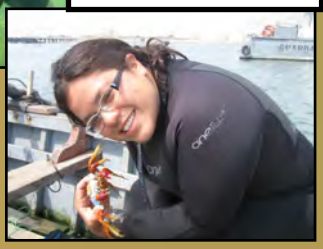
BioNews

Fall 2016 Issue 21

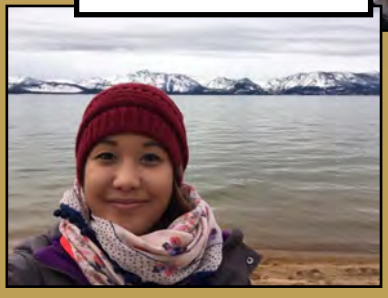
Partial image of Cesar Chavez mural painted on front of SF State Cesar Chavez Student Center by Carlos Gonzalez in 1995.

Educating

Generations of



Scientists



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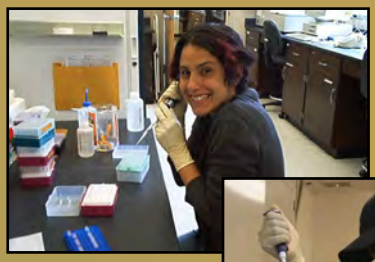
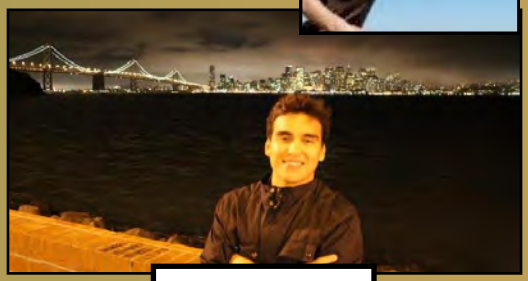


Health Professionals

Teachers



Citizens

Advancing Global Health and the Biosphere

Since 2005, Dr. Michael Goldman has chaired SF State's Department of Biology. Before joining the Biology faculty in 1988, Dr. Goldman earned a Ph.D. in Biological Sciences from Purdue University, was a Post-Doctoral Fellow in Medical Genetics at Baylor College of Medicine, then a Senior Fellow in Medical Genetics at the University of Washington (Seattle).

Dr. Goldman is also a co-organizer of the Department's annual Personalized Medicine conference which began in 2008. Each year the conference highlights a different focus within the personalized medicine field.

"I see the public understanding of science as key if science and society are to thrive," said Dr. Goldman who speaks to both professional and community groups whenever possible. He has talked to TV and radio call-in audiences, written Op-Ed pieces for major newspapers and technical articles for *Science* and *Nature Genetics*. He also reviews novels addressing aspects of genetic science and its implications.

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

It's been a time of great changes on our campus, but Biology remains steadfast in its mission – Advancing global health & the biosphere, and educating the next generation of scientists, health professionals, teachers and citizens. We know these will be the people who must equip us to face the many challenges of the twenty-first century, from global climate change to the loss of life's diversity on our planet, to the onslaught of bolder infectious diseases, and the incessant rise of chronic disease.

Provost Sue Rosser stepped down at the end of August, and we welcome Interim Provost Jennifer Summit. Sue seemed a bit like family to me, as her academic interest was in enhancing the success of women in science and she was, consequently, working very closely with many faculty in our Department. She continues to pursue that interest when she is on campus, where she is also a special advisor to President Wong.

Almost twenty years ago we lost Professor Janis Kuby at the young age of 49 *(see page 3)*. It's hard to overstate how popular and successful Jan was as a teacher, and I'm inviting Jan's students to join our challenge – honor your professor(s) with a gift to the Department of Biology to help us meet our greatest needs today. Visit http://biology.sfsu.edu and click on the "Make a Difference" link.

Biology Professors Jonathon Stillman and Karina Nielsen, who also directs the Romberg Tiburon Center, and adjunct professor William Cochlan obtained an NSF grant to support student training in the interdisciplinary field of marine science *(see page 5)*. This is the first grant of its kind to be awarded to a non-Ph.D.-granting institution like ours, and a tribute to the amazing plan Jonathon, Karina, Bill and their colleagues have put together.

