



FEATURING THE PEOPLE AND PROGRAMS OF SF STATE'S DEPARTMENT OF BIOLOGY

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DEPARTMENT OF BIOLOGY

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**BioNews is published
twice a year and sent
to over 7,000 Alumni
and Friends of the
Department.**



To Alumni and Friends from Dr. Michael Goldman, Department Chair

You've no doubt been seeing SF State's Department of Biology in the news a lot lately. John Hafernik's work on bees infected with phorid fly parasites (see page 4) has attracted international attention, and the San Francisco Chronicle tells of John's work on their own rooftop beehive as I write these words. In the same edition of that newspaper, SF State President Robert A. Corrigan, retiring this year after nearly a quarter of a century leading our institution, laments the failure of the California government to recognize and support the systems of higher education that make California Ground Zero for innovation in high technology and biotechnology. In fact, these years have seen a continual evolution on our campus, reducing our dependence on State funding, and relying ever more heavily on Federal grants, corporate gifts, and on your generous support (see page 2).

We are saddened by the passing of Professor Emeritus Claude G. "Alex" Alexander, an amazing parasitologist, researcher and friend. (You'll read more about him in the Fall 2012 *BioNews*.) Alex's family asked that donations in his memory be made to SF State's Department of Biology where Alex taught for over thirty years. (To make a donation, please use the enclosed envelope or visit: <http://biology.sfsu.edu>, and click on the "In Memory of Dr. Claude Alexander" link.)

I'm excited with the program for our upcoming fundraiser, Personalized Medicine 5.0, which focuses on the cutting-edge topic of epigenetics (see page 8). More and more we are recognizing the causative role these "accent marks" on top of the genomic DNA sequence play in aging, cancer, metabolic and psychiatric disease, and how much future therapies will target such alterations.

I am pleased to report that Dr. Scott Roy, most recently from Stanford University, joined us a few months ago as an Assistant Professor of Bioinformatics (see page 3) and that Dr. Andrea Swei, currently at UC San Francisco, will join us in January 2013 as an Assistant Professor of Global Health Ecology. It is a time of sad departures, tempered by the very exciting addition of new members to the Biology family.

We're all working hard on campus to make you proud, and to help our current students succeed even in the very difficult economic climate we face. We're looking forward to our sixth annual post-Commencement ceremony on Sunday, May 20. We hope that, within your means, you will continue to support our efforts in the days ahead.

THANK YOU 2011 DONORS

You have many choices for your charitable giving so we thank you for investing in the Department of Biology's long tradition of educating scientists, health professionals, teachers and citizens.

Donors like you have created a legacy of teaching and innovation.

Please continue your generosity by making a gift today.

Use the enclosed envelope or visit: <http://biology.sfsu.edu> and click on "Make a Difference"

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Introducing...



"SF State's Dental Post Bacc program is rigorous and requires great commitment from the students. But, it's a life changing experience — it certainly changed my life. I am grateful that it opened a door to dentistry for me — a career I love."

- Dr. Biana Roykh

Photo by Justin Chan



"I am really excited about being at SFSU. The intellectual and social environment in the Biology Department is fantastic, and I am impressed by the balance that the Department strikes between world-class research and teaching. It's great to be at an institution with a mission of participating in and serving the community."

- Dr. Scott Roy

BIANA ROYKH joined the Biology faculty in June 2011 as the Co-Director of SF State's Dental Post Baccalaureate Program. She is responsible for admissions, advising, dental assisting/clerkships, community outreach, and the Dental Colloquium course which includes dental school application support, personal and disadvantaged statement preparation, research presentation support, and current issues in dentistry.

Established in 1998 by Dr. Harvey Brody at UCSF, the program was the first of its kind in the U.S. In 2005, the program was adopted by SF State Biology faculty, Dr. Barry Rothman.

