

Biology Department Newsletter

Fall 2011

Welcome, new and returning students, to Fall Quarter at SCU!

This quarterly newsletter is meant to inform you about what's going on with our students, faculty, and staff here in the Biology department, as well as to keep you up to date on upcoming events, internship opportunities, and Biology courses to be offered next quarter. Thanks for reading, and enjoy!

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Interested in Studying Abroad?



"Visiting the wreck of Hilma Hooker."
Photo courtesy of www.ciee.org



"Documenting underwater resources."
Photo courtesy of www.ciee.org

WHO: Students interested in marine biology and/or conservation ecology

WHAT: CIEE's Tropical Marine Ecology and Conservation program

WHEN: Summer of 2012

WHERE: Study abroad in Bonaire, an island in the Southern Caribbean, 50 meters off the coast of Venezuela

WHY: Learn scuba skills, how to use photo and videography equipment, study coral reefs and other ecological systems, and more!

For more information visit www.ciee.org!!!

Study Abroad information continued on page 4.



Robert Noyce Scholarship Awarded to Chris Macko

Congratulations to Chris Macko ('11), one of eight recipients of this year's SCU Noyce Scholarship! Open to science, math, engineering, or technology (STEM) majors and professionals, the Robert Noyce Teacher Scholarship Program is dedicated to improving the quality of education in high need school districts by increasing the number of qualified STEM K-12 teachers. Each year, the program provides SCU and other universities with scholarships to fund its recipients' graduate level teaching credentials. In return, the recipients must teach for two years in a high need school district, to be completed within four years of the start of the program.

Like many biology majors, Macko was pre-medicine or pre-PhD for most of his undergraduate years. It wasn't until his senior year that Macko was informed about the Noyce Scholarship by one of his mentors.

"Starting my senior year, I wasn't sure what I wanted to do," said Macko. "I had been working in a lab, and even though I loved the research, I felt like I wanted to make a difference in a more direct way. Teaching seemed like the perfect way to do it."

According to Macko, the application process straightforward, but time-consuming. However, once he was accepted into the program, there were a lot of 'loose-ends' that needed to be tied up.

"If I could give any advice to myself a year ago, I would say definitely spend time in a [high school] classroom," reflected Macko. "I didn't have a whole lot of opportunities to do that, and it's gonna help you in your interviews if you have experience in high diversity income areas. Also, for your essays, don't write what the book says; write how you really feel."

Currently enrolled in SCU's School of Education, Macko is excited about his new position as a biology student

teacher for a class of sophomores and juniors at Abraham Lincoln High School, which he will start while obtaining his credentials.

Says Macko,

"It's very interesting because I'm close enough to remember what it was like in high school. So you go into a classroom and think, 'Man, I would hate this,' and then you see it from the teacher's standpoint as to why they have to do this."

An interesting swap of roles, Macko says that the dual perspective actually makes teaching a little easier, though he is still testing the waters to discover the "best way" to teach a class.

"You see a tremendous variety within the students' (levels of knowledge) and then everyone comes out with the same testing results," says Macko. "Then sometimes there's this classroom that's like a primitive jail cell, but the kids do awesome on CST tests (determines if the school is a failing school or meeting annual yearly progress based on No Child Left Behind).

"So you have to decide whether teaching to the test is worthwhile, because they'll do well on the test, but are they really learning anything? You can memorize bio until you get to 'here,' but then you have to learn to think outside the box."

The work load is no piece of cake. Macko works as a student teacher from 7am-12pm and then attends his graduate level credential courses in the evenings, taking classes such as second language acquisition and classroom management.

However, at the end of the day, Macko says that teaching has been the rewarding change he was looking for.

"I'm getting to know my kids now, and I think it's gonna work," he says. "I guess right now, the most rewarding part of teaching is just the kids saying 'hi' to me and being like, 'Hey Mr. Macko!'"

"One kid even wanted to be my friend, so he started calling me "Macko," and I'm like, "Nuh-uh, it's Mr. Macko!"

