SAN JOSÉ STATE UNIVERSITY COLLEGE OF SCIENCE SPRING 2013

THE SCIENTIST

Science in our World and Beyond

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Brian Castellano (Photo by Christina Olivas)

Gilliam Fellowship Awardee

CHEMISTRY MAJOR BRIAN CASTELLANO RECEIVES A 2013 GILLIAM FELLOWSHIP FOR ADVANCED STUDY

Brian Castellano was awarded the Howard Hughes Medical Institute's (HHMI) Gilliam Fellowship for Advanced study this year. The honor provides $46,500 annually of financial support for four years while in a doctoral program where he will be studying biological and biomedical sciences. After being recruited by Cal Berkeley, Johns Hopkins, Yale and the University of Pennsylvania, he accepted the offer from Cal Berkeley.

Asked the reason he is interested in science, he stated, "There is an unlimited amount to learn and discover, and through mentoring, I am able to help others gain a similar passion."

Brian joined Professor Daryl Eggers' research lab and began work on the effects of water on binding systems. Currently, he is investigating the role of water thermodynamics on aqueous binding equilibria. For more, go to blogs.sjsu.edu/today/ or SJSU Today

SJSU and Udacity Partnership

CREATING A PILOT-FOR-CREDIT ONLINE COURSES

Affordable $150 per course as part of the NexGen education.

San José State University and Udacity Inc. are developing a pilot program called San José State Plus offering college classes for credit to both SJSU and non-SJSU students. The program began in January 2013 offering classes from an accredited university at a very affordable price.

Currently, SJSU is offering Intermediate Algebra, College Algebra and Elementary Statistics in this pilot program. Our faculty are working with Udacity to design and create all three courses. Some features include SJSU faculty teaching these courses, critical entry-level math classes were selected, enrollment will be limited to 100 students, ongoing assessments, no textbooks required as content is embedded and self-contained online, mentoring via chat rooms, helpline and peer meetings and exams are proctored online.

This pilot program is part of the Next Generation of learning at SJSU. To learn more, read the complete article by Pat Lopes Harris in SJSU Today.

The College of Science Blog by Dean J. Michael Parrish

MOOC Mania! (Massive Online Open Courseware)

The newest pervasive buzz acronym in Academic is MOOC, or Massive Online Open Courseware. Under the strong direction of President Mo Qayoumi, Provost Ellen Junn, and AVP for Academic Technology Catheryn Cheal, San Jose State has become an early adopter, or explorer, of the MOOC universe. The first foray into this arena involved a partnership between the College of Engineering and ED-X, the Massachusetts startup that has developed online courses with faculty at MIT, Harvard, and UC Berkeley. The SJSU Department of Electrical Engineering Course EE 98, Introduction to Circuit Analysis, was developed as a flipped course where students watched the MIT Edx online lectures for course content, and spent their class periods working together with faculty and other students on group problem solving. This approach showed dramatic improvements in student performance, with the pass rate increasing from 60% for the conventional lecture class to 81% for the flipped class, along with a 10% improvement in class test score averages.

One question that has come up often with these online classes is how this different delivery mode effects student learning. In conjunction with the Udacity courses, we have received funding from the National Science Foundation and the Gates Foundation to assess student learning and faculty effort in this delivery mode. These studies, which will be conducted by external contractor, the RP Group, will form an important part of scholarship on this emerging mode of course delivery. We are moving ahead with preparing a number of other online courses with both EdX and Udacity, with new offerings to be rolled out as soon as fall of 2013. Follow the CoS Blog for information on current issues, blogts.sjsu.edu/cos/.

Moss Landing Marine Labs (MLML)

MIDDLE SCHOOLERS ABOARD THE VESSEL POINT SUR

Students embarking Point Sur

Last fall, Moss Landing Marine Labs' research vessel hosted a group of students from Pacific Grove Middle School for a day aboard the Point Sur learning about the ocean's floor.

Associate Professor **Ivano Aiello** wanted to bring young students into the world of marine science and more specifically to learn about the ocean through sediment. "The program has all the components—exploration, discovery, hands-on applications of mathematical and physical science to be an inspiration for youth and their teachers," said Aiello.

