Santa Clara University
School of Engineering

FSC
FPO

SCU OMC-7379F 4/12 725

SANTA CLARA UNIVERSITY

SCHOOL OF ENGINEERING

SENIOR DESIGN CONFERENCE

MAY 10, 2012

CELEBRATING A CENTURY
OF ACADEMIC EXCELLENCE

The School of Engineering deeply mourns the loss of one of our youngest and brightest stars, Daniel Strickland (1984–2011), assistant professor of mechanical engineering, who was tragically killed in an automobile accident last September. Dan's love of learning, enthusiasm for research, and passion for living inspires those who had the privilege of studying and working with him, and he continues to teach us all to live each moment to the fullest.

Dear Students, Alumni, Community Partners, and Friends

Welcome to the 42nd Annual Senior Design Conference. We are delighted to have you with us for this display of our students' work.

For 100 years it has been the mission of the School of Engineering to educate thoughtful and responsible leaders and innovators. Today's presentations showcase the mix of hands-on, practical experience and theoretical learning that enables our students to graduate with the knowledge, skills, and vision necessary to make a difference in their communities and in the world.

Through a wide range of capstone projects—everything from researching and designing a medical device for removing pulmonary embolisms to improving the energy efficiency of a clothes dryer—our students have spent their senior year using their knowledge for the betterment of society, putting theory into practice, and working collaboratively across disciplines.

As we celebrate the 100th anniversary of the School of Engineering, we are ever more mindful of the community of Bronco engineers who bring distinction to Santa Clara University. We congratulate our Centennial class for their accomplishment in bringing their projects to fruition and we thank those of you who have contributed to their success and to that of the School of Engineering.

Enjoy the presentations!

Sincerely,

Godfrey Mungal, Dean
School of Engineering

Kathryn Kale '86, Executive Director
Alumni Association

2012 SENIOR DESIGN PRESENTATIONS

Thursday, May 10, 2012
Program Schedule

12 p.m. — **Judges' Registration**
California Mission Room, Benson Center

12:30 p.m. — **Lunch and State-of-the-School Address**
Godfrey Mungal, Dean
School of Engineering
California Mission Room, Benson Center

1:30 p.m. — **Judges' Welcome and Orientation**
Godfrey Mungal, Dean
School of Engineering
Kathryn Kale, Executive Director
Alumni Association
Ruth Davis, Associate Dean of Undergraduate Studies
School of Engineering
California Mission Room, Benson Center

2 – 5:30 p.m. — **Senior Design Presentations**
Benson Center, Engineering Center
The Harrington Learning Commons and Orradre Library
Wiegand Room, Arts & Sciences Building

5 p.m. — **Demonstrations**
Engineering Quad

6 p.m. — **Dinner**
Locatelli Student Activity Center

BIOENGINEERING SESSION 1
Learning Commons 129, Viewing and Taping A

Reverse Protein Engineering
2 – 2:30 p.m.
Reggie Antonio, Nick Deyarman, Robert Kempf, Andrew Zeng
Advisors: Zhiwen (Jonathan) Zhang, Liang Xiang
Our goal is to reduce the size of an enzyme while retaining its catalytic function. The approach is to combinatorially screen designed peptide libraries. If successful, this method could be used for therapeutic enzymes and biosensors.

Pathogen Detection by Two-Dimensional Paper Networks
2:35 – 3:05 p.m.
Ian Nova, Samuel Pontrelli, Miller Bauer; Business students: Luis Carillo, Marc Nguyen, Kirtan Patel
Advisor: Unyoung (Ashley) Kim
The objective of our research is to develop an inexpensive, automated, rapid pathogen detection system without the use of electricity or cold storage. We plan to achieve this goal by using a two-dimensional paper network with specific base pair recognition.

Detection of Waterborne Pathogens for the Developing World
3:10 – 3:35 p.m.
Jennifer Batara, Anusha Ravikumar
Advisor: Unyoung (Ashley) Kim
One of the most prevalent issues in underdeveloped areas is the lack of access to clean water. Our microfluidic device, which utilizes a lysis chamber and an electrochemical DNA sensor, can provide a reliable, fast, and safe method for waterborne pathogen detection in underdeveloped areas.

