COMPUTER SCIENCE COLLOQUIUM

Forty-Sixth SERIES Spring 2017

THURSDAYS AT NOON SALAZAR 2016

Feb. 09	William A. Blunden, San Francisco State University **EVADING BIG BROTHER IN A WILDERNESS OF TELESCREENS** Is anyone safe from a global surveillance apparatus that receives more annual funding than most countries spend on their entire military? There are answers to this question and they don't revolve around the latest mobile device. In high-risk environments, the key to evading Big Brother lies not in a technological quick fix but in the obscure domain of field-proven tradecraft: the classic methods of espionage. With homage to Cold War spymasters this talk draws lessons from history to formulate a set of strategies that can take away the advantage of heavily resourced signal intelligence.
Feb. 16	Marie A. Roch, San Diego State University **LEARNING ABOUT ANIMALS FROM UNLABELED ACOUSTIC DATA** Recent work has shown that the human preauditory and/or auditory cortex is likely to play a role in acoustic landmark processing, such as the recognition of syllable and phoneme boundaries. Neurons appear to track acoustic envelopes with neural activity corresponding well with acoustic landmarks. These structures have also been observed in non-human primates, suggesting that acoustic landmark processing could be present in non-human primates and have an evolutionary role. Should landmark processing occur in non-humans, it could provide new methods for approaching animal communication. We present the results of a biologically inspired system on a phoneme segmentation task and anecdotal evidence that plausible boundaries are detected for non-human primates. Many species of toothed-whales are poorly understood, with their ranges determined by handfuls of sightings or stranding's. We demonstrate that properties of echolocation clicks can be used to provide hypotheses about the number of species using an area by analyzing acoustic data from a well-studied area, The Southern California Bight. We show that symmetric Kullback-Leibler similarity metrics from distributional models of toothed-whale encounters can be clustered into species-specific groups that show reasonable concurrence with groups constructed by analysts using known characteristics of echolocation clicks as measured by an adjusted Rand statistic.
Feb. 23	Jason Shankel, Sr. Gameplay Engineer, Roblox, Inc **LEARN YOU A MONAD** Monads do for functional programming what objects do for imperative programming. As the software industry moves from simple systems that required highly optimal code to complex systems that require highly modular code, functional programming has risen in prominence. Monadic design can leverage the power of the emerging imperative/functional software engineering paradigm to produce cleaner, faster, more reliable code.
Mar. 02	**Cooper Quintin, Electronic Frontier Foundation** **THE MORAL CHARACTER OF HACKING** Offensive hacking is fun! Unfortunately, there is no good way to do it without going to jail or working for the government. In this talk Cooper Quintin, EFF Staff Technologist, will give some reasons that you might not want to work for the government and offer some fun and inspiring alternative examples of ways to scratch your offensive hacking itch without going to jail.
Mar.09	Radu B. Rusu, PhD - fyusion CEO and Co-Founder **THE FUTURE OF 3D IMAGING** Welcome to the future, where space is the final frontier, and visual understanding works at scale with robotics-level accuracy. http://fyu.se || http://fyusion.com
Mar. 16	**Spring Break – No Colloquium**
Mar. 23	L Peter Deutsch **PROGRAMMING LANGUAGES COULD HELP SECURITY AND RELIABILITY A LOT MORE. WHY DON'T THEY?** The operating systems and software libraries we rely on are riddled with bugs and insecurities; but programming language technologies, some of which have been known since the 1960s, could eliminate a very large fraction of them. What are those technologies? Why aren't they being used? And what are some ways in which programming language research could help with security and reliability even further?
Mar. 30	Peter Alvaro, University of California, Santa Cruz **ORCHESTRATING CHAOS: APPLYING DATABASE RESEARCH IN THE WILD** Large-scale distributed systems must be built to anticipate and mitigate a variety of hardware and software failures. In order to build confidence that fault-tolerant systems are correctly implemented, an increasing number of large-scale sites regularly run failure drills in which faults are deliberately injected in production or staging systems. While fault injection infrastructures are becoming relatively mature, existing approaches either explore the combinatorial space of potential failures randomly or exploit the "hunches" of domain experts to guide the search. Random strategies waste resources testing "uninteresting" faults, while programmer-guided approaches are only as good as the intuition of a programmer and only scale with human effort. The subject of this talk covers intuition, experience and research directions related to lineage-driven fault injection (LDFI), a novel approach to automating failure testing. LDFI utilizes existing tracing or logging infrastructures to work backwards from good outcomes, identifying redundant computations that allow it to aggressively prune the space of faults that must be explored via fault injection. I will describe LDFI's theoretical roots in the database research notion of provenance, present early results from the field, and present opportunities for near- and long-term future research.
