Issue 6

Spring 2009

SAN FRANCISCO STATE UNIVERSITY DEPARTMENT OF BIOLOGY

BioNews

Congratulations 2008/2009 Graduates!

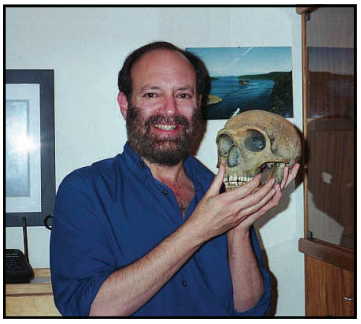
A Word from the Chair

Dear Alumni and Friends:

As another exciting academic year draws to a close, I am moved once again at the stunning accomplishments of our students, alumni, faculty and staff. Just a few examples will have to suffice. Dr. Carmen Domingo led a successful effort to obtain more than $1.7 million from the California Institute for Regenerative Medicine for a program to develop a talented, diverse workforce in human stem cell biology. Dr. Kimberly Tanner's published *Science* paper on the emerging phenomenon of University Science Departments hiring faculty with education specialties solidified our Department's position as a pioneer. Dr. Gretchen LeBuhn now boasts 65,000 requests from all over the world to join her citizen-researcher quest to understand the crucial role of bees as pollinators in maintaining our environment and food supply.

The field behind Hensill Hall is now home to a state-of-the-art Greenhouse. We have three rooms dedicated to teaching collections, and seven housing funded research projects, including Dr. Zheng-Hui He's studies of light captured in photosynthesis *(see page 2)* and Dr. Tom Parker's groundbreaking work on the diversity and survival of unique Manzanita species. *(See page 5)*

Last year's personalized medicine conference was so well received we are hosting Personalized Medicine 2.0—Bioinformatics: Mining the Data on June 4. Speakers include biotechnology financier Steve Burrill, alumni Drs. Hilary Clark and Esteban Burchard, and, as emcee, ABC-7 news anchor and science reporter Carolyn Johnson. Genentech, Navigenics, Novartis, Affymetrix and Pathwork Diagnostics will be among the companies represented. *(For the full story, see http://personalizedmedicine.sfsu.edu)*



I hope you will stay connected with us through attending upcoming events and by visiting our new website: http://biology.sfsu.edu. And remember, in these tough economic times, we really depend on your contributions to allow us to serve the next generation of leading biologists and citizens.

Warmest regards,

Mike Goldman

Inside this issue:

Reach Us

Department of Biology
San Francisco State University
1600 Holloway Avenue
San Francisco, CA 94132
415-338-1548/1549
biology@sfsu.edu
http://biology.sfsu.edu

Editor: Colleen Francis
Photographer: Justin Chan

For address changes: silver@sfsu.edu

Award-Winning Lecturer Researches Brain Tumor Disease

Isaac Yang, M.D., has a passion for glioblastoma research because he believes that "innocent people who have none of the risk factors for other diseases—no smoking, no overeating, nothing—get this terrible disease."

Dr. Yang is a researcher at the University of California, San Francisco Department of Neurological Surgery's Brain Tumor Research Center. His interest lies in skull base tumors and glioblastoma translational disease, especially glioblastoma multifome (GBM), the most common and deadliest form of brain cancer which received public attention after Senator Ted Kennedy was diagnosed with the disease.

Dr. Yang received his undergraduate degree in Molecular and Cell Biology from UC Berkeley in 2000, and his medical degree in 2004 from the UCLA Geffen School of Medicine where he received the Dean's Outstanding Scholar Thesis Award. Since that time, he has won many awards including the American Association of Neurological Surgeons Leksell Award (2009), San Francisco Neurological Society's Kaiser Award (2009), Ruth L. Kirschstein National Research Service Post-Doctoral Fellowship Award (2008-2009), American Medical Student Association's Golden Apple Award (2001, 2003), and Distinguished Mentor (2005).

Dr. Yang's first introduction to the Department was as a guest lecturer for health professions professor, Dr. Barry Rothman. When the opportunity to teach BIOL 326, Human Diseases, came up in Fall 2008, he jumped at it. In Spring, he taught BIOL 640, Cellular Neurosciences.

"What I love most about teaching is the opportunity to motivate and inspire students to make a difference against GBM. We have a few students now, but we could always use more brains against this disease."