Engineering a Cell as a Biosensor
3:45 – 4:15 p.m.
Alex Galan, Ryan Smith, Blake Williams, Alison Wuerstle
Advisors: Zhiwen (Jonathan) Zhang, Liang Xiang
Our goal is to directly quantify protein interactions in mammalian cells by using the tetracycline repressor-based mammalian two-hybrid system. If successful, this method could be used for disease detection.

A Microfluidic Device to Identify and Measure Amine Concentrations in *Cancer borealis*
4:25 – 4:55 p.m.
Rian Draeger, Kira Kubota, Elizabeth Sugahara
Advisors: Unyoung (Ashley) Kim, Steven Suljak
The aim of our project is to fabricate a device that specifically measures the concentrations of dopamine, octopamine, and serotonin in the *Cancer borealis* hemolymph. Ultimately our analysis of amine concentrations in the *Cancer borealis* will be applied to how amine concentrations affect motor programming in humans.

BIOENGINEERING SESSION 2

Learning Commons 133, Viewing and Taping B

Attempt to Increase the Adhesive Strength of Cyanoacrylate Glues Using Carbon Nanotubes

2:05 – 2:30 p.m.

Matt Blanco, Jens Olesen; Business students: Andrew Hoffman, Aska Odomo
Advisors: Prashanth Asuri, T. Kim Parnell

Biological organisms in nature, such as mussels and barnacles, are known to utilize nanoparticles when adhering to surfaces. Using this concept, we hope to improve the adhesive strength of cyanoacrylate glues by adding carbon nanotubes. If our assumption is correct, our findings would guide the development of stronger medical glues.

Interactive Model of Particle Flow through Brain Tissue

2:35 – 3:00 p.m.

Kevin Tang, Camilo Taganas
Advisors: Prashanth Asuri, Maria Pantoja

A manipulable MATLAB-generated model of the brain that simulates the flow of particles through brain tissue from an injection point to the targeted area.

TheraPE

3:10 – 3:40 p.m.

Sofia Pour, Sarah van Keulen, Kristian Hockenson
Advisors: Paul Davison, Gerardo Noriega

TheraPE is a minimally invasive pulmonary embolectomy device. This catheter has both a suction mechanism and a rotating rod with a dynamic head for the fragmentation and total removal of the blood clot. When combined, these main functions create a device that is user friendly, steerable, time efficient, and atraumatic.

Automated Utility Testing Operations (A.U.T.O)

3:45 – 4:10 p.m.

John Fresquez, Zuhayr Elahi
Advisors: Raffi Attarian, Unyoung (Ashley) Kim

The PEAK PlasmaBlade provides precise tissue dissection with the bleeding control of electrosurgery. During research and development, PlasmaBlade prototypes are tested on tissue models in a laboratory environment. To facilitate control and automation of performance testing, Medtronic Advanced Energy tasked the team with developing a test simulator for PlasmaBlade devices.

CIVIL ENGINEERING SESSION 1

Bannan Engineering 325

Highway Interchange Design

2:05 – 2:30 p.m.

Matthew Mrizek, Andrew Sagucio
Advisors: Rachel He, Ziad Dweiri

The I-880 and US-101 highway interchange is redesigned to optimize traffic flow while improving driver safety. The proposed design elements include four overpasses to replace existing roundabouts. A traffic and environmental impact study, as well as a cost estimation is conducted and analyzed.

Ferry Transportation Network for the World Islands, Dubai

2:35 – 3:05 p.m.

Chad Cachero, Brian Daley, Jon Satterfield
Advisor: Rachel He

This project seeks to create a ferry transportation network that will efficiently service the World Islands off the coast of Dubai. To ensure a practical and feasible system, design parameters include ferry selection and routing, terminal sizing, ferry loading and unloading, scheduling, cost analysis, and ticket pricing.

Downtown Bike Lane Design

3:10 – 3:40 p.m.

Phillip Linarte, Maung Lay Maung, Gabriel Peralta
Advisors: Rachel He, Henry Servin

There is a severe lack of bicycle lanes in San Jose making the commute difficult for pedestrians and bicyclists. Currently, bicycle transportation is not at its safest, being geared more toward motorists. Streets have been analyzed to incorporate bike lanes and to complete the streets that appeal most to pedestrians, bicyclists, and motorists.

Los Angeles Area High-Speed Rail Design

3:45 – 4:15 p.m.

