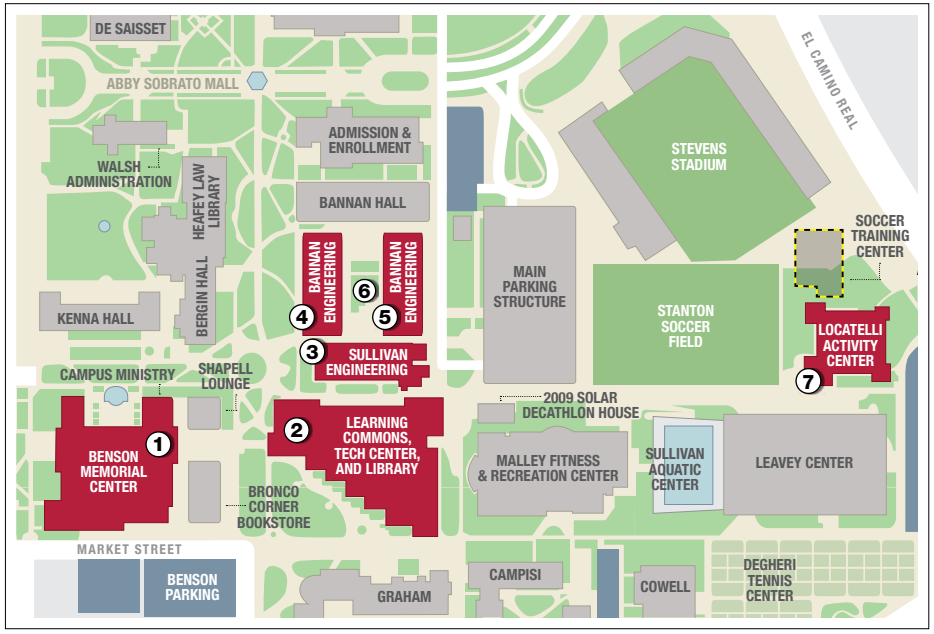

1 Benson Memorial Center
- Judges' Registration
- Judges' Lunch and State-of-the-School Address
- Judges' Welcome and Orientation
- Senior Design Presentations

MECHANICAL ENGINEERING
SESSION 1, 2, 3

2 The Harrington Learning Commons and Orradre Library
- Senior Design Presentations

BIOENGINEERING
SESSION 1, 2, 3

ELECTRICAL ENGINEERING
SESSION 1

3 Sullivan Engineering
- Senior Design Presentations

COMPUTER ENGINEERING
SESSION 1, 2, 3, 4

4 Bannan Engineering Labs
- Senior Design Presentations

INTERDISCIPLINARY
SESSION 2

5 Bannan Engineering
- Senior Design Presentations

CIVIL ENGINEERING
SESSION 1, 2, 3, 4

INTERDISCIPLINARY
SESSION 1

6 Engineering Quad
- Project Demonstrations

7 Locatelli Activity Center
- Dinner

ENGR-7379I 4/2015 725

Santa Clara University
School of Engineering

FSC
FPO

SANTA CLARA UNIVERSITY
SCHOOL OF ENGINEERING

45TH ANNUAL

SENIOR DESIGN CONFER-ENCE

MAY 14, 2015

Dear students, alumni, parents, partners, and friends,

Welcome to the 45th Annual Senior Design Conference. We are delighted to have you with us for this exhibition of our students' work.

At the School of Engineering, our goal is to transform students' lives through distinctive engineering education that capitalizes on the convergence of the Jesuit, Catholic tradition and Silicon Valley's innovative, entrepreneurial ethos. We aspire to educate engineers who advance technological innovation and entrepreneurship in the service of humanity. 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 the design of an improved surgical device to treat sleep apnea to the creation of an aerial drone system for use by wineries to determine the health of their vineyards—our students have spent their senior year using their knowledge for the betterment of society, putting theory into practice, and, in many cases, working collaboratively across disciplines.

As we continue into our second century of excellence in engineering education, we are ever mindful of the community of Bronco engineers who bring distinction to Santa Clara University. We congratulate our seniors 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.