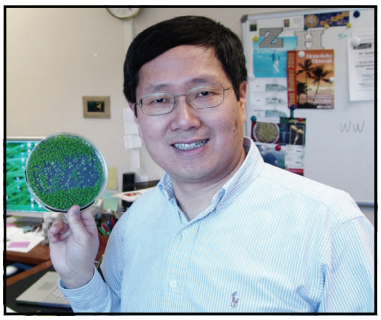
"I got involved with the Department," recalls Isaac, "because of the enthusiasm and passion faculty have for our students, and because of the influence and impact the SF State community has on the City. Our students set the pace and the trends; they have the ability to change the world, cure diseases and make a difference."

Dr. Yang can be contacted at: yangi@neurosurg.ucsf.edu.

Biology in the News

- **Professor discovers ultraviolet-B light sensing mechanism in plant roots**

Zheng-Hui He and his colleagues discovered an important gene that is a vital player in sensing environmental ultraviolet-B light and regulating plant growth and development.



- **Professor receives Outstanding Scientific Achievement Award**

Laura Burrus was awarded the CSU 2009 Biotechnology Faculty Research Award for her work on how Wnt intercellular signaling pathways participate in embryonic development and in cancer.

IN MEMORY

Diana Smith-Beckerman

1955-2009

Teacher, Scientist, Mentor

Diana Smith-Beckerman died January 26, 2009 at the age of 53 after a long struggle with breast cancer.

She earned a B.S. in Medical Technology from Marquette University (1976), and a Ph.D. in Microbiology-Immunology from State University of New York, Roswell Park Division (1987). Before joining the Center for Biomedical Laboratory Science (CBLS) in 1995 as an Assistant Professor in Clinical Chemistry, Dr. Smith-Beckerman was a post-doctoral fellow in Cancer Research Immunology at the University of California, San Francisco. In 2003, CBLS merged with Biology, and she joined the faculty as an Associate Professor.

Dr. Smith-Beckerman taught Mediators of inflammation in Health and Disease, Clinical Applications of Protein Chemistry and Clinical Enzymology. Kiranjit Grewal met her in 2005 when she enrolled in Diana's Immunoassay Techniques course, and remembers "she prepared us for tests by playing "Jeopardy" just like the show before each exam. I thought that was very creative of her, and it engaged all the students in learning. She was full of energy, always coming to class with a stack of lecture notes in one hand and pulling her laptop and projector with the other." Biology Professor Lily Chen recalls "It was common for Diana to spend long hours with students conducting research projects, and overseeing laboratory instruction late into the night."

In addition to serving on 49 thesis committees, Dr. Smith-Beckerman was a member of SF State's Radiation Safety Committee (1996-98), Committee for Curriculum and Academic Standards (1998-2000) and Biology's Scholarship Committee (2006-08). A Bay Area Proteome Group member (1997-09), she worked with biotechnology industry and university scientists to organize meetings and seminars to foster professional advancement for scientists and students alike.

"Step-by-step, you glided into the lattice of life with grace and dignity.

Step-by-step, you climbed the ladder of science with honors and determination."

by ***Dr. Lily Chen from her poem composed in memory of Diana Smith-Beckerman***

Dr. Smith-Beckerman's research was in proteomics which includes the characterization of the expression of cellular proteins in normal, benign, diseased and malignant cells. She collaborated with other researchers to identify cellular proteins that are altered in ovarian cells, and may have the potential to be predictive markers of hereditary ovarian carcinoma. She also collaborated in identifying target proteins for posttranslational processing of CaaX C-terminal residues found in Ras proteins, and are responsible for proper membrane localization. Specific inhibitors that interrupt this processing pathway may have a substantial therapeutic potential due to the important role of proper orientation of Ras proteins in oncogensis. Her research was funded through National Institutes of Health AREA and RIMI grants, and published in numerous peer reviewed articles. She also contributed to nine book chapters.

Diana, a graceful ballroom dancer and devoted Oakland Athletics baseball fan, also participated in several health studies. Twice a year she traveled to Bethesda, MD to take part in a NIH sponsored clinical study for patients with lymphangioleiomyomatosis, a rare lung disease. She joined a study to learn if animals could detect cancer. Shadow, her Cocker Springer spaniel mix, rode to doctor appointments with her, and according to Diana, "knew something was different when I went through chemo and radiation therapy." She thought dogs, due to their keen sense of smell, might be able to detect external manifestations of some cancers such as melanoma.

"Under the greatest adversity," said retired CBLS Director, Dr. Bill Bigler, "Diana did everything possible to contribute to her students, her scientific research specialty and her family."

