen LeBuhn

In time, she went back to school planning to study fish. She worked with Dr. James Thompson at [SUNY Stony Brook](#) lab. Thompson suggested that if she wanted to spend less time on how to do science, and more time doing science, that she look at the relationship between plants and insects. "I got what he was telling me," said LeBuhn, "so I started looking at plant pollinators." She went on to earn a M.S. in Botany from the [University of Connecticut](#), and a Ph.D. in Botany from the [University of California, Santa Barbara](#)

In January 2001, Dr. LeBuhn joined SFSU's Department of Biology faculty. "I was excited about the excellence and number of the ecology, evolution and conservation biology faculty," recalls Dr. LeBuhn. That year she also started a project with 12 colleagues to develop a standardized method for studying bees. At present, this network consists of researchers from 200 sites, including Canada and Brazil.

Today, Dr. LeBuhn's research interests can be grouped into two principal areas: the impacts of habitat change on pollinators and pollination, and the role of environmental variation in maintaining genetic and phenotypic variation within and among populations.

LeBuhn and her students study bees and pollination at twelve sites in Sonoma and Napa counties. Six of the study sites are surrounded primarily by vineyards; the other six sites by oak woodland. Using a combination of monitoring and experimental approaches, LeBuhn's group is evaluating land use and developing strategies for restoring habitat and minimizing the impact of vineyards in regions undergoing development.

According to Dr. LeBuhn, most research done on oak woodlands has focused on trees, vertebrate wildlife and/or endangered species. But, the primary pollinators in these areas are solitary bees which are also important pollinators for many native plant and crop species. Because bees do not pollinate grapes, the conversion of oak woodland to vineyard presents an especially difficult problem for them because they lose both nesting habitat and food resources. "The remaining wild habitat fragments in heavily converted landscapes like the Napa Valley are the equivalent of island refuges in an inhospitable sea," said LeBuhn. "To effectively manage these mixed-use landscapes we need to understand what is needed to allow them to maintain a diverse bee fauna, and to develop methods for reducing the inhospitality of the surrounding matrix."

***"One of every three bites of lunch
you take probably come from a plant
pollinated by wild pollinators."***

The next step for Dr. LeBuhn is focusing on evaluating ecosystem services. According to LeBuhn, economists and ecologists

have started working together to find a way to place an economic value on the contribution of natural ecosystems to human existence. The estimates are eye-opening. For example, pollination services from wild pollinators in the US alone are estimated at four to six billion dollars per year. While these ecosystems are currently produced for "free," replacing the natural ecosystem would cost many trillions of dollars. As a first step, Dr. LeBuhn and her lab are evaluating pollinator service in the San Francisco Bay area.

Did you know that the Harry D. Thiers Herbarium, located in Hensill Hall Room 429, houses the largest collection of mushrooms west of the Mississippi?

To learn more about the herbarium, visit <http://www.mycena.sfsu.edu>

To learn more about Biology's mushroom hunter extraordinaire, Dr. Dennis Desjardin, visit: <http://www.sfsu.edu/~biology/pages/gpages/desjardinq.html>



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HANI EL SHAWA



PHOTO BY JUSTIN CHAN

**Hani El Shawa (left) with
Dr. Megumi Fuse**

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As an undergraduate physiology student, Hani El Shawa was not sure whether he wanted to go to medical school or earn a Ph.D. until he had an opportunity to work on an independent research project with [Dr. Megumi Fuse](#). The goal of the project was to modify a protocol using a digestive enzyme assay to measure trypsin that could be used during a 3-hour undergraduate physiology lab session (BIOL 613). The project was a success, left Hani with a passion for research, and inspired him to continue on as a Physiology and Behavioral Biology graduate student focusing on neurobiology and neurophysiology.

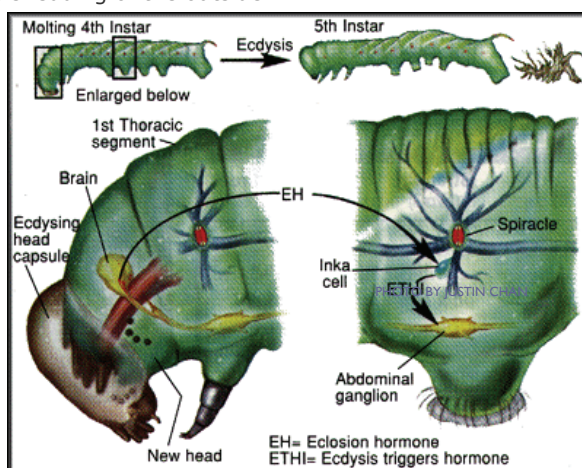
In the Fuse lab, Hani studies the neuropeptides and hormones that trigger a behavior called ecdysis (the shedding of the outside cuticle during molting) in the tobacco hornworm, *Manduca sexta*. (See photo top right.) The current theory is that an Ecdysis Triggering Hormone (ETH) acts on neurons in the brain to trigger the release of the Eclosion Hormone (EH). EH causes a subsequent increase in a cyclic nucleotide, cGMP, that signals the release of hormones that initiate the muscle contractions that will loosen *M. sexta*'s skin to begin the molt.