Dr. Ivano Aiello with students

MLML's Teacher Enhancement Program (TEP) was instrumental in helping Aiello make this a reality. Program Director **Dr. Simona Bartl** matched Dr. Aiello's proposed activities to middle school earth science standards and offered the activity to past participants of TEP. Pacific Grove Middle School teacher Kelly Terry's class was selected. More on the MLML blog, www.mlml.calstate/news.

POINT SUR ENROUTE HOME FROM ANTARTICA

Vessel Point Sur

On November 29, 2012, the research vessel Point Sur began an 8,000 mile expedition to Palmer Station, Antarctica and will return to MLML in May. As of mid-April, researchers were in Mazatlan making discoveries in the Sea of Cortez.

MLML Researchers include a geology team led by University of South Carolina PhD candidate Ben Oliver. Oliver's blog has many photos. The crew include Scott Hansen, Leah Harman, Barrett Carpenter, Stian Alesandrini, Alex Wick, Jack Lavariega, Diego Mello, Tara Pastuszek, Amy Biddle and Captain Rick Verlini.

Crew member, Tara Pastuszek wrote on the Point Sur blog, "Our current science party has been busy at work scouring islands for sedimentary rock looking for evidence that there may have been glaciers in the earth's past when the planet was much warmer than it is today. One of the objectives of this study is to gain insight into how glaciers will be impacted by modern climate change" In this and many other ways, Point Sur and Moss Landing Marine Labs support marine science research with worldwide impacts. For more about the exciting research conducted by MLML scientists, go to the MLML website, www.mlml.calstate/news.

Scientists at Antarctica (MLML)

Science Education Faculty in the News!

FACULTY HELPED CRAFT NEXT GENERATION SCIENCE STANDARDS

Dr. Paula Messina

On April 9, 2013 the final version of the Next Generation Science Standards was officially released. Dr. **Paula Messina**, Professor of Geology and Science Education was one of the team of 41 scientists that crafted the new standards which promise to have a profound positive impact on the way the sciences are taught in K-12. Click on the link to the Standards webpage or go to www.nextgenscience.org. More information in the New York Times about these changes in Science Education.

Paula's participation in the writing team for the standards is clear recognition of her standing in the field, and represents significant service to the country's task of better preparing the scientists and engineers of the future.

Dr. Resa Kelly

Science Education Co-Director Professor **Resa Kelly** participated in a symposium at the recent American Chemical Society (ACS) Meeting in New Orleans focusing on ways to incorporate sustainability issues into K-12 science education. Dr. Kelly and Christina Chiang talked about their Google funded project that focused on training pre-service teachers on ways to bring these issues into the classroom. The overall goal is to inspire future educators "to consider relevant ways to incorporate sustainability threads in their lessons." But, according to Dr. Kelly, "The challenge is, how do we train our teachers?"

Read more about this meeting here or go to www.huffingtonpost.com/keith-peterman/national-awards-for-incorporating_b_3042162.html. For information about the Science Education program at SJSU, go to http://www.sjsu.edu/scied/.

Science Education Resource Center (SERC)

WILDLIFE AMBASSADOR AND RESOURCE LENDING PROGRAMS

In 2012 our Wildlife Ambassadors visited about 2,000 K-12 students in the South Bay Area! Our two most popular programs are the Wildlife Ambassador Lending Program and our Resource Lending Program. Both of these programs provide an invaluable service to educators. **Diane Davis** is the SERC Coordinator.

"Jeremiah" is a California Desert Tortoise *(Gopherus, agassizii)*

SERC is one of the only places in the Bay Area that allows teachers to check out wildlife ambassadors such as reptiles, amphibians and arthropods to visit their classroom for educational purposes. SERC requires that teachers are certified through a Science Live! Professional Development Workshop. To utilize our Resource Lending Program, you will need to visit SERC and then register with us. Our services are FREE for teachers and student teachers. For more information, go to http://serc.sjsu.edu about our services and learn more on how we can help make science more exciting for your students!

Meteorology and Climate Science in the News!

WILDFIRE RESEARCHER RECEIVES $900,000 NSF GRANT

Associate Professor **Craig Clements** has received a $900,000 National Science Foundation (NSF) grant to continue his groundbreaking research on wildfire weather. He received this grant through the Faculty Early Career Development (CAREER) Program, the NSF's most prestigious award in support of junior faculty members nationwide.

