

Santa Clara BioNews

Winter 2006 volume 1, issue 2

Santa Clara University Department of Biology

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UPCOMING EVENTS

Study Abroad and the Sciences

Science students considering studying abroad are encouraged to attend a special program on Monday **Feb. 13th at 5:30 in the Alumni Science Commons**. This informational meeting will highlight programs that fulfill science requirements, ranging from pre-health to ecology to genetics. Virtually all fields of biology and environmental sciences are available. Students who have recently returned from international science experiences will share their insights and photographs, and answer questions. Information will be available on programs in locations ranging from Latin America to Africa to Australia to Europe. For more information contact Dr. Janice Edgerly-Rooks jedgerlyrooks@scu.edu.

Paperwork for Graduating Seniors

For students who plan to graduate in June, pre-graduation evaluations and graduation petitions are due to the Student Records Office by Feb. 24. Blank forms can be picked up in the Biology Office, or in Student Records. If you haven't done it already, please make an appointment with your advisor for the pre-grad evaluation. Completed forms can be turned in to the Biology Office for the Chair's signature. You must also complete the Biology Department exit survey and send it in by email to Cena Hoban choban@scu.edu



Bio 100 - Hot Topics Spring 2006

The focus of the spring quarter edition of the Biology Department's **Hot Topics** seminar course will be **Global Health**, as broadly interpreted by the Biology faculty. Faculty presentations and discussion will focus on issues related to human and/or environmental health around the world, including (for example) infectious diseases in the developing world, environmental toxins, the impact of climate change on ecosystems, and many other topics. The course will meet from **4:45-6:00 pm on Mondays in Alumni Science 120**. The SCU community (students, faculty, and staff) are invited to all presentations. Biology students who plan to participate throughout the quarter should register for Bio 100, a 2 unit upper division course that can be taken multiple times. (Note – Bio 100 does NOT count as one of the seven upper division Biology courses required for the Biology major, but it does count toward the 60 upper division units required for a degree in the College of Arts and Sciences.)

The Bio News "Staff"

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FACULTY NEWS

New lecturers for Spring quarter

Archana Sudame unexpectedly was called upon to join the Biology Department during winter quarter as a replacement instructor for *Bio 4: Light and Life*. (A big THANKS for that!) She will continue teaching in the Biology Department in the spring quarter with *Bio 5: Endangered Ecosystems*. Dr. Sudame received her PhD in Environmental Sciences from Rutgers University in 2003. Since then, she has been working as a Biologist for the California Department of Transportation, carrying out biological surveys of sensitive habitats and monitoring mitigation efforts in the east bay region.



Somasekar Seshagiri will be teaching *Bio 179: Bioinformatics* this spring. Dr. Seshagiri is a scientist at Genentech, where he oversees the DNA sequencing facility, and works on projects to identify and characterize mutations associated with lung and skin cancers. Dr. Seshagiri is an experienced instructor who has taught bioinformatics to a variety of audiences, from undergraduates to clinical professionals. Bioinformatics is a major new addition to the SCU Biotechnology program, and we welcome Dr. Seshagiri to SCU!

Devavani Chatterjea will be joining us to teach *Bio 114: Immunology*. Dr. Chatterjea received her PhD in Microbiology from Stanford University in 2001. She subsequently worked as a post-doctoral scientist in the Department of Pathology at Stanford, studying the development of the immune system, and the roles of mast cells and basophils in fighting infection. Like Dr. Seshagiri, Dr. Chatterjea is currently a research scientist at Genentech, studying T cell biology and inflammation. Dr. Chatterjea will be starting as an Assistant Professor at Macalester College in Minnesota this coming fall, but we are very happy to have her teaching at SCU in the meantime!



Virginia Matzek will be teaching *Bio 151: Restoration Ecology* in the spring, a new cross-listed course for Environmental Studies and the Biology Department. Dr. Matzek has a M.Sc. in Environmental Science, Policy, and Management from U.C. Berkeley, and will shortly be receiving her Ph.D. in Biology from Stanford. She came to SCU this past fall as Director of Campus and Community Programs for the Environmental Studies Institute. In 2006-07, Dr. Matzek will be teaching *Bio 156: General Ecology* (winter 2007), and *Bio 133: California Plant Communities* (spring 2007).