Stephany Contreras, Carla Fierros, Katie Herrera
Advisors: Ziad Dweiri, Rachel He, Sukhmander Singh

Our design focuses on the 30 miles of track between Los Angeles and Anaheim. Depending on elevation and space restrictions, tracks were tunneled, aerial, or at grade. We have focused on horizontal curves, vertical curves, and earthwork, but have also taken environmental and financial implications into consideration.

BART Extension to Downtown San Jose

4:25 – 4:55 p.m.

Eduardo Batres, Jesse Blea, Bernardo Navarrete
Advisors: Rachel He, Henry Servin

Modifications to the Diridon transit station and surrounding community to incorporate BART. Design includes street optimization, signal synchronization, as well as structural design of a pedestrian bridge. Future expansion of high-speed rail to the station will be considered in our design.

CIVIL ENGINEERING SESSION 2

Bannan Engineering 105

A Sustainable Approach to Disaster Relief Housing

2:05 – 2:30 p.m.

Quinn Peck, Scott Wallace
Advisor: Reynaud Serrette

A Sustainable Approach to Disaster Relief Housing fuses traditional bamboo construction techniques with modern structural engineering concepts to yield a permanent single-family residential structure that is environmentally friendly, economical, and strong.

New Design for VTA Light Rail in Downtown Campbell

2:35 – 3:05 p.m.

Timothy Cheng, Alec Nicholas, Felipe Yerkes-Medina
Advisors: Rachel He, Reynaud Serrette, Sukhmander Singh

This project provides an aesthetically appealing design of an elevated VTA Light Rail track and station for downtown Campbell. The design goal is to alleviate traffic congestion while preserving Campbell's unique downtown atmosphere. The detailed design incorporates structural, geotechnical, and traffic design for the bridges, ramps, foundations, and traffic conditions.

ASCE Student Steel Bridge Competition

3:10 – 3:35 p.m.

Travis Duncan, Nicholas Robertson
Advisor: Reynaud Serrette

This intercollegiate challenge requires civil engineering students to design, fabricate, and construct a steel bridge. The bridge will then be tested and judged at the annual ASCE MidPac Conference.

CIVIL ENGINEERING SESSION 3

Bannan Engineering 106

Sustainable Design Solutions for Housing in Ghana

2:05 – 2:30 p.m.

J. Matt Jansen, Nathan Rogers
Advisors: Mark Aschheim, Sukhmander Singh

In the Upper East region of Ghana, overpopulation and inadequate building practices have led to deforestation and poor housing for the local communities. Previous sustainable building methods were examined and refinements investigated to determine the least expensive and most effective method for homebuilding in Ghana's remote villages.

Lightweight Concrete Cool Roof Tiles

2:35 – 3:05 p.m.

Elizabeth Koki, Brennan Nacario, Alejandro Perez
Advisor: Tonya Nilsson

Our unique tile shape perfectly blends form and function for the first time in a cool roof product. Concrete lends its strength and desirable thermal properties to create a tile that excels at shedding off excess heat and lasting longer than traditional materials.

Integrating Wind Energy Into Residential Design

3:10 – 3:40 p.m.

Angel Beltran, Tom Juntunen, Hugo Mailloux-Beauchemin
Advisor: Tonya Nilsson

In an effort to improve the effectiveness of residential wind-harvesting, the benefits of an integrated structural design to optimize wind flow for a wind-powered turbine was studied. Specifically, the use of channels in roofing systems was analyzed in an attempt to increase the wind-harvesting potential of a turbine.

CIVIL ENGINEERING SESSION 4

Bannan Engineering 107

Gas Station and Related Facilities Design/ Feasibility Study

2:05 – 2:30 p.m.

Jennifer Light, Dustin Shitanishi
Advisor: Steven Chiesa

We designed a low-impact gas station and related commercial facilities in San Martin, California. The gas station includes 12 pumping stations, a minimart, and a carwash. We considered site layout, site accessibility, paving/ grading design, storm-water treatment, and water supply/utility tie-ins as part of our final design.

El Pital, Honduras, Water Purification/ Distribution Design

2:35 – 3:00 p.m.

Ashley Ciglar, Lilya Ouksel
Advisor: Steven Chiesa

The project entails the design of a peaking tank, chlorination device, and pipe system. All should accommodate the appropriate volume of flow for a rural town with a projected maximum population growth.

Anaerobic Digester System Improvements for Optimal Energy Recovery

3:10 – 3:40 p.m.