Each June 16 students enroll in an 18-month full-time schedule which includes: DAT review, academic skills enhancement, academic course work, clinical clerkships/community involvement, application and interview skills support, and selection of schools. Two students from every class are selected as peer advisors. "The Program has two goals," explains Dr. Roykh "to increase the number of students from disadvantaged backgrounds gaining acceptance into a US dental school within one year after completion of the program, and to select students who want to work in underserved areas of California."

An alumna of the program (2001-2002), she is proud of the students' 90% acceptance rate into US dental schools, and of their impact on dental care. "Research shows that providing culturally competent dental care increases patient access to care and compliance."

Dr. Roykh graduated from UCLA with a BS in Physiological Sciences, and earned a Doctor of Dental Surgery (DDS) degree from the UCSF School of Dentistry in 2006. She completed a general practice residency at the University of Nevada School of Medicine (Las Vegas) in 2007. Soon after, she returned to the SF Bay Area, and became an Assistant Clinical Professor at the UCSF School of Dentistry where she oversees patient centered care with third and fourth year dental students and lectures to dental residents. She also has an active dental practice in downtown San Francisco.

"It's an incredible feeling to be able to help people succeed in life," said Dr. Roykh, "and to carry Dr. Brody's legacy of turning good students into great leaders in their communities."

Dr. Roykh can be contacted at: Biana.roykhdds@gmail.com For more information about the program, visit: <http://online.sfsu.edu/~brothman/>

SCOTT ROY joined the Biology faculty as an Assistant Professor in Bioinformatics in January. Dr. Roy graduated cum laude from Harvard in 1999 as an undergraduate in Biochemical Sciences, and in 2005 received a Ph.D. in Molecular Biology. He was a post-doctoral researcher at Harvard, Massey University (New Zealand), NIH's National Center for Biotechnology Information, and Stanford University. His research involves programming computers to analyze genome sequences. "I am interested in the evolution of genome structures, and the evolutionary origins of the pronounced differences in genome structures between species."

Dr. Roy is a prolific scientist with more than 60 papers published. When he's not researching, teaching or publishing, he plays in a band. To learn more about Dr. Roy, visit: <http://biology.sfsu.edu/people/scott-roy>

Fund Facts

In 2011,

716

donors
contributed

563

were first-time donors.

79

donors provided
gifts of less than \$250.

5%

of Biology students
donated to the
Department.

\$27,683

was donated.

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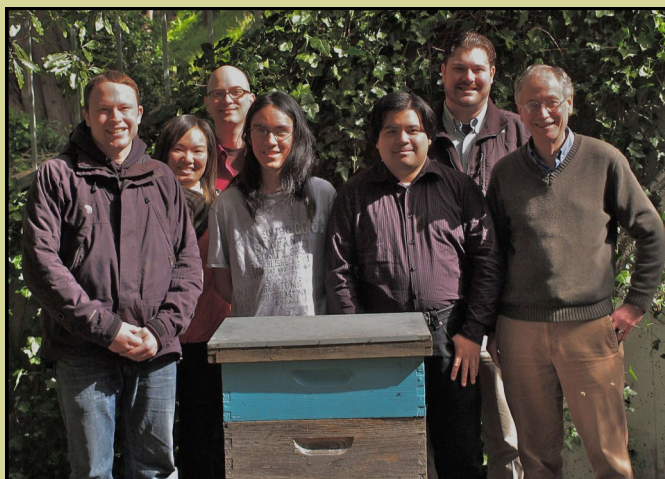
SERENDIPITY IN SCIENCE:

DISCOVERING A NEW THREAT TO HONEY BEES

JOHAN HAFERNIK is a big believer in of the role of serendipity in scientific discoveries.

One morning as he was about to walk into Hensill Hall he noticed several honey bees behaving strangely underneath the outside lights. He scooped them up into a sealed vial thinking they would make a meal for his newly captured praying mantis. As luck would have it, he forgot about the vial. "The next time I looked at it there were fly pupae

surrounding the bees." Dr. Hafernik had discovered that a parasitic phorid fly (*Apocephalus borealis*) had inserted its eggs into the bees, and was using their bodies as homes for its developing larvae.