Other Faculty News....

On a sad note, Dr. John Mooring lost his beloved wife Kay to cancer on November 30, 2005. They were married for 50 years. Please remember John & his family in your thoughts and prayers.

FACULTY SPOTLIGHT

Dr. Bill Murray

By Anne Dee & Maria Miranda

Though Dr. William Murray is a Professor at San Jose State University, he frequently teaches biology courses at SCU, including Pathogenic Microbiology, Parasitology, and Virology – courses that inevitably are memorable experiences for his students.



Dr. Murray's wealth of knowledge, his stories and photos, and his sense of humor are famous among biology students. We recently spoke to Dr. Murray in his office at San Jose State to find out more about him.

Dr. Murray grew up on a farm, where his lifelong interest in animals began. When he was young, one of his horses fell ill and had to be put to sleep. His amazement when the vet told him something as small as a microbe could kill an animal as large as a horse led him to become interested in infectious diseases. He ultimately received a Doctor of Veterinary Medicine degree from Purdue University.

Dr. Murray finds the "complex interplay between microbes and humans" the most fascinating aspect of infectious diseases. The application of "new tools and technology to understand cause and effect of diseases" not only involves the study of biology and molecular pathogenesis, but must also consider changes in human culture, behavior, and demographics. Dr. Murray's research is primarily in the field of parasitology, investigating pediatric and zoonotic diseases. Dr. Murray is also part of an informal group of medical historians exploring how diseases have influenced human history, both causing and resulting from social changes and upheaval. "I'm a frustrated history professor," says Dr. Murray.

Though he was initially interested in a career in engineering (having grown up in a family of engineers), Dr. Murray felt that biology would give him more options. His career has allowed him a variety of opportunities to acquire new skills, travel the world, and encounter unique cases and exotic animals. With regard to teaching, Dr. Murray says he "unexpectedly fell into [it]." Nonetheless, he enjoys mentoring students as a way of giving back. As a professional photographer, he often uses photos to augment his class lectures, because "images convey information in ways that words alone cannot." He finds his interaction with students to be valuable, as they ask good questions and force him to keep up with contemporary research. "Teaching benefits me as much as [it] benefits the students." Dr. Murray believes that "Education is the one true gift you give to yourself." He encourages students to also be flexible and keep their options open, and to realize that biology is a large field. "You'll probably change careers many times in your life. Have confidence, learn new skills, and find something you really like to do. Listen to

your hearts - you'll only be successful doing things you like to do."

ALUMNI PROFILE

Dr. Justen Whittall, SCU '96

By Munroop Atwal

Justen Whittall Ph.D. is a 1996 graduate of SCU. He received a Masters in Plant Systematics from Oregon State University, and in 2005, he received his Ph.D. in Plant Evolution from UC Santa Barbara. I had the privilege to interview Dr. Whittall to get a first hand account of an SCU graduate pursuing his passion in biology.

Dr. Whittall, what is the focus of your research? My research aims to elucidate patterns and processes of plant adaptation and speciation, particularly with respect to flowering plants (angiosperms). I use molecular data (DNA sequences and other genomic tools) to reveal the evolutionary relationships among species. Using these relationships, we can begin to understand patterns of evolution and test specific hypotheses regarding how plants have adapted to their environment. For example, my dissertation research on columbines examined relationships of the 25 species in North America, then used these relationships to understand how new species form. Previous hypotheses suggested that changes in habitat (from desert springs through coniferous forests to alpine peaks) were responsible for the rapid and recent diversification of the North American columbines. My research revealed that columbines have also diversified in response to different pollinators (bees, hummingbirds and hawkmoths). The role of pollinators as driving forces in speciation is not unique to the columbines. Adaptation of plants to pollinators is a major contributor to the diversity of flowering plants we see today.