Stephanie Mow, Alison Nojima, Jessica Song
Advisor: Steven Chiesa

Two anaerobic digesters will be upgraded at the Sunnyvale Water Pollution Control Plant. Energy recovery will be optimized through co-digestion of fats, oils, and greases (FOG). The increase in methane gas production will be used to reduce net energy consumption at the plant.

Design for Community Improvements in Sabana Grande, Nicaragua

3:45 – 4:20 p.m.

Hildaisabel Garcia, Kyle Magazu, Elizabeth Mercado, Agustine Perez-Rojas, Lisa Yabusaki
Advisors: Steven Chiesa, Sukhmander Singh

Our design consists of three components. The first will be a washing station that will implement water catchment systems and a solar pumping system. The second component is a bio-digester that produces bio-gas used for cooking purposes. The third component will be a design for double composting latrines.

COMPUTER SCIENCE AND ENGINEERING SESSION 1

Sullivan Engineering 605

Mobile Sea

2:05 – 2:30 p.m.

Srikar Karempudi
Advisor: Maria Pantoja

Mobile Sea shows a new method of interfacing with a computer program, using an Android device as a peripheral. This is demonstrated through a computer game that additionally has educational value through its demonstrations of basic physics and fluid dynamics, which the user interacts with through interesting puzzles.

eCampusMobile

2:35 – 3:05 p.m.

Sara Philips, Danielle Pontes, Keesa Robinson
Advisor: Darren Atkinson

A mobile Web application designed for Santa Clara University students, eCampusMobile makes major eCampus functions such as viewing a class schedule, adding/dropping classes, and swapping/ editing classes accessible to students on-the-go. Expanding accessibility to mobile devices allows students to use eCampus's time-sensitive functions in a convenient and efficient manner.

Ridyourdorm.com

3:10 – 3:35 p.m.

Nina Bortolotto, Ryan Selewicz
Advisor: Silvia Figueira

Ridyourdorm.com is a new Web application designed to allow Santa Clara University students to advertise used products such as textbooks and furniture to other students for trade or sale in an effort to improve recycling of items that would otherwise be thrown away or sold outside of the University community.

Course Forge

3:45 – 4:15 p.m.

Eric Herde, Graden Rea, Curtis Wilcox
Advisor: Daniel Lewis

Students do not want to spend a lot of time figuring out which classes they should take next quarter. Course Forge is a Web service that saves time and effort by creating class schedules for students based on their Degree Audit.

TAG: Virtual Eyes for a Virtual Reality

4:25 – 4:50 p.m.

Eric Rahman, Ryan Shin
Advisor: Maria Pantoja

TAG is middleware for stereoscopic 3D video games that analyzes the player's brainwaves through EEG technology as well as patterns in user input to deduce what the player is looking at and then modify the rendering system to actually focus on that object, emulating human eyes within a virtual world.

COMPUTER SCIENCE AND ENGINEERING SESSION 2

Sullivan Engineering 618

Virgil: Tablet-friendly Course Management

2:05 – 2:30 p.m.

Jack Finley, David Silver
Advisor: Ahmed Amer

Virgil is a course management system optimized for the use of tablets in the classroom, greatly simplifying the distribution of classroom materials from teachers to students using iPads. Closely integrated Web and iPad applications improve the viability of tablets in the classroom for both teachers and students.

Touch Text Editor

2:35 – 3:00 p.m.

Matt Baker, Eric Sprauve
Advisor: JoAnne Holliday

An IDE for the iPad, allowing users to limit their interactions with the "soft" keyboard to maximize productivity while coding on the iPad.

Gooey Games

3:10 – 3:35 p.m.

Jeremy Bunyard, Angelique Parsons
Advisor: Silvia Figueira

Gooey Games is an online educational system intended for use within the classroom as well as at home.

The Green Giraffe Project

3:45 – 4:15 p.m.

Ernesto Hernandez, Kikelomo Oshinoiki, Hariharan Rajagopalan
Advisor: Silvia Figueira

The Green Giraffe Project is a Web portal geared toward young children participating in grades K–5 as an introduction to the Web and its basic functionalities. It includes features such as a Web search, email, and online social networking within the classroom setting.

Condition: DIVE

4:25 – 4:50 p.m.

Meghan Khurana, Rachel McGuigan
Advisor: Rani Mikkilineni

A website designed to collect and display scuba diving conditions at various dive site locations in Northern California.

COMPUTER SCIENCE AND ENGINEERING SESSION 3

Sullivan Engineering 604

Water Pathogen Detection App

2:05 – 2:30 p.m.