The funding will allow Dr. Clements to obtain new observations from a comprehensive field program tracking wildfire-atmosphere dynamics, and to integrate these observations into education and community outreach.

The grant will allow the team to chase wildfires throughout the West by using a specially equipped truck with the latest technology, including LIDAR and sonar which use light and sound waves to track winds.

The overall goal is to learn more about the super dynamic atmospheric conditions inside and around blazes so we can better predict wildfire behavior, saving lives and property.

In 2011, Dr. Clements received the SJSU Research Foundation's Early Career Investigator Award, which recognizes tenure-track faculty who excel in research, scholarship and creative activity and have secured research funding.

In 2010, Dr. Clements received a National Science Foundation Major Research Instrumentation (NSF-MRI) grant to build a mobile atmospheric profiling system for his wildfire research program. The system is a joint project with San Francisco State University called CSU-MAPS (California State University-Mobile Atmospheric Profiling System) and will allow for the remote sensing of fire-induced winds and plume temperature and humidity. It was deployed for an inversion study in Salt Lake City in January 2011 and in Yosemite during the summer of 2011.

Mobile atmospheric profiling System (Rie Onodera image)

For more on this exciting research, read a San Jose Mercury article from 6/24/2010 titled "Fighting Fires with Science" where a reporter followed Clements' team of SJSU graduate students during a fire experiment conducted in the hills of Dublin, CA.

Dr. Craig Clements

GREEN NINJA WINS GRAND PRIZE

The short animated film "Green Ninja: Footprint Renovation" won the Grand Prize of $5,000 at the Green Screen Climate Fix Flicks festival in Sydney, Australia in 2012. The Green Ninja Project led by Professor **Eugene Cordero** with a collaboration of students, scientists, educators and media artists across five SJSU colleges created the Green Ninja, a climate action superhero who forms the center of an education and behavior change program targeted at reducing our collective carbon footprint. For more information, go to greenninja.org or view the YouTube Green Ninja series launched in early 2013 by GreenNinjaTV.

9th Annual Student Research Day

EVENT SHOWCASES WORK OF SCIENCE STUDENTS

The ninth annual Student Research Day is set for Friday, May 3, 2013 from 10:00 am to 1:00 pm showcasing 64 science research posters and one truck used for wildfire research.

Over 150 students will be presenters, working in the labs of 40 faculty on original research projects. The breadth and advanced level of these projects is very impressive.

A special poster will list the students working with College of Science faculty who will be starting graduate or professional schools in fall 2013 and who will participate in summer research programs throughout the world this summer.

Biology and Art Collaboration

INDUSTRIAL DESIGN AIDS RESEARCHERS

Biological Sciences graduate student **Emma Kelsey** wishes to recognize graduate student **Kat MacKinnon** of the Industrial Design department for all her help in the creation of some design pieces needed for their research.

Emma stated she and her lab partner along with faculty advisor Dr. Scott Shaffer "reached out to the Art department when we needed help with this design and construction project and MacKinnon graciously offered up her help. This collaboration has meant a lot of donated valuable time on MacKinnon's part and has resulted in invaluable products for Dr. Shaffer, my lab mate and I." As MacKinnon will graduate in May, Philip Priolo, an undergraduate also helped Kat with this project and will take over her duties upon her graduation.

Emma goes on to state, "We are overwhelmed with gratitude for these two students and inspired by the success of this interdisciplinary collaboration."

CGMBS is Part of the Clinical Lab Scientist Program

Post-graduates seeking to become licensed Clinical Genetic Molecular Biologist Scientists (CGMBS) enter a 52-week program combining academic and hands-on training in order to help perform research that may result in pharmaceutical breakthroughs improving our well-being.

Students work Monday through Thursday in labs at various companies in Silicon Valley and attend Friday lectures provided by Dr. **Brandon White**.

This program is coordinated through the SJSU Clinical Laboratory Scientist Training Program's (CLS) Director **Suzanne Gayrard** who can be reached at (408) 924-4898. Find more information on the CLS webpage or visit www.biology.sjsu.edu/specialprogs/cls.index.

Science Faculty Receive Awards—*Congratulations!*

DR. BRAD STONE RECEIVES 2012-2013 DISTINGUISHED SERVICE AWARD

This award recognizes a faculty member for exemplary service in a leadership capacity to the university and/or community or profession that brings credit to San José State University.