How did you choose this field? Was this always your passion, or did a particular event spark your interest?

I became interested in plant evolution after taking Dr. John Mooring's Field Botany course during my sophomore year at SCU. In addition to teaching us plant terminology and the unique characteristics of many plant families, he empowered me with a tool to teach myself outside of the classroom – (a book called) *The Flora of the Santa Cruz Mountains*. With this book, I could identify all the plants in the mountains surrounding the Santa Clara Valley. I began drawing plants as I identified them, starting with the weeds I found in vacant lots around campus. I became interested in everything botanical, helping start a community garden on campus, and contributing to the interpretive displays in the native plant habitat outside the law school at SCU. The encouragement of Dr. Mooring, Dr. Eisinger, Dr. Edgerly-Rooks and Fr. Parnell during this time was very influential. I also began volunteering at the UC Berkeley Jepson

Herbarium a couple times a week at the end of my junior year and throughout my senior year.

What is a typical day for you? As a Comparative Biology postdoctoral fellow in Evolution and Ecology at UC Davis, I'm pursuing my interests in plant systematics and evolution. Every day is different. Overall, I develop new research projects, execute them, prepare manuscripts for publication, and move on to the next project. Most projects begin with fieldwork. I use historical information from the herbarium to track down populations of plants to use in my research. Although sometimes I can find plants locally, I've also had to travel throughout the US, Mexico and Canada to obtain specimens for my research. Leaves, seeds and whole plants are brought back to the lab, where I'm currently looking at flower color gene expression from RNA extracts of flower petals. Often my research involves very large datasets of DNA sequences. Recently, I've been performing analyses using our lab's 64-node cluster of computers for the computationally-intensive reconstruction of evolutionary relationships. When I'm not actively collecting data, I often have meetings with collaborators that I'm working with on research projects (several UC Davis faculty, as well as scientists from the US Forest Service, Alaskan Natural Heritage Program, University of Pennsylvania, and several other universities). We're writing papers for publication, and writing grants to fund future research. I also organize a weekly journal club, "The Phylogenetics Discussion Group" that brings together students, researchers, and faculty from several departments at UC Davis to discuss tools for understanding evolutionary relationships.

What are some of the best things about your work? I get to do what I love! I always dreamed of having a career where I looked forward to going to work. I think about plants non-stop whether I'm out in the field, in the lab extracting RNA from flowers, writing manuscripts, or just walking across campus. I really enjoy the field component to my research. I've done field work in Australia, New Zealand, Mexico, Texas, and all the states west of the Rockies. Understanding the ecological forces responsible for flowering plant diversity requires an intimate knowledge of plant-life in the wild. Fieldwork always invigorates me, and inspires my pursuit of the nexus between molecular biology and evolutionary ecology.

What kinds of struggles or hardships do you face in your work? Although there's a lot of stress associated with writing and reviewing manuscripts and grants, field work can pose actual physical danger. On a columbine collecting expedition to Arizona, I got out of our vehicle and hiked right up to a plant we were looking for. As I reached down to examine its flowers with my hand lens, I just about stepped on a rattlesnake at the base of the plant. I later learned that rattlers prey on the hawkmoth and hummingbird pollinators of these columbines (and also unsuspecting botanists!). On another collecting excursion, I climbed Mt. Charleston in a remote area of southern Nevada to locate an unusual alpine columbine. After finding the plants in the dark with my headlamp, I decided to camp out on the mountaintop. In the morning, I discovered that my water had frozen overnight. The thin air and cold temperatures weren't conducive to melting the water, so I quickly descended, for fear of dying of thirst during the 10 mile walk back to the spring to fill my ice-cubed canteen!

Where do you see yourself ten years from now? I hope to be teaching the next generation of plant enthusiasts and continuing my research program in plant systematics and evolution. I would like to join the faculty at a medium to small university where I can empower students with modern versions of the tools I discovered as an undergraduate at SCU.

Do you think SCU prepared you well for the "real world"?
"Very much so! The individual attention, encouragement and thoughtful advice I received at SCU has guided my path ever since."

