

CELEBRATING WOMEN IN SCIENCE DURING WOMEN'S HISTORY MONTH

Several Departments in the School of Science and Technology are sponsoring talks featuring women in science during Women's History Month. All are free to the public, although there are parking fees. Contact Cory Oates in the School office for additional information: cory.oates@sonoma.edu (707-664-2171).

Wednesday, March 4: Mathematics & Statistics Colloquium

4:00 p.m., Darwin 103, Coffee at 3:30 p.m.

Elizabeth Gross, COMPUTATIONAL NEURAL ALGEBRA

In 2014, two teams of researchers won the Nobel Prize in Medicine for discovering place cells, neurons that fire when an animal enters a particular region in their environment. These regions are called place fields and are experimentally known to be convex, which raises interesting mathematical questions. For example, we can ask whether a set of neuron firing patterns could have resulted from a collection of convex place fields. In this talk, we introduce place fields and give a partial answer to this question using computational algebra.

Thursday, March 5: Computer Science Colloquium

12:00 - 1:00 p.m., Salazar 2016

Cynthia Thompson, FINE-GRAINED SENTIMENT ANALYSIS

Targeted sentiment analysis expands on document or sentence-level polarity classification by identifying the sentiment expressed towards specific entities in a span of text. The task is challenging due to the large variety of such entities and to the fact that not all entities are relevant to sentiment analysis. I will describe our work applying supervised and semi-supervised learning techniques to performing fine-grained sentiment analysis.

Wednesday, March 11: Mathematics & Statistics Colloquium

4:00 p.m., Darwin 103; Coffee, Tea, and Cookies at 3:45 pm

Fu Liu, INTRODUCTION TO EHRHART POLYNOMIALS

The A polytope is a higher-dimensional generalization of polygons. We say a polytope is integral if all of its vertices have integer coordinates. Given an integral polytope P , for any positive integer m , we denote by $i(P, m)$ the number of lattice points inside the m th dilation of mP of P . Eugene Ehrhart discovered in 1960s that $i(P, m)$ is a polynomial in m of degree $\dim(P)$. So we often call $i(P, m)$ the Ehrhart polynomial of P . In this talk, I will first survey some well-known results related to Ehrhart polynomials, and then discuss some of my own results on this subject. No previous knowledge on this topic is required.

Thursday, March 12: Engineering Science Lecture Series

4:30 to 5:30 pm, Salazar 2009; Reception & Refreshments 4 to 4:30 pm

Ms. Heidi Barnes, WHAT IS SIGNAL AND POWER INTEGRITY IN DIGITAL SYSTEMS AND HOW IS IT CHANGING OUR WORLD

This presentation will describe the latest challenges in transmitting electronic information at ever faster speeds while at the same time reducing the power consumed. This exciting new area of engineering is called Signal Integrity and Power Integrity. Signal Integrity enables today's computers to send trillions of ones and zeroes in a matter of seconds along a physical channel to a receiver. Power Integrity ensures that no matter how fast and how many ones and zeroes are switching they will all get enough power to switch states. A final example will show how this new area of engineering could have prevented the failure of the first transatlantic telegraph cable in 1865 and how far we have come since then.

Monday, March 23: What Physicists Do

4:00 p.m., Darwin 103; Coffee, Tea, and Cookies at 3:30 pm

Dr. Vera Lüth, STRANGENESS, CHARM, AND BEAUTY IN PARTICLE PHYSICS

Dr. Vera Lüth of Stanford University will reflect on her career in particle physics, discussing Charge-Parity Violation, detector innovations and B decays.

Wednesday, March 25: Mathematics & Statistics Colloquium

4:00 p.m., Darwin 103; Coffee, Tea, and Cookies at 3:45 pm

Math 470 Students; advisor: Martha Shott, PREDICTING RAINFALL AT FAIRFIELD OSBORN PRESERVE FROM MEASUREMENTS AT BODEGA MARINE LAB

The current drought—and historical local flooding—mean that officials, farmers, and researchers are interested in better methods for predicting precipitation. The Fall 2014 Mathematical and Statistical Modeling class partnered with Dr. Christopher Halle, collaborator on a new weather station at SSU's Fairfield Osborn Preserve (FOP). They used historical precipitation data to determine whether measurements at Bodega Marine Lab could reliably predict rainfall in the Rohnert Park area (specifically, at FOP)—and thus hopefully increase the lead time for flood preparation. Student groups will present their models, which draw on topics from calculus and statistics.

Monday, April 6: What Physicists Do

4:00 p.m., Darwin 103; Coffee, Tea, and Cookies at 3:30 pm

Dr. Norna Robertson, ADVANCED LIGO AND THE SEARCH FOR GRAVITATIONAL WAVES

Dr. Norna Robertson (Caltech and the University of Glasgow) will review the search for gravitational waves, and in particular discuss the Advanced LIGO detectors which are expected to carry out their first observational run during 2015.

Thursday, April 9: Computer Science Colloquium

12:00 - 1:00 p.m., Salazar 2016

Kim Zetter, STUXNET AND THE AGE OF DIGITAL WARFARE

In June 2010, a small security firm in Belarus discovered a computer worm that had infected computers in Iran and was causing them to crash. The worm used an ingenious zero-day exploit to spread, but other than this it appeared to be generic malware designed for corporate espionage. But as digital detectives dug through the code and began to reverse-engineer its commands, they discovered it was much more sophisticated than previously believed and had a much more insidious goal—to physically sabotage equipment used in Iran's nuclear program. Stuxnet, as the malicious program was dubbed, was a landmark attack since it was the first cyberweapon ever discovered in the wild and was the first digital code to jump the gap from the digital world to the real world to cause physical destruction. This presentation focuses on how the brilliant attack was designed and unleashed on computers in Iran—being targeted against five companies in Iran who could help the attackers reach their target—how researchers discovered and deciphered it and how its discovery led them to uncover an arsenal of espionage tools that were also created and unleashed by the same attackers. It will also examine how Stuxnet launched a new era of warfare and how critical infrastructure systems in the U.S. and elsewhere are now at risk of 'blowback' and copycat attacks thanks to the authors of Stuxnet.

Monday, April 13: What Physicists Do

4:00 p.m., Darwin 103; Coffee, Tea, and Cookies at 3:30 pm

Dr. Frances A. Houle, MAKING FUELS FROM SUNLIGHT, WATER, AND AIR

Dr. Frances A. Houle, from Lawrence Berkeley National Laboratory, will discuss her work on Artificial Photosynthesis. This has implications for team training and assessment.

Thursday, April 16: Computer Science Colloquium

12:00 - 1:00 p.m., Salazar 2016

Kimberly Cupps, HIGH PERFORMANCE COMPUTING (HPC) AND THE SEQUOIA SUPERCOMPUTER AT LAWRENCE LIVERMORE NATIONAL LABORATORY

Lawrence Livermore National Laboratory (LLNL) has fielded high performance computers to solve problems of national interest for over 50 years. Sequoia is an IBM Blue Gene Q supercomputer capable of 20 petaFLOPs of peak performance sited at LLNL. It is the third fastest computer in the world and is built upon massive numbers of low power cores. In this talk I will touch on HPC applications at LLNL and key components of Sequoia. I will also comment on future challenges facing Exascale computers, expected in the early 2020s.