"A New Threat to Honey Bees,
the Parasitic Phorid Fly, *Apocephalus borealis*"
Co-Authors (L-R): **Andrew Core, Dr. Chris Smith,
Travis Siapno, Christopher Quock, Jonathan Ivers
and Dr. John Hafernik.**
(Editor's note: co-author *Serphina Denault* not pictured.)

Intrigued, he teamed up with graduate student Andrew Core who worked with local beekeepers to collect samples. They collaborated with Dr. Christopher Smith's lab to perform a genetic analysis of the fly and found that it was the same species that is known to parasitize bumblebee and paper wasp populations. They also found evidence of the fly in 77 percent of the honey bee hives they sampled in the SF Bay Area, and in a group of hives in California's Central Valley and South Dakota that are moved across the western U.S.

In early January, they published their research in *PLoS ONE* which became the #1 most viewed article on the journal's website (www.plosone.org) attracting science and public media interest nationwide.

Could the phorid fly parasite be contributing to colony collapse disorder (CCD), a mysterious condition causing declines in U.S. honeybee populations? With the discovery that this parasitic fly is associated with hive abandonment, a symptom of CCD, researchers want to understand this behavior and its role in CCD. The researchers plan to track bees with radio tags and video cameras to see whether infected bees are leaving the hive willingly or being kicked out in the middle of the night, and where parasitic attacks on bees are occurring in the field. They also hope that the simple way they made their discovery will enable beekeepers to collect samples and keep them for a week to observe any signs of emerging larvae.

IDENTIFYING A DEADLY INVADER

SARAH COHEN'S molecular analyses confirmed that a new marine organism was invading Alaska's coastline threatening the state's \$100 million mariculture industry.

In 2010, Dr. Cohen along with researchers from the Smithsonian, National Oceanographic and Atmospheric Administration, Alaska Fish and Game, University of Alaska Southeast, the Sitka Tribe of Alaska and volunteers from the Sitka Marine Invasive Species Bioblitz (<http://bit.ly/pKjU1R>) discovered a new invader that she identified as a filter feeding sea squirt or tunicate called *Didemnum vexillum*. This spongy textured, mustard colored marine organism forms dense colonies that are rapidly taking over the underwater habitat near Sitka by smothering native species while potentially producing acidic toxins that prevent anything from growing on it. This aggressive marine invader has the potential to disrupt a food web vital to Alaska's fisheries as well as severely impact Alaska's developing aquaculture industry. Cohen's lab, and especially RTC graduate student Darragh Clancy, are now using highly variable genetic markers to investigate potential transport pathways, including the movement of boats and other marine materials that may have brought this first aggressive and invasive marine species to Alaska. Researchers from multiple agencies are currently developing a rapid response plan to prevent the organism from spreading to other parts of Alaska.

While field work and genetic analysis are major components of her research, Dr. Cohen is also busy expanding a student-based research program and increasing wet lab opportunities at SF State's Romberg Tiburon Center for Environmental Studies. "In the wet lab—with circulating saltwater—we culture marine and estuarine organisms, and carry out manipulations aimed at understanding growth and reproductive processes. I have a particular interest in early life stages—gametes, gamete dispersal, embryonic and juvenile development, tradeoffs between sexual and asexual reproduction."

Dr. Cohen admits she was destined to become a marine biologist. She grew up in a family of many marine biologists who visited marine labs, museums and tidepools. "So, inevitably I started a major in history in college, then political science, languages, pretty much anything my parents didn't do," she recalls, "before I saw the light of how very fun marine biology and the study of invertebrates and fishes is!"

Dr. Cohen earned her Ph.D. in Zoology from the University of Washington before joining the Biology faculty in 2003. She teaches Marine Ecology and Marine Invertebrate Biology, and with her students and postdocs, she researches many marine taxa "from ciliates and sea grasses, to sea horses, sea squirts and sea stars, acanthocephalans, trematodes, killifish and copepods —along with whatever is in their tiny guts."