What advice do you have for students who are interested in pursuing a career in research?

- 1) Pursue your interests. What starts as a small spark of intrigue can quickly become a flaming desire to know more. Without pursuing those leads, you'll never know if that was a viable path for you.
- 2) Surround yourself with people you admire and respect, both scientifically and personally. Getting to know people in your field will often reveal whether or not that direction is for you.
- 3) Dedicate yourself to something. Even if you are not sure that something is going to be your lifelong career, at least give it a dedicated chance. At the least, you will have learned something along the way. At best, you may have found something really rewarding.

What are some things students should take into consideration when choosing the right graduate school?

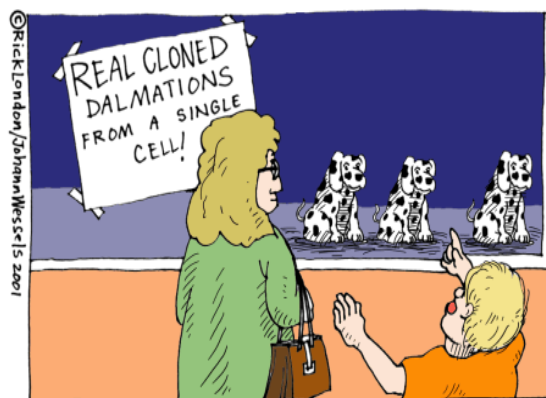
The "right" graduate school is different for every student and can be different in every field. I was constrained geographically because I wanted to stay on the west coast. I introduced myself to several faculty at research universities with appropriate graduate programs. For my master's degree, I applied to four or five schools and visited all of them before even applying. Having made personal contact with a prospective faculty advisor is essential!

- Ask if your prospective advisor has tenure and whether they are considering changing universities in the near future. Both my Master's and Ph.D. advisors received tenure while I was under their tutelage - a bit dangerous, but worth it.

- Consider how successful the department and your prospective advisor have been with previous graduate students. How long has it taken others in their lab to get their degrees? What are they doing now?

- If you are clear on your research goals, ensure the university has sufficient facilities for you.

- Lastly, but importantly, you will likely need funding for your degree. Typically graduate students are supported by some combination of teaching assistantships and research assistantships. Often your tuition and fees are waived. Although you're not going to get rich being a graduate student, it's pretty amazing that you can get paid to go to graduate school!



Mommy, how much is that genome in the window ?

“Ethical Issues in Biotechnology & Genetics” Posters Presented to Board of Trustees, Regents

by Andrew Vu

In an age of technological innovation and development, especially in the field of biotechnology, it is increasingly important to ask ourselves how we should use this technology in the best possible way. Topics such as human cloning, genetic testing, stem cells, and genetically modified foods are captivating the interest of the public and making headlines in the news. Dr. Leilani Miller (Biology Department) and Dr. Margaret McLean (Religious Studies, Markkula Center) have teamed up to teach a class on *Ethical Issues in Biotechnology & Genetics* to explore this subject in more detail.

The course seeks to provide students with the tools to recognize, question, and discuss ethical issues accompanying the growth of biotechnology. Dr. Miller makes sure students have a scientific foundation on which to explore the issues. “Once you understand the science,” Dr. Miller believes, “you can see how it works, and have high level discussions” on the topic. Dr. McLean’s role is to provide students with a background in ethical theory and methodology.

The Bio 171 course consists of lectures, discussions, and case studies, and culminates with a final poster project. Dr. McLean remarks that “ethics is done better in context,” and the case studies give a practical scenario for students to work with. The final poster project allows students to focus on a specific question, and carry out in-depth research on that topic. Dr. McLean notes that the poster projects allow students to “present science and ethics in a holistic way”. The project is done in groups of three, and the students must choose a side and defend it. They often find themselves having to negotiate differences and work out positions, forcing them to develop teamwork and oral communication skills. The poster projects are presented to the SCU community near the end of the quarter, in hopes of stimulating public interest and discussion. The poster presentations were so interesting and impressive this year that Fr. Locatelli asked the class to present the posters at a reception before a recent Board of Trustees meeting, and later to the Board of Regents.