If you are interested in applying for the Noyce Scholarship, visit <http://www.scu.edu/ecppm/education/academics/noyce.cfm>.



Chris Macko '11



SCU's 2011 Noyce Scholars
Photo Courtesy of Patricia Poulsen



Dr. Hess Awarded NSF Grant



Dr. David Hess
Photo Courtesy of scu.edu



Saccaromyces cerevisiae



Wine Barrels
Photo Courtesy of South Coast Winery

This July, Dr. David Hess was awarded a grant from the Molecular and Cellular Evolution panel of the National Science Foundation (NSF). The grant, which was awarded to only 12% of applicants and sums to \$600,000 over a three year span, will go towards Dr. Hess' research on evolutionary patterns in *Saccaromyces cerevisiae*, more commonly known as yeast.

Dr. Hess' research is focused on finding the link between genotype and phenotype in this particular yeast species, which is used to both bake bread and ferment alcohol.

"The alcohol fermentation is really important because making bread is more or less making bread," said Dr. Hess. "But...making a lager is cold fermentation, versus tequila which is agave and it's sealed—there's no oxygen—and wine is open air."

A perfect example of natural genetic engineering by humans over thousands of years, the differences in these yeast strains, can be pinpointed to specific genetic variations in the organisms' DNA due to random mutation. These mutations are what Dr. Hess and his lab hope to identify.

"My research is focused on the effects of metabolism and stress (for example different levels of heat or sugar used in fermentation) on the yeast—the phenotypes that would make it more able to adapt to one situation or the other," said Dr. Hess. "If we can cross two different strains together and see how the progeny from that cross react to certain conditions, we can ask, 'how is the phenotype doing?'"

Dr. Hess hopes that the identification of the mutations that cause phenotypic changes in the yeast will lead to a better understanding of the evolutionary progression of microorganisms in general. More specifically, he hopes to look at the co-evolution of pathogens, such as gonorrhea, with our society today. In the same way that yeast co-evolved with humans as fermentation processes progressed and different techniques were created, pathogens also co-evolve with humans on a second-to-second basis.

"The same thing sort of happens for us as the population explodes and people are more packed in on each other, and we also have more antibiotics and modern medicine," said Dr. Hess.

He continued, "Now pathogens are coevolving with us and evolving to be better passed from person to person and becoming more resistant to our medicine."

An ambitious goal, but one highly relevant to society's needs today, Dr. Hess admits that like all research, this will not be a simple task.

According to Dr. Hess, in the end, what makes a good researcher is continuing to research even though you fail, which, he assures, you will.

"It's okay to fail," he said, "cause if it was easy it would've already been done."



Need a Bio21 Tutor?

WHAT: FREE student tutoring

WHERE: Alumni Science Commons

WHEN: Every Monday and Thursday from 5-7pm!

*If you would like to become a Biology tutor, please contact the Drahrman Center for more information.



A Study Abroad Extravaganza!

Thinking about studying abroad? Here are some options for all you biology, combined sciences, and/or public health majors!

- ⇒ DIS (Copenhagen)
- ⇒ School for Field Studies (multiple sites, including Kenya/Tanzania)
- ⇒ Costa Rica
- ⇒ Mexico
- ⇒ Australia
- ⇒ Turks and Caicos
- ⇒ Boston University international programs (including Dresden, Grenoble, Geneva, and Dublin)
- ⇒ CIEE (multiple sites in addition to Bonaire, including Thailand)
- ⇒ OTS (Costa Rica)
- ⇒ Arcadia programs (including St. Andrews in Scotland)
- ⇒ Casa de la Solidaridad summer program in El Salvador

**For detailed information on any of these programs, please contact the Study Abroad Office at (408) 551-3019, or visit <http://www.scu.edu/studyabroad/>!

Faculty Shout-out's!

Congratulations to Dr. Jim Grainger!



Dr. Grainger was awarded the Dr. John B. Drahrman Advising Award, in recognition of having established a reputation for extraordinary dedication to student welfare among students and colleagues.