To make a donation in memory of Professor Smith-Beckerman, visit http://biology.sfsu.edu and click on the "Make a Difference" link. Please write "In Memory of Diana Smith-Beckerman" in the "Comments" box.
THANK YOU

An Extraordinary Student

Seeking Challenges and Giving Back to the Community

Jasmin Reyes is pursuing a Master's degree in Cell and Molecular Biology because she likes the challenge of facing the subject that had at one time intimidated her. She now finds deciphering molecular mechanisms exciting, but her road to academic achievement began a little bumpy. "My parents, aunts and uncles are all immigrants from the Philippines, and I was the first of my generation to go to a university—one that was 400 miles away from home! Leaving my close-knit family was really difficult, and I didn't do well as an undergrad at UC Berkeley. Because of my poor grades, my advisor suggested that I not major in science, and that really hurt. I look back now, and wonder why she just didn't take the time to get to know my situation, and help me find a tutor. I started doing endocrinology research that involved both bench and field work with Dr. Tyrone Hayes, and the hands-on experience plus a mentor who believed in me helped me gain the confidence to continue pursuing science."

She chose SF State's graduate Biology program because of the University's diverse community and the teaching spirit her advisor, Dr. Leticia Márquez-Magaña, embodies. "The Biology faculty," said Jasmin, "are passionate in helping us young researchers develop the necessary skills to become successful scientists."

In the lab, Jasmin observes the behavior of *Bacillus subtilis*, a non-pathogenic bacterium, during starvation. She is looking for an adaptive response called "bacterial cannibalism" in which sibling cells are killed based on their different expressions of a sigma factor called sigY—a protein which binds to the RNA polymerase enzyme, and 'carries' it to the genes that need to be 'turned on.' Jasmin studies sigY autoregulation using QPCR to measure sigY gene expression. She investigates the nature of cell lysis (death) using cell-free media assays. "Through cell death," she explains, "nutrients become available for consumption. We suspect that when cells are starving sigY and a temperate prophage (SP β) work together to regulate cell lysis, so that surviving cells (those expressing normal sigY levels) can eat the dead cells (those that had expressed low sigY levels)." Jasmin's research supports the concept of population heterogeneity – that within a population there are differences in gene expression that yield different phenotypes despite the fact that they have identical genomes. Thus, bacterial populations may be more like multicellular organisms than simple clonal masses of cells.

Jasmin Reyes and Dr. Leticia Márquez-Magaña

"I like to dig deeper into things—looking beyond the obvious in search of a new perspective or connection. I seek challenges because they help me to always grow. I'm a life-long learner. I love the pursuit of knowledge."

Jasmin is always seeking ways to give back to the community. In 2008, her team was awarded a SFSU-UCSF U56 Cancer Awareness Mini-Grant which she used to teach middle school girls of color about the Human Papiloma Virus (HPV), how it causes cervical cancer, and how it can be prevented with the HPV vaccine and pap smears. She participates in Biology's Spectrum program through which she co-teaches an after-school science club at James Lick Middle School encouraging girls to become interested in biomedical research. And, she tutors disadvantaged lower division undergraduates for SF State's Summer Science Institute.

In 2008, she participated in Stanford's Comprehensive Cancer Research Training Program, and has developed an interest in translation medicine, especially immunotherapy research. A cancer health disparities class (HED 330/BIOL 332) has fueled her interest in public health research.

Jasmin will graduate in Summer 2009. Her goal is to become a biomedical research physician. She can be reached at jasminreyes@gmail.com

Solving a Botanical Mystery

Identifying a one-of-a-kind Manzanita Tree

Hillson's manzanita plant (top), Rose Hillson (top right), Mike Vasey (wearing hat) and Tom Parker in front of a Manzanita they named *A. gabilanensis (left)*

When Biology professor, Tom Parker, and lecturer, Mike Vasey, learned that Friend of the Department, Rose Hillson, had a Manzanita growing on serpentine under a blanket of ivy in her yard, they were intrigued. And, when they discovered that she lived on Parker Avenue where the old Laurel Hill Cemetery was established in 1853, they suspected her plant could be something out of the ordinary.

Dr. Parker studies Manzanitas (*Arctostaphylos)* which he describes as "endlessly fascinating." Parker and Vasey wrote a treatment for *Arctostaphylos* for Flora of North America and the Jepson Manual of Higher Plants of California (2nd edition) with Jon Keeley of the USGS.

"Having to learn a number of species has put me in the top five of people who understand Manzanita taxonomy."

For nearly 20 years, Parker has been asking "why are so many Manzanitas difficult to distinguish, and how did California end up with so many of them?" Ninety-five sun-loving Manzanita species, characterized by their rich red-brown smooth bark, grow in California. On San Francisco's sandy dunes, two Manzanita species were known to thrive: the Presidio Manzanita (*A. montana* ssp. *ravenii*) and a serpentine endemic now thought to be extinct in the wild — the Franciscan Manzanita (*Arctostaphylos franciscana*).