“Unlike science, the study of ethics often presents no clear answers”, says Dr. Miller. “Ethical questions are always evolving, and we have to continually revisit them.”

As Dr. McLean points out, there will probably never be a definite solution to the world’s ethical issues, but we must nevertheless keep questioning and discussing them. For interested students, the *Ethical Issues in Biotechnology & Genetics* (BIOL 171) course, which is a required course for the Biotechnology minor, will be offered again in the spring quarter of 2007.

Job Opportunity - Research Position in Vascular Biology at UCSF

An opportunity is available for a full-time salaried research assistant to work in the laboratory of Dr. Donald McDonald (UCSF Department of Anatomy, Cardiovascular Research Institute, Comprehensive Cancer Institute). The focus of the lab’s research is vascular biology, particularly angiogenesis and vascular remodeling in inflammation. Projects involve the use of mouse models of cancer and chronic inflammation. Tissues are analyzed by a variety of morphological and immunohistochemical techniques using light, fluorescence, confocal, and electron microscopy. The candidate will also be responsible for ordering mice and reagents, caring for animals, preparing buffers and general laboratory upkeep, writing experimental protocols, and administering drugs to mice, as well as performing surgery, removing and processing tissues, making measurements, and analyzing results.

The positions are available in the late spring or early summer of 2006. At the latest, the new research assistants should plan to begin work in early June. Although a two-year commitment is essential, the job is temporary in that it is assumed that the applicants will eventually attend medical school or graduate school. In general, we are looking for highly motivated students who have a strong science background. Oral and written language skills, effective interpersonal skills, and computer skills are also very important. No prior research experience is required, but it would be an obvious advantage.

For more information, a complete job description, or to submit a resume, contact Natalya Lyubynska or Rachel Davis (rbdavis@itsa.ucsf.edu). Resumes should include science and math courses completed, prior research and work experience, career objectives (M.D., Ph.D., or both), MCAT or GRE exams taken and scores, earliest possible starting date, names and contact information for three references, and desired date of matriculation into medical or graduate school.

Summer programs & Internships

Many faculty in SCU science departments offer students research opportunities in the life sciences. Interested students should individually seek out faculty and inquire about internship possibilities, as there is no formal application process. There are also many summer research and training programs available at other universities, research institutes, and for-profit companies.

A great place to start looking for biology and biotechnology summer internships opportunities, organized by discipline and geographic location, is a website put together by the Rochester Institute of Technology:

www.rit.edu/~gqfsbi/Symp/summer.htm#categories

We’ve also collected some local opportunities below:

California Academy of Sciences – Summer Systematics Institute (6/19 – 8/11/06)

Contemporary Issues in Natural Science

The Summer Systematics Institute was formed more than 10 years ago with support from the National Science Foundation. The SSI partners seven undergraduate

students with California Academy scientists to conduct research, as well as participate in tours, seminars and lectures related to biodiversity, phylogenetic systematics, molecular techniques, evolutionary biology and global change. The SSI provides a \$3,500 stipend, and up to \$2,850 in travel and living costs. Applications are due February 17, 2006, and are available online at: <http://www.calacademy.org/research/internship/ssi/>

Stanford University, School of Medicine – Health Careers Opportunity Program (6/25 – 8/5/06)

Medical Career Preparation

The Stanford HCOP is committed to developing a diverse health care workforce to serve underserved and disadvantaged populations. Stanford HCOP provides a supportive academic opportunity for motivated, promising educationally, and economically



disadvantaged students who seek a career in medicine, medical research, and minority health issues. The curriculum consists of a combination of medically-related sciences courses, academic advising and coaching, workshops, research, MCAT reviews and other events, all emphasizing critical thinking and scientific reasoning. Applications are due March 11, 2006, and are available online at: <http://hcop.stanford.edu/>. For more information contact Kathryn Fitzgerald at kathrynf@stanford.edu

Stanford University, School of Medicine – Summer Research Program in Biomedical Sciences.