Dr. **Brad Stone** was chair of the Chemistry department for nine years, co-director of the SJSU/NASA Faculty Fellowship Program and faculty advisor for KSJS, San José State's FM campus radio station. Stone has won many national awards for his work as a music director and jazz radio programmer at KSJS. He has served as an invited panelist, moderator and organizer at numerous jazz conventions for more than 20 years. This has led to many years of national recognition for SJSU, including Jazz Station of the Year, Jazz Programmer of the Year and the *JazzWeek* Duke Dubois Humanitarian Award for Lifetime Achievement.

Besides supporting faculty and student research, his role as Chemistry Chair fostered closer ties between departments, conducted collaborative research and course development while streamlining the double-major process for students. "For me to serve the university and the students in other ways besides teaching and research is really important because it supports our mission in the CSU", Stone said. "If I can contribute in some small way then that is very gratifying to me."

— From SJSU News

ALEJANDRO GARCIA IS THE 2012—2013 OUTSTANDING PROFESSOR

The Outstanding Professor Award recognizes a faculty member for overall excellence in academic assignment. Professor **Alejandro Garcia** from the Physics and Astronomy department insists there is no secret recipe for teaching, but he tries to instill in his students to always look with "keen fresh eyes" in order to understand how things move in the world.

Garcia has been recognized for his commitment to bringing science, technology, engineering and mathematics (STEM) education to the visual arts, having developed the course "Physics of Animation" in 2009. The collaboration between the physics and animation departments is a product of one of two NSF Transforming Undergraduate Education in STEM grants Garcia has earned; the most recent one looks into the optics of animation.

As a physics consultant at DreamWorks Animation SKG, Garcia applied traditional physics to the art of animation in the film *Madascar 3: Europe's Most Wanted* and was able to bring valuable information back to his students about how physics is used in a major feature film studio.

— Amanda Holst, SJSU News

Faculty Receive ***More*** Awards—*Congratulations!*

DR. SCOTT HAMILTON RECEIVES CALIFORNIA SEA GRANT FOCUS AWARD

Moss Landing Marine Laboratories (MLML) Ichthyologist Professor **Scott Hamilton** is among six investigators who recently received the California Sea Grant Focus Award. The California Sea Grant sponsors marine research to support the management, conservation and enhancement of California's marine resources and awards the one-year grants to early-career faculty investigators with extraordinary scientific merit.

Dr. Hamilton's research focuses on kelp forest fish and the effects of climate change in kelp forest communities including physiology and the ability to detect the odors of predators. Oceans become more acidic from the carbon dioxide in the atmosphere when it diffuses into seawater. Read more.

DR. ERIKA MCPHEE-SHAW RECEIVES LEOPOLD LEADERSHIP FELLOWSHIP

Dr. **Erika McPhee-Shaw** of Moss Landing Marine Labs is one of 20 recipients of the next generation of Leopold Leadership fellows. The fellowship will provide these scientists with tools to more effectively communicate their science beyond the scientific community. Dr. McPhee-Shaw plans to use this fellowship to contribute to a greater understanding of nitrate pollution, ocean acidification and the ocean's role in storms and forecasting weather and climate. Read more.

DR. LIONEL CHERUZEL RECEIVES 2012 EARLY CAREER INVESTIGATOR AWARD

Dr. Cheruzel (center) and his research group (photo-SJSU Research Foundation).

The SJSU Research Foundation Early Career Investigator Award recognizes tenure-track SJSU faculty who have excelled in areas of research, scholarship or creative activity as evidenced by their success in securing funds for their research, publishing in peer-reviewed journals and carrying out other scholarly and creative activities at an early or beginning point in their career at SJSU.

Dr. Lionel Cheruzel, in his third year at SJSU, has been tremendously productive in his field of bioinorganic chemistry. Since joining the Department of Chemistry, he has successfully competed for multiple grant awards totaling $480,000. These grants have come from the Department of Health and Human Services, the Research Corporation, and the CSU Program for Education and Research in Biotechnology. In addition to an impressive record of grantsmanship, Dr. Cheruzel has become a valued member of the SJSU faculty through a combination of excellence in teaching and research.

