Bio News

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INSIDE THIS ISSUE:

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SAN FRANCISCO STATE UNIVERSITY

A Word from the Chair

I'm thrilled to have this chance to share with you some of the exciting events and changes we've seen in the Department of Biology in recent months. First, I want to thank Dr. John Hafernik, who served our Department for more than a decade as Chair, shepherding us through a remarkable transition from just a trickle to now a flood of Federal research funding, and a sweeping six-year renovation and earthquake retrofit.

Commencement was exciting. Dr. Kenneth Fong (BA '71, MA '74), biotechnology entrepreneur and venture capitalist, spoke as the University's Alumnus of the Year, and was later appointed to the CSU system-wide Board of Trustees. Cell & Molecular Biology student TaiJuana Sylvester accepted the Master's hood on behalf of the entire graduate school. We're so proud!!

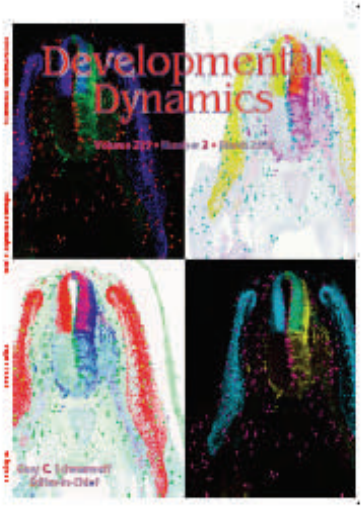
We're pleased to have Dr. Nan Carnal leading us in undergraduate and curricular development, and Dr. Zheng-Hui He building our graduate programs and research infrastructure. We've joined other departments in the College in forming a Center for Computing for the Life Sciences for work at the cutting edge of biotechnology and information technology, and a Center for Science Education. Programs just in early-stage development include a Professional Science Master's Degree in Biotechnology & Regenerative Medicine, an MS concentration in Biology Education, a multi-campus MS in Genetic Counseling, and a Center for Bay Area Conservation.

You'll read, in this first issue of *Bio News*, about Diana Chu's groundbreaking work, featured on the cover of *Nature*—arguably the most prestigious scientific journal in the world. And how our students, past and present, continue to make their mark on the academic and professional worlds. We couldn't wait to share all this with you, and we're hoping you will write to us, tell us what you think, and share news about your career, family and friends. Better yet, come back and see us.

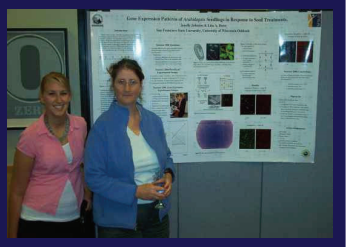
- Michael Goldman

SFSU Biology's People in the News

(Left) "Worm's Sperm" The photography of Dr. Diana Chu was featured on the cover of the September 7, 2006 issue of *Nature*. (For more information, see page 3)



(Right) Dr. Laura Burrus' photographs were featured on the cover of the March 2006 issue of *Developmental Dynamics*.



Janelle Johnson (left) with mentor, Dr. Lisa Dorn

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Student Profile—Janelle Johnson

Cell and Molecular Biology student, Janelle Johnson, originally planned to major in Business, but soon after coming to SFSU, she changed both her mind and her major. Changing to a science major was a challenge, Janelle recalled, "a hands-on lab experience was new to me, but I was able to adjust rather quickly."

Looking for more research experience, Janelle attended a graduate school fair held at SFSU, and learned about undergraduate summer research programs. She researched the web and found the National Science Foundation website which listed more summer programs. "I looked for those programs whose application dates hadn't passed, and applied to all of them," said Janelle. "In March 2006, I learned that I had been accepted into the Proteomics and Functional Genomics program at the University of Wisconsin Oshkosh."