Alumni Dan Maher, Ken Fong, John Wulf, Amy Waterhouse, and Dr. Victoria Hines from BioMarin and I have begun plans for our tenth annual conference on personalized medicine. Dubbed *Personalized Medicine 10.0: Has it changed your life?* the conference will draw from our best speakers and topics over the years to paint a current, critical picture of this crucial field which President Obama has immortalized in his Precision Medicine initiative. One of the conference's most important functions is to expose our students to speakers and guests from more than a dozen academic institutions and local biotechnology companies giving them a chance to mix with CEO's, physicians, faculty members, and government folks concerned with our future. It is also a fund-raising effort, with significant sponsorship from companies like BioMarin, Gilead, Genentech, and Roche, and a partnership with the City of South San Francisco, the birthplace of biotechnology. Why not join us for *Personalized Medicine 10.0* on June 2, 2017 at the South San Francisco Conference Center?

The Domingo Lab Group: (L-R) Johnson Yang, Kellen Hopp, John Bugay, Talia Hart, Coohleen Coombes, Jason Garcia, Maria Del Pilar Lopez, Chris Pineda, Dr. Julio, Ramirez, Dr. Carmen Domingo

Alumnus Directs Student Research

Before earning a Ph.D. in Genetics and Developmental Biology with an emphasis in plant stem cell biology from UC Berkeley, Post-Doc, Laboratory Manager and alumnus **Julio Ramirez** earned a BS in Microbiology (2000). "Drs. Leticia Marquez-Magana, Laura Burrus and Frank Bayliss inspired and supported me in those critical years as an undergraduate," recalls Julio, " I simply could not have accomplished my professional goals without them."

In 2011, Julio returned to SF State to inspire and support students in Dr. Carmen Domingo's lab. "I had opportunities to work in the Biotech industry," said Julio, "but decided to work in our Department because I felt that I could make a significant impact on our students' training. This is my primary commitment. I worked with Dr. Blake Rigg's Biology Undergraduate Mentor Program (BUMP). And, provide administrative and mentorship support for College of Science & Engineering programs including NIH-RISE, NSF-REU and NIH SF-BUILD which provide students with research training.

The Domingo lab group researches the signaling pathways that control differentiation of muscle cells (miRNAs) in *Xenopus laevis* (the African clawed frog). These muscle-specific miRNAs and many of the signaling molecules involved in regulating cell differentiation have been found in humans, mice, and amphibians. The lab group wants to learn how these signaling pathways are coordinating very specific events (i.e., making muscles) during early development.

"Messenger RNAs (mRNAs) are typically translated into proteins to perform cellular functions, but sometimes mRNAs need to be downregulated or 'turned off,'" explains Julio. "MicroRNAs target mRNAs by binding to very specific sequences, so that a mRNA does not translate into a protein. For instance, you may not want a protein that directs a cell to divide when you really want a cell to follow or maintain a specific cell lineage (i.e., muscle). Our students have worked hard to show that a microRNA, miR-206, plays a key role in muscle formation during the early development of *Xenopus laevis* embryos."

The Domingo lab is currently optimizing an assay to measure the ability of miR-206 to downregulate mRNA targets in *Xenopus laevis* embryos. They are also collaborating with various research groups within the Department including Dr. Scott Roy's lab group who are helping to find potential targets of muscle specific miRNAs using a bioinformatic approach.

What does Julio like best about his work at SF State? "We believe that by understanding these complex signals one can be better prepared to investigate what happens when things go wrong (i.e., human disease such as muscular dystrophy). It's hard work but extremely rewarding. SFSU has some of the best students I've ever had the pleasure to work with. And, it's really been a blessing to work with our faculty."

Nearly 20 years ago, the Department lost a remarkable professor, Dr. Janis Kuby. She joined the Biology faculty in 1979 and was quickly recognized as a skilled and enthusiastic professor and researcher. She also authored a best-selling comprehensive immunology textbook, *Kuby Immunology*. In 1997, Dr. Kuby lost her battle with cancer within weeks of completing the 3rd edition of her textbook. Newer editions, though written by others, were continued in her name because of the quality of her original textbook. That year, a scholarship was established in memory of Dr. Kuby which provides support for undergraduates majoring in Cell & Molecular Biology or Microbiology. (*Donations can be made to the Department in memory of Dr. Kuby by visiting http://biology.sfsu.edu and clicking on the 'Make a Difference" link or by writing "Biology — in memory of Dr. Kuby" on your donation check.) Editor's Note:* Do you have a memory of Dr. Kuby you would like to share with other alumni? Email silver@sfsu.edu

The RTC: Rich in History *by Erin Blackwood*

The site of the Romberg Tiburon Center for Environmental Studies (RTC) was believed to have been a Coast Miwok camp or village before the Mexican-American Reed family raised beef cattle and dairy cows, and operated a brick kiln to serve San Francisco. In 1877, a codfish processing plant was constructed in the natural cove to dry and pack Pacific cod from Alaska (then a U.S. territory recently purchased from Russia) before shipping it to the East Coast to make cod liver oil.