Apr. 06	Yekaterina Kharitonova, Harvey Mudd College, Claremont, California **SEMANTICALLY LINKING INSTRUCTIONAL CONTENT USING COMPUTER VISION** The Semantically Linked Instructional Content (SLIC) project strives to help users, such as distance learners, gain easier access to digital video presentations. The project focuses on lectures and talks in which the presenter uses electronic slides. By automatically matching video segments with the corresponding slides, this project helps facilitate the video viewers' learning process by making presentation content quickly searchable and easily retrievable.
Apr. 13	Zachary N. J. Peterson, Cal Poly, San Luis Obispo **CAN GAMES FIX WHAT'S WRONG WITH COMPUTER SECURITY EDUCATION?** Year after year, we see reports on an ever increasing gap, both in the public and private sectors, between the number of computer security professional we need and the number we expect to produce. While the reasons for this trend are varied, there is a perception (particularly among those new to computing) that security can be asocial and isolating, that it is void of creativity and individual expression, and lacks positive social relevance. But, as we all know, security can inherently have all of these qualities, which perhaps manifest themselves most clearly in cybersecurity games. Indeed, the freedoms of play inherent in games may directly address the qualities deficient in security pedagogy, with many educators now turning to security games, in and out of the classroom, as a meaningful tool for outreach and education. This talk takes a critical look at the use of games, and explores some ways that games can (and cannot) fix computer security education.
Apr. 20	V. Scott Gordon, California State University, Sacramento **HIGH-PERFORMANCE GPU GRAPHICS: TAKE A RIDE ON THE OPENGL PIPELINE** Most 3D graphics programming today is "shader-based". That is, some of the program is written in a standard language such as Java or C++, and some is written in a special-purpose "shader" language that runs directly on the graphics card (GPU). Shader programming involves passing graphics data down a "pipeline", with modern graphics cards able to process this data in parallel. It's complex, but the payoff is extraordinary power. The blossoming of stunning virtual reality in videogames and increasingly realistic effects in Hollywood movies can be greatly attributed to advances in shader programming. This talk will demonstrate examples of shader programming that showcase the processing power of today's graphics cards. The speaker is the author of "Computer Graphics Programming in OpenGL with Java", published in 2017 by Mercury Learning.
Apr. 27	Jason Isaacs, California State University, Channel Islands **SWARMATHON TO MARS** The next phase of the NASA Mars Exploration Program involves sending a spacecraft to Mars and returning it safely to Earth. The first passengers on such a mission will not be human astronauts but Mars rovers instead. The success of this mission requires theses rovers to locate and retrieve local resources on Mars. This process is referred to as In-situ resource utilization (ISRU). Technologies are needed to allow a large group of autonomous rovers to find and collect materials such as ice, which can be converted, into hydrogen fuel to power the return journey. Toward this long-term goal NASA through a cooperative agreement between the NASA Minority University Research and Education Program (MUREP) and the University of New Mexico in partnership with the NASA KSC Swamp Works has developed a national competition called the Swarmathon where teams of students develop foraging and collection algorithms for a swarm of rovers. In this seminar I will discuss the CSU Channel Islands participation in the NASA Swarmathon Competition and our approach to addressing these challenging problems.
May. 04	***STUDENT PRESENTATIONS*** **(Pizza during talks in Salazar 2016)** **SHORT PRESENTATIONS OF RESEARCH CARRIED OUT BY SONOMA STATE COMPUTER SCIENCE STUDENTS**
May. 11	**END OF SEMESTER CELEBRATION & AWARDS (Pizza during talks in Salazar 2016)** **AWARDS PRESENTED TO SONOMA STATE COMPUTER SCIENCE MAJORS**

Supported by the SSU Instructionally Related Activities Fund
and the generous donations of friends of SSU Computer Science Department.

Computer Science Department, Sonoma State University, Rohnert Park, CA 94928
(707) 664-2667
http://www.cs.sonoma.edu

Parking is usually available in lots "E" and "F" and costs $5.00