Sincerely,

Godfrey Mungal, Dean
School of Engineering

Kathryn Kale '86, Executive Director
Alumni Association

PROGRAM SCHEDULE

Thursday, May 14, 2015

12:30 p.m.	**Judges' Registration** California Mission Room, Benson Center
12:30 p.m.	**Judges' Lunch and State-of-the-School Address*** Godfrey Mungal, Dean *School of Engineering* California Mission Room, Benson Center
1:45 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
2:15 – 5 p.m.	**Senior Design Presentations** Benson Center, Engineering Center, The Harrington Learning Commons and Orradre Library
5 p.m.	**Project Demonstrations** Engineering Quad
6 p.m.	**Dinner** Locatelli Student Activity Center

** Due to space constraints, this event is open only to Conference judges and invited guests.*

A special thanks to Bob Fox ’61 and his wife, Robin, for their support of our Senior Design Conference. Their generosity has helped many of today’s design projects become a reality, and their commitment to assisting our engineering students is both valued and appreciated. The founder and president of Fox Engineering and Manufacturing, Bob is dedicated to creating practical and hands-on experiences for engineering students.

BIOENGINEERING SESSION 1

Learning Commons 133,
Viewing and Taping B

Electrochemical Detection of Nitrate

2:15 – 2:45

Monica De Lazzari, Kristina Howard, Lillian Tatka

ADVISOR: UNYOUNG (ASHLEY) KIM

This project aims to develop a low cost, user friendly, accurate, and portable device for the electrochemical detection of nitrate in drinking water, for use in developing countries where this problem is prevalent.

Biological Applications of Scanning Thermal Microscopy

2:50 – 3:15

Amanda Brantner, Warren Jolley

ADVISOR: ZHIWEN (JONATHAN) ZHANG

Our team is using AppNano Vertisense SThM probes to characterize gold nanoparticles, as well as other biologically relevant materials.

ASSURED Bacterial Detection toward Paper-Based Microfluidic Chip for Resource-Limited Areas

3:25 – 3:50

Willy Leineweber, Mallory Williams

ADVISOR: UNYOUNG (ASHLEY) KIM

The World Health Organization estimates that over 3 million people die annually from waterborne illnesses. To address this, we propose a preventive diagnostic device that uses a paper-based sandwich assay and a smartphone application to detect the presence of bacterial pathogens in water samples.

BIOENGINEERING SESSION 2

Learning Commons,
Training and Instruction 203

Redesigning Lp-PLA2 while Retaining Catalytic Function

2:15 – 2:45

Kevin Cronin, Stacie Lim, Eddy Liu

ADVISOR: ZHIWEN (JONATHAN) ZHANG

Our project focuses on redesigning the enzyme lipoprotein-associated phospholipase A2 (Lp-PLA2) into a novel enzyme of peptide size. Successfully eliminating unnecessary amino acids from the structure of Lp-PLA2 will produce a smaller, functional enzyme. With this result, highly effective therapeutic protein drugs will gain feasibility.

Anti-Tumor Efficacy Study in CT 26 Tumor Model

2:50 – 3:15

Sophie Biencourt, Caroline Brooke

ADVISOR: ZHIWEN (JONATHAN) ZHANG

The goal of this project is to evaluate the therapeutic benefit of combining an approved drug, compound A, and a drug candidate, compound B, in a murinae colon tumor model.

A TALE of Two Nucleases: Using TALENs to Edit the Genome of *C. elegans*

3:25 – 3:55

Clare Bartlett, Kriszten Kocmond, Erin Root

ADVISOR: LEILANI MILLER

TALENs is an exciting technology which can be used for targeted genome editing. By using TALENs to mutate the genome of *C. elegans* we aim to advance the understanding of TALENs as a genetic engineering tool and contribute to the research on a transcription factor in the Ras/MAPK signaling pathway.

Engineering a Cell as a Biosensor

4:05 – 4:30

Alex Lehman, Connor Lynch

ADVISOR: ZHIWEN (JONATHAN) ZHANG

This project involves using the mammalian two hybrid system (trM2H) to detect protein-protein interactions in mammalian cells. The trM2H system works by outputting a green fluorescent protein (GFP) signal, with an intensity proportional to the binding affinity of the two proteins.

BIOENGINEERING SESSION 3

Learning Commons 129,
Viewing and Taping A

Insulin Pump Housing Modification Project

2:15 – 2:45

Matt Coleman, Kurt Holloway, Steven Long, John Tidwell

ADVISOR: PRASHANTH ASURI

In collaboration with Asante Solutions, the Insulin Pump Housing team is working to change the method by which Asante Solution's insulin pump bodies are sealed. This will streamline the manufacturing process as well as increase the consistency of sealing the insulin pump bodies.