In 1904, the U.S. Navy purchased the property for a coaling station to fuel Navy ships. The Navy constructed the house on the hill for Commanding Officers. The house was renovated in 2000, and is now the Ohrenschall Guest Center. Ships from the Mare Island Navy Yard bunkered there on their way to sea. In 1908, President Theodore Roosevelt's Great White Fleet bunkered at the site during their cruise around the world. By 1930 coal was replaced by petroleum as a fuel source, and the station shut down, but chunks of coal can still be found.

From 1931 to 1940, the Navy loaned the base to the State to established its first nautical training school, the Maritime Academy, which was relocated to Mare Island during World War II. In 1933, New Jersey-based Roebling and Sons used the north end of the property as a staging area for construction of the Golden Gate Bridge. Ships delivered 400 pound coils of steel wire, which were wound onto reels, and then barged to the bridge site to be woven into the hanger or catenary cables that connect the highway deck to the two main suspension cables.

In 1939, the Navy established the Naval Net Depot, a construction and maintenance facility for anti-submarine and anti-torpedo mines and nets which included a net seven miles long and weighing 7,000 tons strung across the entrance to San Francisco Bay, from Crissy Field in San Francisco to Fort Baker in Sausalito.

In 1977, at the urging of College of Science & Engineering (CoSE) Dean Jim Kelley *(photo left)* SF State President Paul Romberg *(photo right)* submitted a proposal to develop a field station and marine laboratory dedicated to the study of the San Francisco Bay. The Romberg Tiburon Center for Environmental Studies was established on 25 acres the following year under a 30-year lease from the U.S. Department of Education for the whopping sum of $1. Over those 30 years, several building renovations were completed and a simple greenhouse, a bay water intake system including several small habitat tanks and a small research pier were built.

Today SF State's Tiburon campus, encompassing 51 acres including 11 of tidelands, is home to an interdisciplinary group of RTC faculty, researchers and students affiliated with Biology, Chemistry & Biochemistry, Geography & Environment, and Earth & Climate Sciences. In addition, RTC and CoSE host the San Francisco Bay National Estuarine Research Reserve and the Smithsonian Environmental Research Center's Marine Invasions Laboratory. The Center is a thriving nexus of collaborative, interdisciplinary research and education focused on marine and estuarine ecosystems. With over 100 people on site daily, research covers most of the sensitive issues in the Bay today, including the impact of freshwater diversion, human additions of nutrients and chemicals, invasive species, wetland restoration, climate change, harmful algal blooms, and marine mammal and bird conservation. *(Photos courtesy of Tiburon Landmarks Society)*

The Romberg Tiburon Center for Environmental Studies Photo by Erin Blackwood, 2010

Erin Blackwood is the Education and Outreach Coordinator at the Romberg Tiburon Center (RTC) for Environmental Studies. Before joining the RTC in 2007, she earned a BA in Marine Biology from UC Santa Cruz and a M. Ed. In Environmental/Science Education from Western Washington University.

While working as a Science Education Specialist at the children's Bay Area Discovery Museum, she collaborated with RTC personnel on science exhibits and programs. "When the Education and Outreach Coordinator position opened up at RTC, I jumped at the chance to work with scientists to engage the public in more complex marine/estuarine science and conservation topics."

"In collaboration with alumna and Graphics Coordinator Adria (Lassiter) O'Dea *(MA Marine Biology 2003)* I'm responsible for our external communications, including our *Bayside* newsletter *(view past issues at http://www.rtc.sfsu.edu/about/documents.htm)*, the RTC website, email list, and social media. We're now developing a public walking tour of the history and current research of the RTC site which will be led by volunteer docents and graduate students."

Erin also coordinates RTC's biggest event — the annual open house lab tours — in addition to summer undergraduate and teacher intern programs, the semiannual Rosenberg Institute Public Forum, and student and scientist participation in off-site community events such as SF State's 'Expanding Your Horizons' STEM conference for middle school girls.

When asked what she liked best about working at RTC, she said, "It's hard to pick one thing! I love working with graduate students and learning about their research, learning from other scientists and inspiring people to learn about marine science. And, of course, location, location, location!"

"I welcome alumni to pay us a visit. Contact me at erin70@sfsu.edu or visit www.rtc.sfsu.edu to learn more and connect with us!"