Connor Carey, John Seubert
Advisor: Silvia Figueira

We are working with electrical and bioengineering students to create a probe that can detect bacteria in water for developing countries. We will be creating the Android application.

Transparently Reducing NVIDIA Graphics Card Power Consumption in Low-Load Environments

2:35 – 3:00 p.m.

Kevin Sullivan
Advisor: Silvia Figueira

Current graphics card power consumption at idle/low load is much higher than it could be. I manipulate the clock speeds of the graphics cards to reduce power consumption, ideally without the user noticing. This is largely aimed at the overclocking community, which has no convenient power reduction options available.

eRescue

3:10 – 3:40 p.m.

Casey Larson, Kristen Muramoto, Rosemary Pham, Tim So
Advisor: Silvia Figueira

eRescue is a crowdsourcing emergency notification application for the iPhone that will increase the likelihood of victim recovery.

Black Box

3:45 – 4:15 p.m.

Christopher Jamison, Nick Perakis, Chris Williams
Advisor: JoAnne Holliday

An Android mobile text messaging application employing password protection, encryption of stored and sent messages, and sessions each time the application is used, to secure the user's sensitive information.

Get Me There

4:25 – 4:50 p.m.

Monica Camorongan, Joe Schneider
Advisor: Silvia Figueira

An iPhone application that will allow individuals with learning disabilities to travel through their communities independently. Our primary user group currently consists of the students at the Santa Clara Adult Education Center.

ELECTRICAL ENGINEERING SESSION 1

Learning Commons, Training and Instruction 203

Body Wearable Direction Finding Antenna Arrays

2:05 – 2:30 p.m.

Jerrick Hayes
Advisors: Talal Al-Attar, Tokunbo Ogunfunmi

The project aims to reduce the physical signature of a person while he or she performs a direction finding routine. The body wearable design will allow an operator to utilize an increased range of freedom by reducing the likelihood of detection.

Waterborne Pathogen Detector

2:35 – 3:05 p.m.

Michael Busch, Alexander Coffin, Lauren Yamauchi
Advisor: Shoba Krishnan

Our project addresses the issue of testing for potable water. Current lab equipment is large and costly, so our goal is to take this lab equipment and make it portable and easily affordable. We also want our system to be user friendly.

Equation Based Optimization of StrongARM Latch Comparator

3:10 – 3:35 p.m.

Daniel Brukwinski, Daniel Hanna
Advisor: Talal Al-Attar

We are using the schematic of a StrongARM Latch Comparator and optimizing its equations in various phases while linking them together through the analog optimizer, Magma Titan ADX.

MECHANICAL ENGINEERING SESSION 1

Learning Commons 316, St. Clare Room

Design of a Low-Profile Solar Tracker with Hybridized Control

2 – 2:30 p.m.

Laughlin Barker, Darcy Marumoto, Criselle Olaes, Joseph Valdez; Business student: Oliver Glenn
Advisor: Hohyun Lee

A two-axis solar tracker is presented for use with concentrated solar power and photovoltaic panels. Unique geometry coupled with a hybridized control algorithm improves accuracy and repeatability, while allowing the system to maintain a low profile during adverse weather conditions.

CAES System

2:35 – 3:05 p.m.

Michael Biederer, Joseph Burke, Matt Komo, John O'Malley
Advisors: Monem Beitelmal, Drazen Fabris

A small scale Compressed Air Energy Storage System (CAES) designed to provide clean power to remote locations and microgrids. Designed in conjunction with StorWatts.

Project Omoverhi

3:10 – 3:40 p.m.

Peter Graham, Alex Kranenburg, Tor Krog, Cameron Schwab
Advisors: Tim Hight, Hohyun Lee

An economically viable thermal energy storage solution utilizing a phase change material to provide consistent and sustainable thermal energy to people in developing countries. The main design applications include chicken brooding and neonatal incubation.

Solar Powered Water Purification System

3:45 – 4:20 p.m.

Alina Carlson, Reece Kiriu, Andrew Nose, Chris Sugii, Erin Taketa, Alex Tamai
Advisors: Monem Beitelmal, Drazen Fabris

A solar powered water purification system has been designed to produce clean water for developing communities. This system uses a distillation process to desalinate ocean water, and falls in between reverse osmosis and solar stills in terms of price and performance.