Tongue Suspension Suture for Obstructive Sleep Apnea Patients

2:50 – 3:20

Erin Araj, Leah Karlsen, Abigail Kilkenny

ADVISORS: UNYOUNG (ASHLEY) KIM, ERIK VAN DER BURG

Our goal is to create an elastic, biocompatible tongue suspension implant for patients with obstructive sleep apnea, one that eliminates the need to be tethered to the mandible and incorporates Siesta Medical's Encore Tongue Suspension System.

Micro Motion Controller

3:25 – 3:55

Sandeep Adem, Cameron Chu, Karan Kapoor

ADVISORS: ZHIWEN (JONATHAN) ZHANG, RAJEEV KELKAR

We are developing a 2-D-of-freedom controller for micro-surgical procedures including neurosurgery, retinal surgery, and vascular surgery. This is intended to be further developed so that it may be used by da Vinci robotic surgeons in micro-surgical procedures.

Micro-Controller: Part 2

4:05 – 4:35

Bergen Antell, Michael McNaul, Steve Shushnar

ADVISOR: UNYOUNG (ASHLEY) KIM

Our goal is to allow paralyzed children and adults the possibility to play chess. This requires additional construction of a micro-controller, adding a motorized third axis and a finger gripper to pick up chess pieces.

CIVIL ENGINEERING SESSION 1

Bannan Engineering 105

Sustainable Design in Ghana

2:15 – 2:45

Anthony DeCosta, Amanda Laufer, Theresa McArdle

ADVISOR: MARK ASCHHEIM

Our project explored the replacement of a roof in Ghana using the Nubian Vault construction method. While La Voute Nubienne Association currently builds physically stable structures, we aim to provide the technical data needed for international support of this method to further expand the NGO's capabilities.

Structural Housing Improvements in Oaxaca, Mexico, Using *Arundo donax*

2:50 – 3:15

Greg O'Neill, Jonathan Tadros

ADVISORS: MARK ASCHHEIM, TONYA NILSSON

This project researches *Arundo donax*—a type of giant, perennial cane plant—to examine its use as a viable structural building material. Used alongside other traditional building methods, this material may offer new technologies for housing in developing countries.

Interlocking CMU Geometry Design

3:25 – 3:50

Raquel Avila, Nick Jensen

ADVISORS: TRACY ABBOTT, MARK ASCHHEIM

This project consists of the design of interlocking voided concrete block and the evaluation of block wall strengths. We aim to find an inexpensive solution for wall construction that can be tailored to work in different wind and seismic environments.

Designing with Bamboo: Frames and Connections in Underdeveloped Areas

4:05 – 4:30

Bryson Kam, Andrew Spencer

ADVISORS: MARK ASCHHEIM, TONYA NILSSON

Our project focuses on the construction and testing of a proposed structural system in which bamboo and concrete masonry block are incorporated with a plastic hinge mechanism. This structure would primarily be used in Haiti and other developing countries that are prone to seismic activity.

CIVIL ENGINEERING SESSION 2

Bannan Engineering 325

Preliminary Design and Construction Planning of a New Santa Clara University Student Fitness and Recreational Center

2:15 – 2:45

Justin Matoi, Steven Sakamoto, Alex Sarr

ADVISORS: TRACY ABBOTT, HISHAM SAID

Our team developed a preliminary proposal for a new fitness and recreational center for Santa Clara University, a plan which included spatial programming, structural design, and construction planning. Spatial programming provided additional building square-footage. Structural design included steel frames and foundation design. Finally, the construction planning included project estimating, scheduling, and logistics.

Bannan Pedestrian Bridge

2:50 – 3:20

Chris Banaga, Kevin Delos Santos, Tim Mort

ADVISORS: TRACY ABBOTT, HISHAM SAID

The proposed pedestrian footbridge design is a project that aims to develop and improve the quality of student life at Santa Clara University. Construction design includes estimating, scheduling, and logistical analysis of the project, and structural design includes design calculations and computer analysis of the columns.

Seismic Retrofit of Soft Story Building in San Francisco

3:25 – 3:55

Maggie Jones, Alexei Sinkevich, Will Smithers

ADVISOR: REYNAUD SERRETTE

This project aims to analyze the existing conditions of a soft story residential building located in San Francisco to determine the effectiveness of available soft story retrofit methods and to design an implementable and cost-effective seismic retrofit.