Dr. Cheruzel currently leads an active research group comprised of eight undergraduate students and one graduate student. He and his group are focused on Cytochrome P450, and the synthetic potential for biotechnological applications. More on the Cheruzel Research Group can be found at www.sjsu.edu/cheruzel. Dr. Cheruzel has made significant contributions to the development of knowledge in his field as evidenced by his strong publication record with three publications in peer reviewed journals since joining the faculty and one publication currently in review.

— Pat Lopes Harris, SJSU Today

Faculty Recognition

PROFESOR ELLEN METZGER IS AN APPG DISTINGUISHED EDUCATOR

Professor **Ellen Metzger** in Geology and Science Education received the 2013 Distinguished Educator Award of the Pacific Section of the American Association of Petroleum Geologists (AAPG) in "recognition of distinguished and outstanding contributions to geological education and counseling of students."

Dr. Metzger has been the Co-Director of the Bay Area Earth Science Institute (BAESI) program to educate teachers in Earth Science since 1990 and was a National Association of Geoscience Teachers Distinguished Speaker from 2005-2008. She has written articles not only on geology including petrology and geochemistry, but also on diversity in the geosciences; incorporation of Earth Science into physics and chemistry classes; and how Earth scientists can reach out to teachers.

In her free time, she has worked with NASA, Chevron, NSF, Intel and others to solicit funding for her programs as well as served on the Board of Directors of the California Science Teachers' Association.

Congratulations, Dr. Ellen Metzger!

Geology Chair Bob Miller noted that Professor Dave Andersen won this award in 2005. SJSU is one of only a few universities who have had two faculty members receive this recognition.

FACULTY REMEMBERED

Sally Veregge with that great smile

Surrounded by her family and friends at home, **Sally (Sylvia) Veregge** passed away peacefully on September 22, 2012. Sally is survived by many friends who treasure the time they had with her.

Sally thoroughly immersed herself in education and the integration of education within the world. She earned a BS and MS in Biology and a BS in Nursing followed by a PhD in Neuroscience from Baylor College of Medicine, Houston. Sally brought her strong educational background and eclectic working background to the Biological Sciences department at San José State University in 1984 where she taught a wide variety of courses and rose to the rank of Professor and Chair of her department.

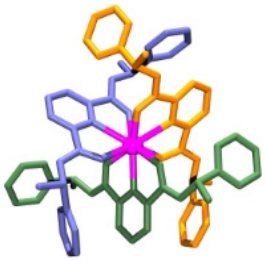
Quietly innovative as a professor, Sally collaborated with others to create interdisciplinary curricula such as one of the first Professional Science Masters in the country [Masters in Biotechnology] providing students strong internship opportunities in the valley and working closely with the hospitals and clinics in the area to build and support a Clinical Laboratory Science program.

Sally was a loved and respected teacher. She treated every student as if they were her only student. She engaged students in her research laboratory and spread the ability to learn and the love of learning to thousands.

Sally often expressed herself with her trademark smile. We will keep her in our hearts and minds remembering how she enjoyed life, respected and helped others, lived life to its fullest and cherished her family and friends.

Exciting Research is Happening Here!

PROFESSOR LEADS STUDENTS IN RESEARCH LINKED TO MRIs



Muller's team created this lanthanide compound.

Chemistry department Chair **Gilles Muller** does research that helps biochemists understand how molecules interact with other molecules in the body using the lanthanide series as probes. Gilles stated, "The reason why we study lanthanides is because when you excite them with a certain wavelength or a light of a certain color, they emit another wavelength or color." Muller studies these emissions using circularly polarized luminescence spectroscopy, a technique that uses lasers to determine the configuration and interaction between compounds and biomolecules.

Thanks to the National Institutes of Health and other grants, Muller leads a dynamic research group comprised of 10 undergraduates and two graduates focused on polarized light and the potential for biomedical applications.

In 2008, Muller won the Henry Dreyfus Teacher-Scholar Award for his dedication as an outstanding teacher and mentor for undergraduate scholarly research. Muller stated, "The most rewards come from seeing that at some point, I have made a contribution to my students' futures. We are an institution where faculty and students work very close and that is why I came to SJSU."

— Amanda Holst, SJSU News

WHAT MAKES DORMANT SEEDS GERMINATE AFTER WILD FIRES?