Dr. Jonathon Stillman (top left) and co-PIs **Drs. William Cochlan** (bottom left), **Tomoko Komada** (top right), and **Karina Nielsen** (bottom right) received a National Science Foundation Research Traineeship grant to fund a program designed to increase graduate Marine Science majors' understanding of the impacts of, and responses to, global changes in urbanized coastal and estuarine areas. The program, based at the RTC, and called the Research Intensive Pedagogical Training of Interdisciplinary Estuarine Scientists or RIP TIDES, combines coursework, research, and an internship. Courses will introduce students to interconnected aspects of estuarine and coastal processes, biotic responses, critical habitats, human impacts, and resource management issues associated with global change. Professional skills including scientific communication, scientific writing, data analysis, ethics and budgeting will be emphasized. Trainees will conduct research projects on the impacts of global change that illuminate areas for action in developing solutions. The first cohort of students is planned for Fall 2017.

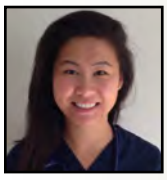
BEN ABDON ***(MS Physiology & Behavioral Biology 2016)*** is a Ph.D. candidate in Molecular Integrative Physiology in the Program of Biomedical Sciences at the University of Michigan and recipient of a Rackham Merit Fellowship.

BRENDA CISNEROS ***(BS Physiology 2013)*** is a Ph.D. candidate in the University of Michigan's Molecular and Integrative Physiology program and a recipient of a Rackham Merit Fellowship and Bernard Maas Fellowship.

LALEH ESMAILI COTE ***(BA Biology 2012)*** is a Ph.D. student in UC Berkeley's Science and Mathematics Education program and a National Science Foundation Graduate Research Fellowship recipient. She authored "Undergraduate Research Experiences in STEM Fields" published in UC Berkeley's *GradNews.*

LAUREN FLETCHER ***(BS Physiology 2015)*** is a Department of Energy SULI Intern at the Pacific Northwest National Laboratory.

KRISTIN HOLMES ***(MS Cell & Molecular Biology 2016)*** is a Ph.D. candidate in Molecular & Cell Biology at the University of Washington and recipient of the prestigious Achievement Rewards for College Scientists.



DIANA HUANG ***(BS Physiology 2012)*** graduated from SF State's MS in Nursing program, and is a nurse at San Francisco's Chinese Hospital.

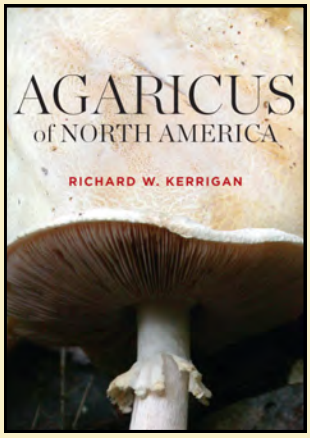
DAVID JAMES ***(MS Cell & Molecular Biology 2015)*** is a MD student at Stanford School of Medicine and co-author of "Extensive Migration of Young Neurons into the Infant Human Frontal Lobe" published in *Science*.

STEVE KIELAR ***(MS Marine Biology 2015)*** is an Assistant Scientist for the Sea Education Association.

Rick Kerrigan

BA Biology 1974
MA Biology 1982

"I'd like to bring to your attention the publication of a volume of research that really got underway in the 1970s under the mentorship of Dr. Harry Thiers *(photo left)*, and was prefigured in my master's thesis "Agaricus of Coastal California."



"Agaricus of North America," published by New York Botanical Garden Press, incorporates molecular and phylogenetic approaches and comparisons of American and European type specimens with contemporary field samples. It represents a considerable expansion of geographical and ecological scope over my 1982 thesis study."

"Harry mentored a remarkable number of students, most of whom made major contributions to the field of mycology or cryptogamic botany. SF State's Thiers Herbarium *(photo below)* remains the primary depository for my recent field specimens. I hope that the taxonomic and phylogenetic synthesis attempted in this new volume will reflect well upon Harry and the Department of Biology that played a large role in my professional education."

Deborah Taylor

BA Biology 1977

Deborah Taylor received her Master's in Public Health from the University of New England. Before earning her MPH, she earned a Teaching Credential in Science from Notre Dame de Namur University, worked as a technical writer and taught science. Her current interests are focused on mosquito-borne diseases and she has done volunteer work for the San Mateo County Mosquito and Vector Control. Her future goal is "to apply my communication skills to developing public health curriculum for bay area school districts."