For Hani's thesis project, he gathered supporting evidence that ETH target sites exist downstream from the brain. He found through electrophysiological analysis of abdominal ganglia nerves that ETH is capable of initiating muscle contraction directly from the central nervous system, and in the absence of the brain. In



Photo by Hani El Shawa

January 2007, he presented his research at the Society of Integrative and Comparative Biology and the Bay Area Neuroscience Gathering.



Truman JW (1996). Ecdysis control sheds another layer. *Science* 271: 40-41

"My work in the Fuse lab has given me the skills necessary for success in research: independent experimental design and experience with immunocytochemistry, enzyme and protein bioassays, animal dissections, electrophysiology, and statistical analysis of data."

Hani is skilled at multi-tasking. When he's not in the lab, he works as a teaching assistant for

BIOL 611, the human physiology lab for non-biology majors, mentors undergraduate physiology students, wins awards including an independent research award and the Graduate Student Council in Biology Scholarship—and works in his family's restaurant located in San Francisco's North Beach.

Hani will graduate in May 2007. His goal is to earn a Ph. D. then either teach or work as a medical researcher.

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Biology Department Looking to Expand

adapted from Jennifer Thomas, Golden Gate [X]press

The Biology department is planning to implement a prestigious two year graduate program that will place SFSU in the company of schools such as Stanford, UCLA and the Georgia Institute of Technology, which already offer similar programs.

The Professional Science Master (PSM) degree will integrate scientific research with business skills such as marketing, management, statistics, writing and communication.

"Work force development is the direction we want to go in," said Associate Professor, [Lily Chen](#), who will lead the PSM program. "That is why 25 percent of the curriculum will focus on teamwork and communication."

The [Alfred P. Sloan Foundation](#) provided an \$891K grant to 12 CSU campuses to launch the programs, with a portion of the donation going to SFSU.

Biotechnology and regenerative medicine will be the emphasis of SFSU's PSM learning environment. The PSM degree program will be directed toward students who intend to get jobs immediately after obtaining their master's, rather than going on for a Ph.D. According to Chen, the program will include a three to six month internship to better prepare students for what lies ahead. The goal is to recruit students with science-related bachelor degrees, preferably pertaining to biology, such as biochemistry, microbiology and biotechnology majors. The faculty predicts that the majority of the students who will enroll in the new master's program will be returning SFSU students, and bio-tech students attending City College of San Francisco.

According to the Council of Graduate Schools, "CSU anticipates producing more than 1,100 PSM graduates in the program's first five years."

In the meantime, Chen and her colleagues are doing research to find the optimal course content. "My goal," said Chen, "is to find how we can provide the best quality curriculum. We will do it right, we will do it well."

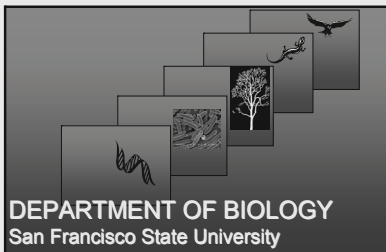
For more information on visit: www.calstate.edu, www.sfsu.edu/~psm or email: lilychen@sfsu.edu



PHOTO BY DAVID BIEBER

Northern California PSM Directors

Left to right: Drs. Lily Chen (SFSU), John Nishio (CSU Chico), Eric Seuss (CSU East Bay), Stephan Crothers (San Jose State), Janey Youngblom (CSU Stanislaus), and Shirley Kovacs (Fresno State) (not in photo).



on by faculty, lecturers and staff.

An overwhelming majority picked the entry (left top) submitted by plant ecology professor, Dr. [Tom Parker](#) (right). As one voter explained, the new logo "incorporates the research and teaching of the whole department."

Runner-up designs were submitted by staff member, Lily Fung, and student, Saleema Fazal.

Readers: Let us know what you think of the new logo! Email: bionews@sfsu.edu

THE DEPARTMENT GETS A NEW LOGO!

In March 2007, the Department of Biology sponsored a department logo design competition. Open to all faculty, staff and students, the design had to be original, represent the Department of Biology, consist of no more than three colors, read well in black and white, and be appropriate for both large and small size prints. Choosing from among the over 20 entries that were received, competition judges Drs. Nan Carnal, Lily Chen, Mike Goldman, Zheng-Hui He, Bob Patterson, and "Bio News" editor, Colleen Francis, selected four designs which were voted



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Reader's Poll

Should Biology undergraduates be required to pass a bio-ethics course before they can graduate? Why?

Email your response to bionews@sfsu.edu