The Stanford Summer Research Program in Biomedical Sciences is a fully funded residential internship program offering undergraduates who want to prepare for and enter PhD programs in the biomedical sciences a unique opportunity for advanced research experience. This experience includes research design, coaching, educational workshops, field trips, and presentations in a symposium. Provides a \$2,000 stipend, and all accommodations, travel and meals are paid for. Applications for this summer were due February 1, 2006, but for more information on future internship opportunities go to:

<http://med.stanford.edu/phd/diversity/ssrp.html>

University of California, San Francisco – Undergraduate Mentorship Program in Dentistry (6/18 – 8/2/06)

The UCSF School of Dentistry offers comprehensive degree programs in specialty areas of dentistry including oral and maxillofacial surgery, public health, pediatric dentistry, endodontics, prosthodontics, periodontics and orthodontic. UMP helps put undergraduate students on the track for dental school and

exposes them to the dentistry profession with hands-on experience in a clinical setting with faculty or dental student mentors. Students will attend classes, field trips, demonstrations and presentations. Applications are due March 3, 2006, and are available online at:

http://dentistry.ucsf.edu/admissions/admiss_program5.html#ad6

For more information contact the UCSF School of Dentistry at (415) 476-3151 or go online.

University of California, San Francisco – Summer Research Training Program (Pharmacy)

The UCSF School of Pharmacy is a nationally top-ranked school that offers undergraduates, interested in pursuing a PharmD/PhD degree, the opportunity to conduct research, and obtain a working knowledge of pharmacy-related laboratories, clinical research involving patients, and social, behavioral and health policy research. Students work closely with faculty and participate in weekly discussion seminars, and present findings in a symposium. Applications for this summer were due February 1, 2006, but for more information on future internship opportunities go to:

<http://pharmacy.ucsf.edu/pharmd/outreach/summerresearch/>

Public Health and Healthcare

The Health Career Center has offered internship placement for over 20 years, and is works to place students in leading healthcare organizations including hospitals, clinics, medical groups, health plans and healthcare associations, advocacy organizations, public health departments, consulting firms and healthcare product providers. The HCC is partnered with UC Berkeley and UCLA Schools of Public Health, connecting students with faculty and mentors. For more info go to:

<http://www.healthcareers.org/main/apply/login.asp>

Roche (Palo Alto) - Biotechnology

Our full-time ten-week internship program provides an opportunity for undergraduate juniors and seniors to gain hands-on experience in a focused, highly productive setting. Internships have been offered in Biology, Biochemistry, Cell and Molecular Biology, Analytical Chemistry, Medicinal Chemistry, and Pharmacology. Working under the guidance of a Roche mentor, interns are assigned significant cutting-edge projects in their field of study. Full-time interns are compensated at \$13.50/hr ten-week internships are available mid-June to mid-August. Interviews will take place in late March for selected students. To apply, e-mail your resume and cover letter to paloalto.interns@roche.com

Please include a college major or area of interest in the subject line of the e-mail. The deadline is February 28, 2006.

Schering-Plough Biopharma, Summer Intern - Bioinformatics (Requisition ID: 14489BR)

Schering-Plough Biopharma is seeking a summer intern to develop data display tools for gene expression and protein expression data. The candidate will develop data display tools for gene expression and protein expression data, developing an interactive, information-rich display of data from a gene expression database, as well as a proteomics application to report experimental results. This position will

provide exposure to gene and protein expression data, databases, and good software engineering practices. Interacting with bench scientists on a daily basis, the intern will have the opportunity to develop software with scientifically rich data displays. The intern must be at least a junior, enrolled in a bonafide college Bioinformatics program or in a combination major and minor of Biology and Computer Science, and be capable of coding in java or Perl. The position will last a maximum of 12 weeks during the period from June to August, 2006. To apply, please visit the Schering-Plough career website at http://www.scheringplough.com/schering_plough/careers/careers.jsp

Gilead offers paid scientific internships in Medicinal Chemistry, Biology, Metabolism and Protein Chemistry at its Foster City, CA campus. College/University students should be in their junior year with a B average or better and have completed at least one lab course. Interested students may apply by sending their resumes to careers@gilead.com.