To learn more about Dr. Cohen, visit: http://rtc.sfsu.edu/research/in_cohen.html



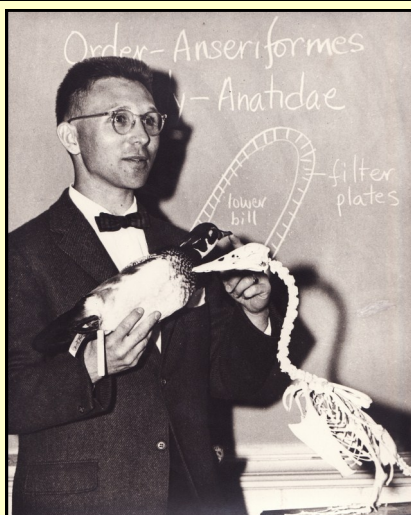
"So much research involves model systems aimed at understanding the mechanisms that control life processes, and this approach is quite important, of course. But, to gain a broader understanding, you have to look at life in an environmental context since that is what has shaped adaptation and differentiation."
- Dr. Sarah Cohen



RTC Graduate Student
Darragh Clancy (left)
Photo by Gretchen Lambert



Didemnum vexillum.
Photo by Heather Meuret-Woody
Sitka Tribe of Alaska



PROFESSOR BOB BOWMAN
1960

"I still appreciate and miss my SF State mentor Robert Bowman.

He was an amazing person without whom I would NEVER have succeeded in either science or teaching. He was the sort of professor that made SF State a unique and remarkable place."

— Dr. John Anderson
(photo right)

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WITH OTHER
BIOLOGY ALUMS.**

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ALUMNI NEWS

JOHN ANDERSON

(M.S. Ecology and Systematic Biology 1982)

is a College of the Atlantic Professor and a Linnaean Society of London Fellow. His research focuses on the conservation of seabirds using GIS technology for coastal and marine ecosystem management, community planning and development.



WANDERSON CARLOS

(B.S. Biology 2002)

is the Science Department Head at Jefferson High School in Daly City, a Teen Leadership Challenge Advisor for Daly City Libraries and Recreation Department and an Industry Initiatives for Science and Math Education Fellow.



KEVIN CLARKE

(M.S. Ecology and Systematic Biology 2008)

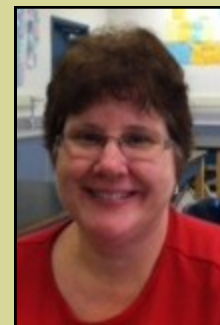
owns "Bugs Under Glass" (www.bugunderglass.com) — a green-certified insect display business. A bug aficionado since childhood, Kevin's collection contains 4,000 specimens.



COLLEEN COOLISH-VALADO

(B.A. Biology 1985)

teaches biology and physiology at Jefferson High School in Daly City. She and her students work with the Friends of San Bruno Mountain to remove non-native plants and plant native ones to save the endangered Mission Blue Butterfly.



ANNA DREXLER

(M.S. Physiology and Behavioral Biology 2006)

is a Ph.D. candidate at UC Davis. She co-authored a paper on malaria parasites published in the *Public Library of Science Pathogens*. Her research on a malaria-proof mosquito made *Time Magazine's* "Best Inventions of 2010" list.





A Passion for Anatomy

ALEXANDRA KOB is a **undergraduate with a passion for anatomy**. “I switched my general biology major to physiology,” she explained, “immediately after completing a Human Anatomy class

with Dennis Schulz in Spring 2010. I love every second spent studying the human body, and how it works.” In fact, Alexandra loves the study of anatomy so much that she used two awards she received from Sigma Xi and SF State’s College of Science and Engineering to purchase new tools for detailed dissections of the head and neck (known as a hemi section) for the anatomy lab.