Congratulations to Dr. Craig Stephens!



Dr. Stephens was awarded the Bruto-coa Family Foundation Award for Curriculum innovation for leading the development of the Biotechnology minor and the Public Health Science major and minor.



Schedule of Guest Lectures

Date	Speaker	Topic
Friday, October 7 4:00pm (Daly Science 206)	Martin Fenstershieb	<p>“Fall Public Health Seminar”</p> <p><i>Dr. Fenstershieb will discuss a major new report from the Public Health Department and the Health Trust on social determinants of health in Santa Clara County, which in many ways is a microcosm of California and the nation. Dr. Fenstershieb will talk about how poverty influences disease rates, and how factors such as geography, ethnicity, gender, education, and employment affect health outcomes in our region.</i></p>
Wednesday, October 19 All day (Locatelli Center)	TBA	<p>“Technology Award Nexus Conference”</p> <p><i>This one-day event will build on the momentum of The Center for Science, Technology, and Society's Global Social Benefit Incubator and The Tech Museum's Tech Awards program to bring examples of successful social entrepreneurship to the wider Silicon Valley community. Based around interactive panel discussions, the agenda will focus on providing tangible examples from entrepreneurs who have built their social ventures into self-sustaining organizations that provide real, on the ground impact to those living in systemic poverty. To further enhance the program, the audience will have an opportunity to hear from The Tech Awards laureates 2011 who represent cutting-edge technology benefiting humanity in the areas of Education, Equality, Health, Economic Development, and Environment.</i></p>
Thursday, November 3 8:30 to 6 p.m. (Wiegand Room, Arts and Sciences Building)	Francoise Baylis Albert Jonsen	<p>"Let Conscience Be Their Guide: Conscientious Refusals in Health Care"</p> <p>-- A Daylong Conference at Santa Clara University</p> <p><i>The problem of conscience and health care has drawn increasing attention in the last years. Should a pharmacist who is morally opposed to birth control be legally required to dispense birth control to a client at a pharmacy? This and related questions will be discussed in a daylong conference featuring keynote addresses by top experts in the field and panel discussions of ethics cases involving conscience and health care.</i></p>
Tuesday, November 8 (O'Connor 106)	Wang Chiew-Tan	<p>“Splash: A Platform for Analysis and Simulation of Health”</p> <p><i>Splash - Smarter Planet Platform for Analysis and Simulation of Health - is a framework for combining heterogeneous simulation models and data. By enabling interoperability and reuse of models and data, Splash enables experts from different disciplines to collaborate to exploit their combined knowledge. The resulting composite simulation models can be used for deep predictive analytics, enabling "what if" analyses that cut across disciplines and supporting complex health decisions when expertise from a single domain does not suffice.</i></p>
Tuesday, November 15 (O'Connor 106)	Oscar Ibarra	<p>“Natural Computing: Membrane Systems”</p> <p><i>An overview of the basic ideas, results, and applications of membrane computing, a branch of natural computing inspired by the structure and the functioning of biological cells, cell tissues, or colonies of cells. Membrane computing has given rise to an unconventional computing model, namely a P system, which abstracts from the way living cells process chemical compounds in their compartmental structure. We also look at neural-like systems which incorporate the idea of spiking neurons in membrane computing and discuss various classes and characterize their computing power.</i></p>



Winter Course Offerings

BIOL 5 Endangered Ecosystems L&L

BIOL 19 Biology for Teachers L&L

BIOL 22 Introduction to Evolution and Ecology

*BIOL 25 Investigations in Cellular and Molecular Biology
L&L*

BIOL 101 Research Seminar

BIOL 104 Human Anatomy L&L

BIOL 106 Medical Consequences of Western Lifestyles

BIOL 117 Investigations in Epidemiology L&L

BIOL 124 Human Physiology L&L

BIOL 144 Natural History of Baja

BIOL 145 Virology

BIOL 156 General Ecology L&L

BIOL 159 Plagues in the Age of Insects