MECHANICAL ENGINEERING SESSION 2

Bannan Engineering 326

DryAir

2:00 – 2:30 p.m.

Michael Chong, Colin Dess, Timothy Hussey, Elizabeth Papengellin
Advisor: Tim Hight

Improving the efficiency of the electric clothes dryer through use of an internal heat exchanger for the Max Tech and Beyond Appliance Design Competition.

NanoSatellite Fabrication and Analysis

2:35 – 3:05 p.m.

Samuel Harrison, Patrick Scott, Victor Zapien
Advisor: Christopher Kitts

Development of an architecture for designing, analyzing, and fabricating the structural frame of a nanosatellite.

Equalizing Distribution Device

3:10 – 3:40 p.m.

Charles Franz, Greg Method, Keegan Wada; Business students: Chi Tao Chow, Jooyoung Jang, Peter Noges, Vaishali Parekh
Advisor: Christopher Kitts

The Equalizing Distribution Device mitigates in-train forces on long trains due to slack action from inadequate braking technology. It does this with remote controlled, removable valves that can be easily installed on any train's brake pipe, instantly upgrading the system. This reduces maintenance and improves train handling, efficiency, system speed, and safety.

Design and Control of a Quadrotor UAV Helicopter

3:45 – 4:20 p.m.

Andrew Gallaher, Kathleen Huber, Mark Morgan, Andrew Noujaim, Alicia Sherban
Advisor: Mohammad Ayoubi

The Claracopter group presents the design and manufacture of a Quadrotor UAV helicopter to be used for rescue and surveillance. The frame was designed in such a way that the body does not require any specific tools for assembly. A linear optimized control technique will stabilize the Quadrotor's attitude autonomously.

INTERDISCIPLINARY SESSION 1
Arts & Sciences, Wiegand Room

Formula Hybrid - Electrical
2 – 2:30 p.m.
Orianna Hillard, Mendel Hung, Jules Edward Salvador
Advisors: Shoba Krishnan, T. Kim Parnell
The Formula Hybrid Electrical Group aims to produce a high-efficiency and high-performance modular electrical system capable of rugged user abuse and uncompromised user safety. Engineering modularly will allow battery pack options to be presented as vehicle upgrades after introduction to market, with prices correlating with vehicle power-to-weight ratios.

Formula Hybrid - Body
2:35 – 3:05 p.m.
Rafael Aboitiz, Manuel Cardona, Robert Kozak, Keenan O'Flaherty
Advisors: Hohyun Lee, T. Kim Parnell
The Formula Hybrid Body Group aims to develop a modular air-cooled battery system with increased battery efficiency as part of a new formula hybrid vehicle body and cooling package designed to manipulate thermal inefficiency to boost aerodynamic efficiency.

Formula Hybrid - Powertrain
3:10 – 3:40 p.m.
Jason Guan, Patrick James, Joseph Perry, Marcus Schwab
Advisors: Tim Hight, T. Kim Parnell
The Formula Hybrid Powertrain Group aims to create an extremely efficient hybrid drivetrain through compounding the effects of multiple high-efficiency technologies and prove that existing transportation efficiency can be affordably improved.

Formula Hybrid - Suspension
3:45 – 4:20 p.m.
Nick Bayati, Kevin DeMartini, Jacques Sahyoun, Sean Screws, Scott Stewart
Advisors: Tim Hight, T. Kim Parnell
The Formula Hybrid Suspension Group aims to construct a low-cost, high-performance race suspension that optimizes vehicle efficiency and is designed to be nearly 100 percent recyclable. A material life cycle analysis will be performed to test the cost benefit of our design after completion.

Formula Hybrid - Controls
4:25 – 4:55 p.m.
James Case, Vera Kovacic, Michael Oberti, Ryan Rusconi
Advisors: Christopher Kitts, T. Kim Parnell
The Formula Hybrid Controls Group aims to design and implement a vehicle control and data acquisition system with broad-spectrum, continuously updated control logic outputs dependent upon driving conditions and driver request history. The system will function to optimize vehicle efficiency and performance for each driver in every unique driving situation.

INTERDISCIPLINARY SESSION 2
Learning Commons, Training and Instruction 205

infinityBoard: A Lecture Tool for the Future
2:00 – 2:30 p.m.
Collin Lee, Justin Miller, Ryan Sacia
Advisors: Shoba Krishnan, Daniel Lewis
infinityBoard is a simple and unobtrusive blackboard replacement that functions simultaneously as a writing surface and a digital interactive content display. infinityBoard enables professors to bring all the benefits of digital content to their lectures while allowing them to focus on teaching rather than the complications of technology.