In Fall 2011, she enrolled in a special studies class where with her partner Laura Johnson they integrated their dissection of the head and neck into Schulz’s anatomy lab curriculum. She presented their results at the American Association of Anatomists’ (AAA) Meeting in Experimental Biology in Washington D.C. Their abstract “Art and Science of Anatomy: Hemi-Section of the Head and Neck” was published in the *Federation of American Societies for Experimental Biology Journal*, and posted on the 15th International Conference for Women Engineers and Scientists’ website.

In August 2011, she was selected by the AAA as one of two students in the country to identify and develop recruitment strategies and programs geared toward undergraduate faculty and students. “I think it’s important to encourage undergraduate student researchers and faculty to stay involved with a society like AAA that can offer great opportunities to stay up to date, and network with others.” Her article “Expanding AAA’s Undergraduate Student Population” was published in the December 2011 issue of the AAA newsletter.

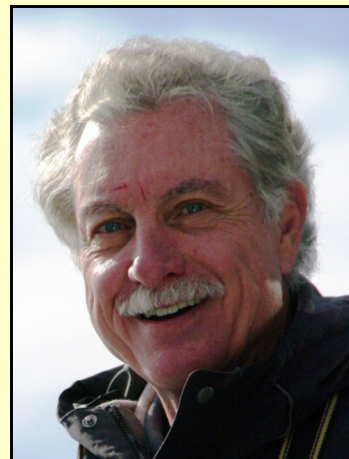
A member of Sigma-Xi, and the National Research Society, Alexandra will graduate in May. When asked about her future scientific and professional goals, she said, “I have my sights set on in-depth research of the craniofacial region, and to lead a research lab of my own. Teaching anatomy is a career path I am considering.”

Alexandra can be contacted at akoba@mail.sfsu.edu

The Joys and Challenges of Teaching Onboard

**DAVE
BEHRENS**

(B.A. Biology 1971;
M.A. Marine
Biology 1973)
**is a Professor
at Pierce
College and a
specialist in
nudibranchs.**



He has discovered and named many new species, and authored several books including *Nudibranch Behavior* and *Pacific Coast Nudibranchs*.

In December 2011, he wrote to us about both the joys and the problems of teaching coral reef ecology classes onboard a 126-foot sailboat (the KLM Aurua) in Indonesia during the summers.

“Teaching and learning onboard a boat provides students with many opportunities they would not normally have in a classroom, you just can’t achieve with videos and PowerPoint what the personal experience will attain. Watching students discover on their own, touch, observe, report back what they have seen — those are lessons they will never forget. But, learning and teaching onboard provides its own set of challenges including confinement and the weather. When the weather was bad, folks got sick, and teaching was tough.”

Dave Behrens
(davidwbehrens@gmail.com)



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**Advancing
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of Scientists,
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PERSONALIZED MEDICINE CONFERENCE'S 5TH YEAR!

Biology's Personalized Medicine Conference kicks off its fifth year on May 24 at the South San Francisco Conference Center. Since its beginning in 2008, the one day event has seen a steady rise in attendance which now includes biotechnology industry leaders, scientists, healthcare professionals, educators, journalists, parents and students. Past conferences have focused on targeting cancer, bioinformatics, pharmacogenomics and consumer genetic testing. This year the focus is on the role of epigenetics — the genetic change above and beyond the DNA sequence level — which will have profound implications for personalized medicine, pharmacogenomics, aging and oncology. Sponsors for the 2012 conference include BioMarin, Swedish Biomimetics, the City of South San Francisco, Monogram Biosciences, Act Oncology, Sofinnovaventures, Zogenix, Deloitte, Takeda, PRA International, Kenson Ventures, SF State's Center for Computing Life Sciences and Professional Science Master's Program, Bay Bio, San Jose Bio Center, Personalized Medicine Coalition and the CSU Program for Education and Research in Biotechnology.

Personalized Medicine 5.0

Thursday 5/24/2012

South San Francisco Conference Center

Registration & Information

<http://personalizedmedicine.sfsu.edu>

dnamed@sfsu.edu



The Role of Epigenetics



An SF State University Biology Conference