"The first two weeks I attended an intense eight hours a day, five days a week lab course that introduced different lab techniques, including SDS-PAGE, 2-D gels, Western blotting and PCR. Afterwards, in addition to attending journal clubs, and meeting with other professionals in the field, each student worked on individual research projects. "

Under the direction of Dr. Lisa Dorn, Janelle worked with the plant, *Arabidopsis thaliana*.

Gene microarray technology was used to identify 'plasticity genes' which change the plant's phenotype to fit differing environmental conditions. Janelle looked at the timing of reproduction (days to bolting) of cold vs. non-cold treated seeds. Prior research in Dr. Dorn's lab showed that different treatments of the seeds affected the timing when the plants will bolt. The future goal is to monitor changes in both global and tissue-specific gene expressions in different environments.

Looking back at the nine week program, Janelle believes that the best thing about her research experience was how it altered her way of thinking about biology.

"I used to just memorize what I learned from reading my textbook, but now I can think of a problem and know what methods to apply to find the solution."

Janelle will graduate in May 2008, and plans to attend graduate school to earn a master's degree, and maybe later, a Ph.D. She hopes to work in the private sector researching genetics and/or disease.

Staff News

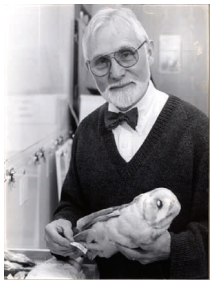
Meet Laura Cochrane

Undergraduate Laboratory Manager, Laura Cochrane, is a very busy person. She provides instructional support for four general biology courses that serve approximately 375 majors and 600 non-majors per semester — all in all, some 36+ labs! Since joining the Biology Department in January 2006, Laura is the person to call when these labs need reagents, lab equipment, plants and other live materials. She also pretest protocols, troubleshoots problems, provides laboratory safety instruction, aids in the development of new lab exercises, and supervises 5-6 graduate assistants.

"I enjoy putting together a quality undergraduate laboratory experience."

After earning a B.S. in Physiology in 2001, Laura worked with Dr. Sally Pasion as a research technician for four years. In 2005, she switched gears, became a plant ecology master's candidate, and now works with Dr. Tom Parker researching Manzanita seed morphology and its relation to fire ecology.

In Memory — Robert Bowman, Ornithologist and Protector of the Galapagos



Robert Bowman, retired SFSU Biology Professor and renowned ornithologist, died, at the age of 80, on March 12, 2006 of heart failure at his home in Berkeley.

Professor Bowman joined the SFSU Biology faculty in 1955, taught both graduate and undergraduate courses on comparative anatomy and ornithology, and conducted 15 research trips to the Galapagos Islands until he retired in 1988. Many who knew him marveled at his humor, enthusiasm and uncanny ability to mimic the sounds of the birds he studied.

Bowman was dedicated to protecting and preserving the wildlife and ecology of the Galapagos Islands, which he and his wife, Margret, first visited in 1952. Throughout his professional career, Bowman produced ground-breaking work on the morphology, behavior and song evolution of Galapagos finches -- the birds which helped to shape Charles Darwin's ideas about evolution.

As a result of the increasing threat on the island's biodiversity by the human population, Bowman, along with an international group of scientists and conservation organization representatives, created the Charles Darwin Research Station, located on the islands, and the Charles Darwin Foundation whose mission is to provide support to ensure the conservation of the Archipelago environment and biodiversity through scientific research. Bowman also worked to convince the Ecuador government to designate the entire archipelago as a national park, and for his effort, he received the Republic of Ecuador's Medal of Honor in 1964.

Professor Bowman served as the President of the Pacific Division of the American Association of the Advancement of Science from 1981-83. He was a founding director of the Oceanic Society, editor of three scientific books and numerous research articles on the Galapagos, and board member of many natural sciences organizations including the California Academy of Sciences.

If you would like to make a donation to SFSU's Biology Department in memory of Professor Bowman, please visit www.sfsu.edu/~biology, select the Biology Department on the drop down menu, and write "Robert Bowman" in the "Comments" box. Your generosity is greatly appreciated!

"Bob Bowman was a great teacher and colleague and one of my heroes."