Genentech summer internships (South San Francisco and other sites): www.gene.com/gene/careers/college/internships/

Celera internships (South San Francisco and other sites): www.celera.com/celera/college_programs

PDL Biopharma (Fremont) internships: www.pdlbiopharma.com/index.cfm?navId=76

Theravance (South San Francisco) internships: www.theravance.com/careers/internships.php

Lawrence Berkeley National Laboratory internships: <http://www.lbl.gov/Education/CSEE/cup/Summer2006/>

The **National Institutes of Health** has a large number of summer research internships available at many sites. For a directory of these opportunities, go to www.jobs.nih.gov/pdf/studentprogramsNIH.pdf

Ephor, a new student journal for the SCU community!

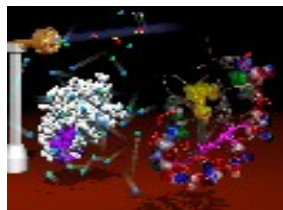
By Victor Quintanar-Zilinskas

Students produce great work on a regular basis. Whether it's a term paper, capstone research project, honors thesis, or something else, these papers have the potential to be excellent scholarship. If the work of professional scholars is published for the worldwide academic community, the best efforts of scholars-in-training should at least be shared with the campus community!

The *Ephor* is a journal for Santa Clara students, founded as a forum for the exchange of student body intellectualism. The mission of this journal is to encourage students to express and examine quality thinking as a part of the learning community a university is supposed to be. This article was written as a call to all students for submissions.

Submissions are due by finals week, and the first issue is scheduled to be online by April 14th at the *Ephor* web site (temporarily at www.xanga.com/BigEphor.)

All students are encouraged to contribute to this journal. Professors may also contribute articles or other work. Send submissions to editorephor@yahoo.com. Commentary-type work is welcome. Academic papers require a reasonable approximation of the standard MLA/APA bibliography. *Ephor* looks forward to receiving your work!



NEW!!! INTERDISCIPLINARY BIOENGINEERING PROGRAM at SCU

Starting this spring, a new interdisciplinary program in Bioengineering will be launched at Santa Clara University. The goal of the program is to educate students to solve problems that interface engineering with the life sciences and medicine. The program is designed to prepare students for careers in biomedical research and development, particularly with respect to development of medical technology and instrumentation. The bioengineering program could also be useful for students preparing for professional training in medicine, dentistry, optometry, or other health-related fields. The curriculum integrates biology, chemistry, physics, mathematics, and engineering. In particular, the program will help students understand problems and issues relating interactions between living and non-living materials and systems.

The Bioengineering Program has major and minor degree options. Students can choose a "General Engineering" major with a concentration in Bioengineering. Within this major, there will be separate tracks in "Biomedical Devices and Instrumentation", and "Biomolecular Science". These tracks will share lower division requirements, but differ in upper division options. Alternatively, students planning to major in one of the sciences can choose to add a minor in "Biomedical Engineering".

The first course offered for the program, **ENGR 10: Introduction to Bioengineering**, will be taught by Tim Hight (Mechanical Engineering) this spring. Check the course catalog for more information. This will be an exciting, interactive course offering an overview of the field.