At first, Parker and Vasey were excited by the possibility that Hillson's plant might be a surviving Franciscan Manzanita, but the young stem and flower stalk structure were different. "What it really seemed to cluster with was a plant from the southern Santa Cruz Mountains that Mike and I named *Acrotstaphylos ohloneana*," said Parker.

The process of identifying Hillson's plant began by testing the tree's morphology, then genes were sequenced, chromosomes counted and aligned with a relationship tree before Parker identified it in April 2009 as a new subspecies of *Arctostaphylos bakeri* —a small tree normally restricted to a few serpentine sites near Occidental in Sonoma County. Parker and Vasey are still considering whether to name the plant, but probably will.

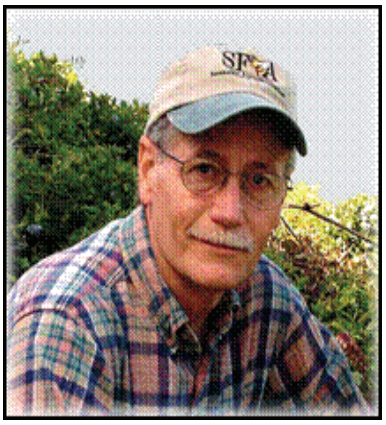
Dr. Parker earned his Ph.D. from the University of California, Santa Barbara before joining the Biology faculty in 1980. He teaches Ecology of California, Plant Ecology, Fire Ecology and Community Ecology. Mike Vasey teaches Our Endangered Planet. To learn more about Dr. Parker's research, visit: http://userwww.sfsu.edu/~parker/index.html.

Editor's Note: Rose Hillson sought and won landmark status for her tree in September 2008.

A Brief Look at Department History

Two Chairs: Remarkable Men, Remarkable Achievements

John Hafernik 1992-2005



John Hafernik earned his B.S. in Entomology from Texas A&M University in 1970, and his Ph.D. in Entomology from UC Berkeley in 1977.

Dr. Hafernik promoted a vision of a department where excellence in teaching and research go hand-in-hand.

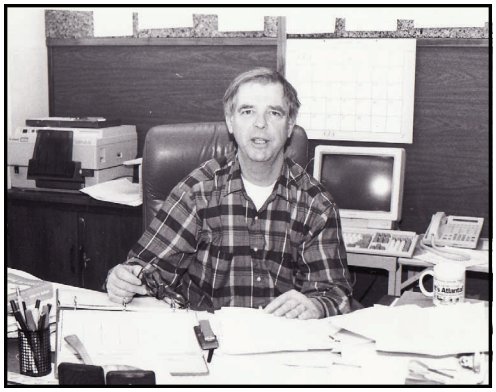
Under his leadership, the Department housed one of the top masters-level programs nationwide, and achieved a national reputation for excellence in training students—especially women and minority students—in biology. Thirty-one outstanding tenure-track faculty members were hired, including 12 women, 12 minority scientists and the first education specialist.

Dr. Hafernik worked to synergize opportunities for students and faculty to do world-class science. He launched a joint master's program with the California Academy of Sciences, and fostered close relations with the Romberg Tiburon Center through joint faculty hires and research and teaching collaborations.

While Chair, he shepherded the Department though the remodeling of Hensill Hall, and the establishment of the Conservation Genetics Lab.

Dr. Hafernik currently serves on the California Academy of Sciences' Board of Trustees and was elected the Academy's President in 2008. He is also President-Elect of the Pacific Division of the American Association for the Advancement of Science and will assume its presidency at the division's annual meeting jointly hosted by SF State and the California Academy of Sciences in August 2009.

Crellin Pauling 1983-1992



Crellin Pauling (1937-1997) received his baccalaureate degree from Reed College in Portland, Oregon, and his Ph.D. in genetics from the University of Washington, Seattle. He came to SF State from UC Riverside where he was a successful teacher, researcher and administrator.

Under his leadership, the rapidly growing Department of Biology became a visible force in research and an innovative center for teacher education. In 1989, SF State received a National Science Foundation grant to offer recombinant DNA workshops for high school teachers. At that time, the program was the only one of its kind in the country.

Dr. Pauling oversaw the addition to the curriculum of two major courses: Introductory Biology 1 (BIOL 230) and Introductory Biology II (BIOL 240)

He was keenly interested in biotechnology education and an enthusiastic supporter of the California State University Program for Education and Research in Biotechnology (CSUPERB) created to meet the needs of the life science industry. The program involves students and faculty from the Biology, Chemistry, Engineering, Agriculture, Business, Math and Computer Science departments at all twenty-three CSU campuses.