Ithuriel's Spear *(Triteleie laxa)*
Photo courtesy of grownatives.cnps.org

Seeds from certain fire-adapted plants can lay dormant for years until an intense fire causes them to germinate. Professor **Daniel Straus** and his students have been studying the chemical signals from the fire that induce germination in these plants, karrikins, small butenolides produced in the smoke of burning cellulose from plant material, have been found to be potent stimulators of germination. However, their isolation is tedious.

Jia Lu separates and tests the components of a karrikin solution (Christina Olivas photo).

Professor Straus and his research student **Jia Lu** have been using synthetic methods to produce karrikin and then testing the compound in field studies. Straus and his team have observed growth enhancement by their synthetic karrikin in one species, *Ithuriel's Spear,* so far. The advantages of producing karrikins by laboratory synthesis include the possibility of producing larger amounts and the ability to modify the structure. Professor Straus is interested in exploring whether the known karrikins or analogues might have value as a growth enhancing agent in other plants, including crops. To learn more, read the article about their work in SJSU Today.

21st Century Classes

PROFESSOR USES SMARTPHONES TO ENGAGE STUDENTS

Cell phones are usually discouraged in the classroom. But you won't find Associate Professor **Peter Beyersdorf** asking his students to put their phones away.

Dr. Beyersdorf stated, "Students have always liked being engaged in interactive classes. Anytime you can make class fun, it has benefits to learning." At the end of every class Beyersdorf asks his Physics 51 students to turn on their smartphones to take a quiz.

According to Beyersdorf, the results of the quizzes give him an overall assessment of the class and keep him interested in developing new material. "For the most part, technology isn't changing the way people teach and learn, it's giving them more avenues and opportunity to tap into learning in less traditional environments," Beyersdorf said.

— Amanda Holst, SJSU News

CLASS PROMOTES INTERDISCIPLINARY "BIG DATA"

The Computer Science Department introduced an experimental class in the fall that is expected to fill a huge unmet need for businesses to pull together and analyze "Big Data" from their growing databases.

Department Chair Jon Pearce said, "If you understood some of these techniques and could do this, you would be invaluable, instantly employable and have a ton of job security."

The class, Introduction to Big Data, CS 185C takes a look at wrangling the giant amount of data generated by the explosive growth in online communications to address all sorts of issues including establishing business trends, tracking infection rates, fighting cyber crime, or even screening potential employees. The class is now a four-course certificate program.

— Amanda Holst, SJSU News

NEW PROFESSIONAL SCIENCE MASTERS (PSM) DEGREE IN STATISTICS

The Mathematics Department began the Professional Science Masters (PSM) degree program in Statistics in the fall of 2011. It is one of only four PSMs in statistics nationwide and the only MS Statistics PSM program west of the Mississippi.

A Professional Science Masters is designed as a degree that teaches students the necessary skills to work in business, government or industry. In the MS Statistics program, important practical skills students will learn include the ability to communicate statistical ideas effectively, the ability to use technology effectively to assist in solving large statistical problems, and the ability to use statistical modeling to solve practical problems. In addition to their required course work, MS Statistics students are expected to gain experience as a statistical consultant.

The Director of the MS Statistics program is **Dr. Steve Crunk**. For more information, visit the web page http://ww.sjsu.edu/statistics/. For information about a career in Statistics, go to http://www.math.sjsu.edu/~crunk/.

The MS Statistics program began with 26 students in the spring 2012 semester. It is projected to reach nearly 100 students by next year.

— Brad Jackson, Ph.D.

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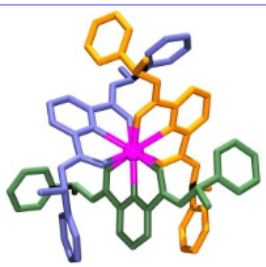

Muller's team of research students created this lanthanide compound. See story on page 10.

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J. Michael Parrish, Dean
Elaine Collins, Associate Dean
Editor
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Exploring for a better tomorrow!

Alumni: As a graduate of the College of Science, you are part of a community who are continually seeking answers about our world and beyond.

For those interested in a better tomorrow, please consider making a donation toward our continued excellence in teaching future scientists.

http://www.sjsu.edu/giving/support/colleges/cos/index.html