For more information, contact one of the following people:
Dr. Timothy Hight (Mech. Engineering) THight@scu.edu
Dr. Samiha Mourad (Elec. Engineering), SMourad@scu.edu
Dr. Craig Stephens (Biology), CStephens@scu.edu
Dr. John Birmingham (Physics), JBirmingham@scu.edu
Dr. Brian McNelis (Chemistry) BMcnelis@scu.edu



Study Abroad Opportunities

Applications for Summer and Fall 2006 international education immersions are due soon. SCU offers community-based learning, field experience, and classic classroom settings at over 110 sites worldwide, including the following SCU-affiliated programs:

- Casa de la Solidaridad in El Salvador (Fall & Spring)
- Casa Summer Pre-Med/Pre-Health Policy
- London (Summer, Fall, Spring quarter)
- Durham, England (summer)
- Verona, Italy (summer)
- Cuba (fall and spring quarter)
- Freiburg, Germany (summer)

Recent policy changes have made virtually all SCU scholarship and financial aid available for SCU and affiliated overseas programs. For more information, visit the International Programs website www.scu.edu/studyabroad or stop by their office in the Cesar Chavez Commons, Bldg. A.

Biology Courses for Summer 2006

The Biology Department has lined up an excellent assortment of courses this summer, with a particular focus on human biology. If you're behind on upper division courses, or just want to get ahead – maybe you're planning on going abroad in the fall? – Both summer sessions have upper division courses available, with or without a lab.

Session I June 22nd – July 28th

Bio 2 Human Health/Disease MW 6-9pm Murray
 Bio 104 Human Anatomy L+L MTR 3:20-5:30pm Majlesi
 Bio 104 LAB TR 6-9pm
 Bio 145 Virology MWR 8-10:10am Murray

Session II July 31st – September 5th

Bio 28 Human Sexuality MTR 8-10:10am Jackler
 Bio 116 Human Genetics TR 6-9pm Fowler
 Bio 124 Human Physiology MWR 3:20-5:30pm Courtney
 Bio 124 LAB MW 6-9pm

To register follow this link:

<http://www.scu.edu/summer/>

Biology Courses for Spring Quarter

Non Majors Courses

Bio 5 Endangered Eco L+L, Sudame, TR 11:50-1:35 ALMSC220
 Bio 5 LABS TUES OR THURSDAY 2:15-5:00 ALMSC 125
 Bio 18 Explor Biotech L+L, Sundaram, MWF 11:45-12:50 ALMSC 220
 Bio 18 LABS MON OR WED 2:15-5:00 ALMSC 125

Biology intro series

Bio 23 Invest in Evo & Eco L+L, Dahlhoff, MWF 10:30-11:35 ALMSC120
 Bio 23 Invest in Evo & Eco L+L, Edgerly-Rooks, 11:45-12:50 ALMSC120
 Bio 23 LABS TUES, WED, THURS 2:15-5:00 ALMSC 260,262
 Bio 23 LABS TUES & THURS 8:30-11:45 AALMSC 260,262

Upper Division Courses

Bio 100 Hot Topics, Miller, M 4:45-6:00 ALMSC 120
 Bio 104 Human Anatomy L+L, Majlesi, TR 7:00-8:30PM ALMSC 220
 Bio 104 LAB TUES & THURS 8:30-10:00 ALMSC 310
 Bio 110 Genetics L+L, Miller, ALMSC 120
 Bio 110 LABS TUES, WEDS THURS 2:15-5:00 ALMSC 359
 Bio 111 Parasitic Micro, Murray, TR 8:00-9:45 ALMSC 120
 Bio 113 Microbiology L+L, Stephens, MWF 1:00-2:05 DALY 201
 Bio 113 LABS MON WED 2:15-4:00 ALMSC 361
 Bio 114 Immunology, Chatterjea
 Bio 131 Agroecology L+L, Eisinger
 Bio 131 LABS TUES OR THURS 2:15-5:00 ALMSC 127
 Bio 151 Restoration Ecology L+L, Matzek
 Bio 151 LABS TUES OR THURS DALY 106
 Bio 174 Cell Biology L+L, Grainger
 Bio 174 LABS TUES OR WED 2:15-5:00 ALMSC 302
 Bio 178 Bioinformatics, Seshargiri W 7:00-10:00 ALMSC 256
 Bio 187 Bio of Aging, Plonka T 6:00-9:00 ALMSC 120
 Bio 191 Project Lab: Biotech L+L, Islas
 Bio 191 LAB TUES & THURS 2:15-5:00 ALMSC 301