John Hafernick. Professor, Biology

Chu's Discovery Advances Infertility Research adapted from Denize Springer, SF State

Research on the DNA in the sperm of tiny soil worms sheds new light on the causes of human male infertility. Assistant Professor, Diana Chu, is lead author on the paper, "Sperm Chromatin Proteomics Identifies Evolutionarily Conserved Fertility Factors," which identifies new proteins critical to the production of healthy sperm. Chu's cutting-edge research is the cover story of the September 7, 2006 issue of Nature.

Male infertility contributes to about 30 percent of reproductive failure in the United States. "Male fertility treatments go around the cause," Chu said. "No one knows the molecular basis of infertility ... how the proteins work." Her research concentrates on identifying these causes. The identification of the factors that function in fertility and reproduction could define new avenues for understanding human male infertility, finding appropriate treatments, and/or identifying male contraceptive methods.

Chu uses the one-millimeter long worm, *Caenorhabditis elegans*, as a model for understanding how the DNA content of sperm is assembled. "This species is very useful to us because its genome is completely sequenced," Chu said. "It does many of the same processes that we do but the complex process of making sperm is much simpler in worms than humans."

The idea for Chu's research came from the observation that the way worm sperm DNA is packaged looked similar to that of humans. "We decided to look for proteins that associate with sperm DNA and found that they are important for fertility in *C. elegans*," Chu said. Her team also found that the majority of proteins in the worms have similar counterparts in mice and humans, and that some mice proteins were required for fertility.

"As with all research, we began with an idea and a few hunches. But unlike most explorations, almost every one of these ideas turned out to work."

New Faculty

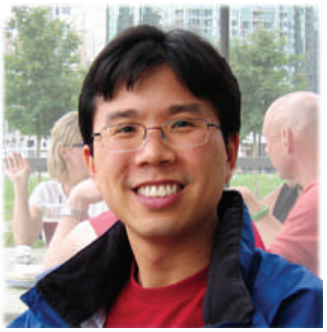
Joseph Chen

Joseph Chen's decision to become a research scientist occurred between his college sophomore and junior years when he had the opportunity to work as a summer research intern at the University of Pennsylvania's Department of Radiation Oncology. That experience also contributed to his decision to join the Biology faculty in August 2007. "I wanted to teach at an undergraduate institution such as SFSU," said Chen, "where we can promote the development of future researchers."

Dr. Chen received his B.S. in Biology with Honors from Harvey Mudd College in 1995. As an undergraduate he was awarded the Barry M. Goldwater Scholarship. From 1995-2001, he was a National Science Foundation Pre-doctoral Fellow in Harvard University's Ph.D. program in Biological and Biomedical Sciences. Returning to California, Chen was a post-doctoral fellow at Stanford University (2002-2006) where he was awarded the Ruth L. Kirschstein National Research Service Award from the National Institutes of Health.

Dr. Chen studies two model organisms, *Caulobacter crescentus* and *Sinorhizobium meliloti*, to learn how they employ multiple regulatory mechanisms to organize and place their subcellular components correctly — especially at the cell pole. He is also examining the roles of bacterial cell polarity in symbiotic interactions with other organisms.

His future research goals are to analyze the mechanisms that control temporally and spatially-specific proteolysis, identify the factors that contribute to differential cell fates following asymmetric division, and assess the functions of conserved polarity determinants in the symbiotic relationship between *S. meliloti* and alfalfa.



"I am a very visual person and like spatial , architectural arrangements. I think that's why I became interested in learning more about how bacteria organize subcellular components and the resulting physiological impact."

Because the bacteria he studies are closely related to a highly infectious pathogen, *Brucella*, Chen believes his research may contribute to the future development of antibiotics. His research on the symbiosis between rhizobia and plants may also help to reduce the need for fertilizers.

Currently, Dr. Chen is setting up his research lab on the 6th floor of Hensill Hall. He will be teaching the general microbiology lab in Spring 2007.

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