Dennis Desjardin

BS Botany 1983; MS Ecology & Systematic Biology 1985

Dr. Dennis Desjardin is a SF State Biology Professor in botany with an expertise in mycology and Director of the H.D. Thiers Herbarium *(photo on page 6)*. Before joining the Biology faculty in 1990, he earned a Ph.D. in Botany: Mycology at the University of Tennessee.

An expert on the evolution and biodiversity of fungi, Dr. Desjardin has discovered over 250 new species, including luminescent mushrooms. His fieldwork projects are in the Hawaiian islands, Micronesia, Thailand, Malaysia, Indonesia, west African islands São Tomé and Príncipe, Madagascar, Brazil and the western United States.

In 2015, he co-authored "*California Mushrooms: The Comprehensive Identification Guide*" which was awarded the 2016 Award of Excellence in Plant Identification & Field-Guides by the Council on Botanical and Horticultural Libraries (CBHL). CBHL awarded the guide because it was 'well-organized and illustrated with informative, but concise profiles of 650 species including information on their habitat and edibility.' To learn more about Dr. Desjardin's research, visit: https://faculty.sfsu.edu/~ded/

VANESSA KNUTSON *(MS Ecology & Systematic Biology 2013)* is a Ph.D. candidate in Harvard University's Organismic and Evolutionary Biology program and a recipient of a National Science Foundation Graduate Research Fellowship.

SHANA McDEVITT *(PSM Biotechnology 2014)* is Director of the UC Berkeley QB3- Vincent J. Coates Genomics Sequencing Laboratory.

ALLISON NELSON *(MS Ecology, Evolution and Conservation Biology 2015)* co-authored "Migration Patterns of San Francisco Bay Area Hermit Thrushes Differ across a Fine Spatial Scale" published in *Animal Migration.* She presented her research at the North American Ornithological Conference.

SHAWNTEL OKONKWO *(BS Physiology 2014)* is a Ph.D. candidate in UCLA's Molecular Biology program and a National Science Graduate Research Fellowship recipient.

OLIVER OLIVERIO *(MS Cell & Molecular Biology 2015)* is a Senior Associate at Amgen and co-author of "Placental Transcriptomes in the Common Aneuploidies Reveal Critical Regions on the Trisomic Chromosomes and Genome-Wide Effects" published in *Prenatal Diagnosis.*

BETH SHEETS *(MS Ecology & Systematic Biology 2013)* is a Research Technician at Stanford University's Hopkins Marine Station. She is the lead author of "Investigating the Widespread Introduction of a Tropical Marine Fouling Species" published in *Ecology and Evolution.* Her photo of *Botrylloides nigrum*, a tropical tunicate, was featured on the cover of the issue.

JONATHAN STERN *(MA Ecology & Systematic Biology 1991)* is a SF State Biology Lecturer and a Whitely Scholar at the University of Washington Friday Harbor Laboratories' Helen R. Whitely Center.

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Biology values its alumni and we want to hear from YOU! Email silver@sfsu.edu and let us know about your academic, professional, scientific accomplishments.

The Bugs in Our Homes

Carpet Beetle

Spitting Spider

Last Fall, students from Dr. John Hafernik's entomology class collected and identified arthropods (invertebrate animals with exoskeletons, segmented bodies and jointed limbs and include ants, flies, chiggers, spiders, centipedes, millipedes, shrimps and lice) living in their homes and apartments. The information these citizen scientists gathered was part of a global effort (specimens were also collected from Japan, Peru and Sweden) by researchers including Biology alumna Misha Leong *(MS Ecology & Systematic Biology 2008) (photo left)*, currently a Post-Doc at the California Academy of Sciences' Institute for Biodiversity Science and Sustainability, for a study "Arthropods of Our Homes."

The study began when researchers from North Carolina State University, North Carolina Museum of Natural Sciences and the California Academy of Sciences surveyed 50 houses within 30 miles of Raleigh and found that people share their houses with up to 500 diverse arthropods. The most commonly collected were flies, spiders, beetles, ants and book lice. Researchers are quick to point out that many species are benign. They wander in from the outdoors or have been brought in on cut flowers or produce and usually die quickly because they are not equipped to live in our homes. The fact that we usually do not even know that they are living with us highlights how little we interact with them.

(Insect photos by Matt Bertone.)

"Participating in Misha's arthropods-in-homes project provided our entomology students with a great opportunity to hone their skills in insect sampling and identification and, at the same time, contribute to important research on an intriguing, but little studied area of entomology.
— Dr. John Hafernik