CSUN Department of Biology

BIOSPHERE

The Weekly Bulletin of Biology

Biology Colloquium: Friday, 18 November 2011, 2:00 pm in CR 5125

"Life in the Underground: A Radical Perspective"

—our own—

MariaElena Zavala, Ph.D.

Schiffman and the Gophers

Dr. Polly Schiffman was featured last week in the *L.A. Times* in a lengthy article, "The dry garden: Détente with the gopher." The article is about Schiffman's studies of the role of gophers in the ecology of California prairies.

Evidently the *Times* caught one of her many talks given to community groups. Her next talk is on November 16 for the Santa Ynez Valley Natural History Society.

Teaching in Another Realm

On November 8th, **Drs. Stan Metzenberg** and **Aïda Metzenberg** gave a Learning Bytes presentation to CSUN faculty on the use of "Second Life" in teaching. Reruns of Learning Bytes are available from the CSUN website.

New Prof: Genomics, Microbes

Dr. Rachel Mackelprang joined the faculty of the Department of Biology this fall. She is now teaching Principles of Microbiology. In the spring, she will teach Bacterial Diversity.

Mackelprang attended the University of Utah, where she skied at all of Salt Lake City's best resorts and obtained her B.S. in Biology. As an undergraduate, she worked in laboratories that studied *Sin Nombre* hanta virus in deer mice and the genetics of rheumatoid arthritis.

Mackelprang pursued her graduate work in the Department of Genome Sciences at the University of Washington. As a graduate student, Mackelprang focused on human population genomics. She used polymorphisms in humans and other mammalian species to reconstruct the evolution of T-cell receptor genes, which are key components in immunity.

Her interest in evolution and populations led her to a postdoc at the Joint Genome Institute (JGI) and Lawrence Berkeley National Laboratory. Her postdoc work was on Neanderthal genomics. Though she continues some work in the field of ancient hominid genomics, her time at the JGI opened her eyes to the power of high-throughput DNA sequencing to address urgent environmental questions. This resulted in a shift in her core scientific interests.

Mackelprang's current research is focused on the response of permafrost microbial communities to global-warming-induced thaw. Permafrost represents one of Earth's largest carbon reservoirs. Thawing of the permafrost and the

subsequent microbially mediated decay and release of trapped carbon as greenhouse gasses is predicted to contribute substantially to global warming. However, the microorganisms responsible for these processes are largely unknown.

Because the conditions needed to culture wild microbes are usually unknown, Mackelprang has taken an alternative path to studying these communities—metagenomics. Metagenomics provides access to all the organisms in a sample by isolating and sequencing their DNA. Her research includes studying the interaction between the environment and microbial communities in the thawing permafrost and the consequences of climate change to carbon loss. By developing an understanding of these complex interactions, Mackelprang hopes to facilitate predictions of the contribution of Arctic thaw to climate change.

At CSUN, students in Mackelprang's lab will have the opportunity to participate in interdisciplinary research that includes integrating genomics, microbiology, and bioinformatics.

Master's Theses Research Supported!

The University provides grants to support thesis expenses, based on a version of the thesis proposal. The following Biology students were awarded Thesis Support this year: **Darren Brown**, **Nathaniel Bruns**, **Nicole Cassel**, **Jessica Cinkornpumin**, **Ivan Dimov**, **Tannaz Faal**, **Anna Galstyan**, **Allen Harell**, **Fadi Kandarian**, **Alexander Kandel**, **Eddie Karabidian**, **Osvaldo Larios**, **Sean Lee**, **Alissa Luken**, **Veronika Rapoport**, **Anupama Sadhu**, **Bansari Shah**, **Brenton Spies**, **Jesse Tootell**, **Christopher Wall**, **Camdilla Wirth**, and **Arash Yazdani**. Congratulations to all!

Malone funded by CSUPERB

Dr. Cindy Malone received $15,000 from the CSU Program for Education and Research in Biotechnology. When asked to explain what the money was for, she told *Biosphere*: "Committed and terminally differentiated somatic cells, such as fibroblasts, can be 'reprogrammed' to a pluripotent, embryonic stem cell-like state by the simple addition of four highly selected transcription factors. This suggests a way to generate personal, designer stem-cell lines that could be used (with appropriate methods and safeguards during differentiation) to regenerate or replace defective organs and tissues. The efficiency of reprogramming remains very low, as only <0.01% of cells undergoing a variety of reprogramming protocols achieve a pluripotent, stem cell-like state. We want to understand how a cell factor called hypoxia inducible factor 1 alpha (HIF1α) can improve the efficiency of re-instructing mature cells from an individual to a stem-cell state. Because HIF1α expression improves stem cell differentiation, repression of HIF1α ought to enhance reprogramming efficiency. Maybe our research will provide new understanding for the oxygen-dependent and oxygen-independent role(s) of HIF1α in reprogramming differentiated cells to a pluripotent, regenerative medicine-friendly state."

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