Spartan
2:35 – 3:05 p.m.
Arun Koshy, Siddharth Parmar, Anirudh Rao
Advisors: Ahmed Amer, Shoba Krishnan
Our current grid system has not been altered for many years, which implies there is potential for more blackouts due to future technology. Our proposed solution is a prototype for an electrical power control mechanism based on theoretical research to build more robust and efficient power management systems.

Remote Data Acquisition
3:10 – 3:35 p.m.
Stephen Cauterucio, Corey Simoncic
Advisors: Darren Atkinson, Shoba Krishnan
We are building a system which retrieves sensor readings from machines in the civil engineering lab and sends them to a smartphone where they will be displayed graphically.

Passive Unitized Regenerative Fuel Cell (PUReFC)
3:45 – 4:20 p.m.
Sandeep Lele, Ross Pimentel, Jeff Schwartz, Michael Sizemore, Sutyen Zalawadia
Advisors: Shoba Krishnan, Daniel Strickland, Abdie Tabrizi
In off-grid settings, companies are using clean energy sources such as wind and solar. Due to the intermittence of these technologies, these companies turn to environmentally unfriendly batteries to store surplus energy. The PUReFC team has developed a regenerative fuel cell to offer a cleaner energy storage alternative.

Heat Activated Wearable Technology (HAWT)
4:25 – 5 p.m.
Sonny Gandhi, Marcia Leung, William Rosario, Lauren Shishido, Brian Tseng
Advisors: Ahmed Amer, Shoba Krishnan, Hohyun Lee
A self-sustaining system has been developed using human body heat to power a low-energy biomedical device. The battery life in low-powered systems can be greatly increased by utilizing this alternative energy source. Additionally, biomedical readings are transferred and displayed on an iPhone.

INTERDISCIPLINARY SESSION 3
Sullivan Engineering 602

EMBR Micropump
2 – 2:30 p.m.
Albenis Curiel, Christopher Ledesma, Jose Marcial Portilla
Advisors: Unyoung (Ashley) Kim, Daniel Strickland, Abdie Tabrizi
An electrolysis driven micropump created using photolithographic techniques for biomedical applications. This novel micropump uses a platinum catalyst to allow for a fully enclosed cyclic driving mechanism.

Flow Sensing for EMBR Micropump
2:35 – 3:00 p.m.
Nicholas Dimond
Advisor: Shoba Krishnan
Working under the constraints of the EMBR micropump, this project implements an embedded sensor to measure flow rate.

Roverwerx: RoboMedic for Triage (RM-T)
3:10 – 3:45 p.m.
Jeffrey Chen, Anusuya Choudhury, Daniel Gih, Edgar Gonzalez, Bersabe Morales, Diana Zeballos
Advisor: Christopher Kitts
Design and implementation of a multipurpose use mobile land robot, Roverwerx, mainly involving urban search and rescue. The overall system includes an upgrade to the robot's main infrastructure, an arm with five-degrees of freedom, and installation of an environmental sensing apparatus. This robot is currently fitted for mass casualty triage.

Roverwerx: RoboMedic for Triage (RMT): Triage Function
3:45 – 4:10 p.m.
Kelsey Brunts, Martin Chuang
Advisor: Christopher Kitts
Roverwerx has been redesigned to function as a robotic remotely-operated triage system designed to be used in mass casualty disasters to minimize the risk to emergency rescue workers while maximizing the number of victims assisted. The design includes biometric sensors and a triage centered user interface to facilitate safer triage.

SHARK - Sensory Hull Autonomous Research Kayak
4:25 – 5:00 p.m.
Alex Hanchett, Marcus Montanile, Doug Renfro, Paul Twining, Max Wyman
Advisor: Christopher Kitts
The SHARK project is a low-cost robotic kayak capable of collecting and transferring data to a central hub. It is also designed to be integrated with an autonomous kayak fleet for multi-robot control.