To honor Dr. Pauling for his extraordinary contributions to the training of teachers and scientists and his commitment to the creation of a scientifically literate electorate, each year CSUPERB sponsors the Crellin Pauling Student Teaching Award.

Where are they now?

Do you recognize these Biology alumni? Our best guess is that the photos were taken in the late 1950's or early 60's. If you can identify anyone, please let us know by emailing silver@sfsu.edu.

We asked 2007/2008 graduates to complete an exit survey—below is some of what we learned.

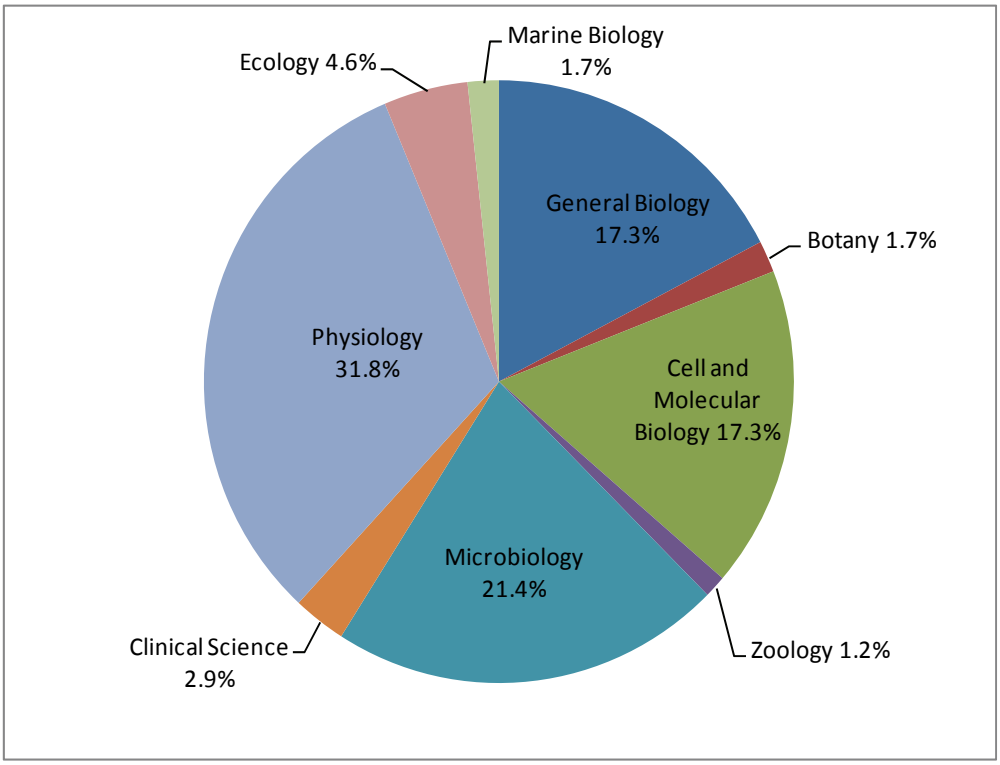
52% agreed that their experience with SF State Biology courses were superior to their experience with biology courses at other institutions.

57% came to SF State specifically for one of the specialized Biology majors. *(See pie chart below left.)*

71% would recommend SF State's undergraduate biology program to potential students.

73% were more enthusiastic about Biology now than when they started their biology major at SF State.

2007/2008 Graduates (N=173) enrolled in the majors below:



Your contribution ensures our continued history of providing students excellence in teaching and research.

And, your gifts are tax-deductible.

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Thank you!

Department of Biology
San Francisco State University
1600 Holloway Avenue
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June 4, 2009

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- ✓ Hear panel discussions by Bay Area research, diagnostic, investment and academic leaders.

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http://personalizedmedicine.sfsu.edu

Letters

Maintaining a strong relationship with our alumni and friends is vital to our mission. We want to know about your accomplishments, read your letters to the Editor, see your photos (please provide captions), and learn about your memories as Biology students, faculty, staff, or lecturers. Email to silver@sfsu.edu or mail to: Colleen Francis, Department of Biology, San Francisco State University, 1600 Holloway Avenue, San Francisco, CA 94132.

Stay up-to-date on Department, College and University news, community events, grants and scholarships, educational, research, internship, employment and volunteer opportunities, by receiving the weekly electronic "Bio Bulletin" sent every Tuesday. To subscribe: email silver@sfsu.edu.

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