2016 CITRIS SEED FUND AWARDS

In 2016, CITRIS and the Banatao Institute received 54 highly competitive proposals from the four CITRIS campuses at UC Berkeley, UC Davis, UC Merced and UC Santa Cruz. Ten teams will receive a one-time award, averaging $57,000 each, for interdisciplinary work meant to lead to larger research programs and extramural grant proposals. Winning proposals incorporate sensors, drones, and data analytics to advance cultural heritage preservation, online learning, and applications in health care, energy and agriculture.

Analyzing large corpora of code submissions to generate actionable hints for code correctness and style

We use machine learning and software analysis to generate immediate, customized, actionable feedback on the correctness and quality of students' computer code with minimal instructor intervention, by using structural similarities between different students' code submissions as the basis of targeted hints to help the students improve their code.

Principal Investigators:
Armando Fox (UC Berkeley)
Premkumar Devanbu (UC Davis)

Avoiding Unnecessary Cesarean Section Deliveries: Informing the Decision via Transabdominal Fetal Oximetry

The project aims to develop a non-invasive trans-abdominal fetal brain oxygenation measurement system. The system will help obstetricians to easily distinguish between normal and critical drops in fetal heart rate during labor contractions, and thus, will enable patients and clinicians to avoid unnecessary Cesarean section surgeries.

Principal investigators:
Soheil Ghiasi, Andre Knoesen (UC Davis)
Neil Ray (UC Davis Medical Center)

A Biosensor for Early Detection of Increased Risk of Necrotizing Enterocolitis in Premature Infants

This project proposes development and testing of a multivariate biosensor pod to measure expelled gases from premature infants and to correlate these gases with the fecal microbiota. The ultimate goal is an early detection system for intestinal dysbiosis which precedes a common and devastating disease of premature infants: necrotizing enterocolitis.

Principal investigators:
Mark Underwood (UC Davis Medical Center)
Andre Knoesen, David Mills (UC Davis)

Bodie Digital Community: Connect with your Past

This project is an augmented reality application for mobile devices created in collaboration with California State Parks. This app promotes public engagement in heritage preservation, fosters connection among visitors, and generates useful data that improve the management and preservation of California natural and cultural resources.

Principal Investigators:
Nicola Lercari, Marcelo Kallman (UC Merced)
Arnav Jhala (UC Santa Cruz)

Enabling robots to express emotions based on human demonstrations

The goal of this project is for robots to leverage "body language" to express their state of awareness, hesitation, excitement, disappointment, etc. The project is a collaboration between roboticists, computer graphics experts and professional dancers. The team will develop and test methods for transferring motion capture data of a human dancer expressing emotions to a robot arm in a manner that preserves the emotional content of the motion. Experiments will use the PR2 and Kinova arm to evaluate these methods with human subjects via the Amazon Mechanical Turk platform.

Principal investigators:
Anca Dragan, Lisa Wymore (UC Berkeley)
Marcelo Kallmann (UC Merced)

Low-Cost Carbon Uptake Remote Sensing System and Training Module

This project is a collaboration between the UCSC S-lab and UC Davis D-lab to build a low cost web-enabled remote sensor system and training module, based on the arduino platform, that locally monitors carbon uptake by plants. This system can be widely deployed by students from around the world to monitor carbon dioxide and water uptake by plants in their communities in order to facilitate sound land management practices that reduce the negative impacts of environmental and climate change.

Principal investigators:
Kurt Kornbluth (UC Davis)
Sue Carter (UC Santa Cruz)

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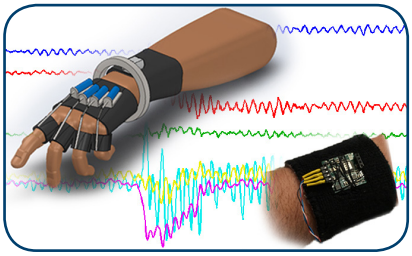
Putting the Feedback Cycle in High Gear: Community-sourced, Data-driven Approaches for Sustainable Transportation Infrastructure

Stymied by the complex and opaque process involved in improvements to physical infrastructure? Tired of multiple trips to City Council? Distrustful of assumptions behind consultant projections? We will improve the planning process by collecting ongoing data using smartphones, and allowing cities to prototype changes and measure their impact before finalizing.

Principal investigators:
Randy Katz (UC Berkeley)
Lise Getoor (UC Santa Cruz)



Robotic Exoskeleton For The Stabilization Of Tremors (RST) In the Hand and Wrist

Current treatment options fail to adequately support the millions of Americans living with Parkinson's Disease or Essential Tremor. This collaboration between the UC Davis School of Medicine and UC Santa Cruz College of Engineering proposes a novel solution that achieves hand, wrist, and arm stabilization through a non-intrusive robotic exoskeleton.

Principal investigators:
Lin Zhang (UC Davis)
Gabriel Hugh Elkaim (UC Santa Cruz)

Smart Infrastructure in Affordable Housing

UC Merced and Cabrillo College (Santa Cruz County) are developing smart "Tiny Row Houses" (TRHs) that can address the need for affordable housing in Northern California urban areas and Central Valley rural areas. These structures will be equipped with integrated smart systems to minimize resource inputs and operational consumption.

Principal investigators:
Ronnie Lipschutz (UC Santa Cruz)
Elliott Campbell (UC Merced)

Under-Canopy Robots for Biofuel Plant Phenotyping Research

This project is developing a miniature high-throughput phenotyping robot to help plant breeders automate the measurement of plant architecture they require to accelerate the creation of more efficient energy crops that are better adapted to climate change and can be produced on marginal land without displacing food crops.

Principal investigators:
David C. Slaughter, Stavros Vougioukas, Julin Maloof, Neelima Sinha (UC Davis)
Peggy Lemaux (UC Berkeley)