2012 SENIOR DESIGN CONFERENCE

WE WISH TO THANK THE FOLLOWING ALUMNI, FRIENDS, AND INDUSTRY PARTNERS WHOSE PARTICIPATION AS JUDGES CONTRIBUTES GREATLY TO THE SUCCESS OF THE *Senior Design Conference…*

Bioengineering

John Giddings ’91, ’97
Telelumen

Ron Hansen ’73

Lou Pace ’83
Abbott Laboratories

Greg Richmond ’85
Intuitive Surgical

Manny Ruiz ’84
Lockheed Martin Space Systems

Carl Simpson ’79
Coronis Medical

Curtis Wong ’10

Civil Engineering

Jeff Abercrombie ’84
California High Speed Rail Authority

Chris Brady ’98
Stanislaus County Public Works

Mark Davis ’95
San Luis County Public Works

Raymond Fassett ’92
Condon-Johnson & Associates, Inc.

Robert Fassett ’87
PG&E

Jim Foley ’68
Engineering and Construction Consultant

Chris Freitas ’84
Santa Clara County - Land Development Engineering

Michael Freitas ’70
Freitas + Freitas Engineering and Planning Consultants, Inc.

Richard Grabinski ’91
Flatiron Corporation

Joseph Harkins ’76
Lawrence Berkeley Lab

Kristen Jackson ’08
UC Davis

Daphne Korthamar ’99

Brian Mapel ’93
BMA Construction Engineers, Inc.

Anthony Mei ’70
U.S. Army Corps of Engineers

Bob Olson ’89
Nova Partners, Inc.

Jeff Perko ’84
Manito Construction, Inc.

Glenn Roberts ’71

Computer Science and Engineering

Russ Aleshi ’76
IAM-1 Co.

Ross Dakin ’07
Vorstack Corporation

Karl Hennig ’04
Baynote, Inc.

Han Hong ’04
Webb Family Foundation

Francis Jang ’11
SanDisk

Brian Janjic ’89
IBM

Pedram Keyani ’00
Facebook

Jeff Krenek ’87
Hewlett-Packard

Ryan Leary ’08
OnLive

Frank Lee ’88
GIC Inc.

Gerald Luiz ’91
NVIDIA

Michael Meyer ’92
NVIDIA

Anthony Murabito ’88, ’92
Murabito, Hao & Barnes LLP

Sean Schiff ’09
Sportvision

Electrical Engineering

Jerome Blaha Jr. ’99
Polaris Wireless

Minh Dao ’08
Anritsu Company

Ryan Harami ’08
Lockheed Martin

Johanna Hernandez ’99
Toshiba

Meg Howe ’12
Texas Instruments

Miles Iseri ’88
Cupertino Electric, Inc.

Mark Maloney ’93
Rohde & Schwarz

Mondeep Thiara ’06
Maxim Integrated Products

Mechanical Engineering

Joe Cassetta ’79
IBM

Bobby Evtimov ’02
Lockheed Martin

Timothy Fogarty ’83
AI Solutions

Jim Gotterba ’74
ALZETA Corp.

Paul Krug ’56, ’64, ’76

Robert Lee ’07
Lockheed Martin

Steven Maggipinto ’79
U.S. Navy

Robert McDonald ’88, ’98
Oracle

Giovanni Minelli ’11
Naval Postgraduate School

John Quilici ’77

Eric Steuben ’90, ’95
Asante Solutions, Inc.

Dave Tung ’91
Seagate Technologies

Donald Van Buren ’70
Bay Area Air Quality Management District

Peter Woytowitz ’93
Novellus Systems, Inc.

Interdisciplinary Projects

Ralph Babcock ’90

Patrick DalCanto ’07

Bernhard Henschke ’58

Donald Johnson ’69

Sheila Johnson ’83
Lockheed Martin

Daniel Lee ’71
Sun Microsystems

Douglas Leong ’90, ’01
TE Connectivity

Avery Lu ’95
Infineon Technologies North America

Joseph Mastroieni ’73
Diocese of San Jose

Michael McCormack ’68, ’71
California Energy Commission

Don McIntosh ’66

Michael Muscha ’81, ’91
Lockheed Martin

Joseph Oloju ’11

Steven Rodriggs ’85
Lockheed Martin

Edward Schwabecher ’81

George Skoda ’74, ’80

Mark Swoboda ’09
Texas Instruments

Noel Tamayo ’90
Qcept Technologies

Evor Vattuone ’66, ’68
ESV

Anshul Vyas ’11, ’14
TENT Laboratory

Jose Ysaguirre ’79
Qualitau, Inc.

Alberto Fonts Zaragoza ’08
BuildingIQ