Santa Clara University Multicultural Center Redesign

4:05 – 4:30

Angela Non, Isaac Raven

ADVISORS: TRACY ABBOTT, HISHAM SAID

The redesign of the new Bob Shapell Student Activities Hall, home to SCU's Multicultural Center, aims to provide a more functional space for its users. The design will require demolishing existing columns and implementing a lighter roof system, in addition to providing a preliminary cost estimate, construction schedule, and site-logistics plan.

CIVIL ENGINEERING SESSION 3

Bannan Engineering 106

Homeless Garden Project

2:15 – 2:45

John Miller, Tara Pozzi, Caroline Ruwe

ADVISOR: STEVEN CHIESA

This project includes the design of a gravity-fed water delivery and distribution system for a 12-acre farm. The farm will be used by the Homeless Garden Project, a nonprofit organization geared toward helping the homeless in Santa Cruz, California.

Low Environmental Impact Neighborhood District in Gilroy, California

2:50 – 3:15

Ellen McKay, Kaelynn Willey

ADVISORS: STEVEN CHIESA, RACHEL HE

Our project involves the planning and design of a low environmental impact neighborhood in Gilroy, one which includes a mix of single-family and multi-family homes with an integrated commercial component. The design process consisted of establishing street and lot layouts and designing utility systems with local connections. The final product addresses the need for sustainable, family-friendly communities.

Hearst Avenue Complete Street Design

3:25 – 3:50

Nabilah Deen, Robbie Powell

ADVISOR: RACHEL HE

This project implements comparative street designs that incorporate sustainable features such as bike and pedestrian accessibility, efficient traffic signal sequences, and effective stormwater management attributes along Hearst Avenue in Berkeley, California.

CIVIL ENGINEERING SESSION 4

Bannan Engineering 107

Hayward Shoreline Levee Design

2:15 – 2:45

Samuel Beering, Karissa Canonizado, Caleb Young

ADVISOR: SUKHMANDER SINGH

This project encompasses the design of a section of levee in Hayward. A new levee is needed to protect the shore from flooding due to rising sea levels and future storm events.

Geomorphic Restoration and Stabilization of a Reach of Stevens Creek

2:50 – 3:20

Travis Giffen, Gretchen Kayser, Nick Roby

ADVISORS: LAURA DOYLE, EDWIN MAURER

This project focuses on the restoration of a 400-foot reach of Stevens Creek in Santa Clara County, California. The new design will increase the stability of stream channels, riparian system functions, and fish passage while improving or maintaining the "level of service" based on geomorphic data.

Santa Clara University Creek Restoration

3:25 – 3:50

Scott Cameron

ADVISOR: EDWIN MAURER

This project investigates a possible design for the restoration of a creek once located near the premises of Santa Clara University.

COMPUTER ENGINEERING SESSION 1

Sullivan Engineering 604

iKure Health Worker Tracker

2:15 – 2:45

Mason Maeshiro, Daniel Mendoza, Astha Singh

ADVISOR: SILVIA FIGUEIRA

iKure, a social benefits entrepreneurship, strives to provide affordable health care to people living in rural communities. We are creating a mobile application that not only tracks the workers' locations through their android tablets but also allows the administrator to access this information in real time.

Volunteer Connect for IkamvaYouth

2:50 – 3:20

Weihan Li, Ann Parden, Joohoon Sa

ADVISOR: SILVIA FIGUEIRA

This project is a mobile web-based application for IkamvaYouth, a nonprofit organization working with learners in South Africa. Our location-based web application provides a more convenient sign-up process and suggests the optimal matches of volunteers and students based on their registered location to expedite the initial work of the organization.

Beacon Pack

3:25 – 3:55

Aiden Barbari, James Mack, James Terry

ADVISOR: SILVIA FIGUEIRA

The British Airways-sponsored Beacon Pack is a solar-powered data repository that stores educational and world news content accessible through SMS text. This product will provide information to millions of individuals in developing countries who have low-level cellular devices.

Wakabi: On-Demand Ride Service for Rural Uganda

4:05 – 4:30

Michael Brew, Bryant Larsen

ADVISOR: SILVIA FIGUEIRA

Wakabi is an SMS-based application designed to streamline the ride-sharing process currently existing in rural Uganda. The system allows individuals to connect with hired motorcyclists (Boda drivers) by texting a single number. Wakabi will deliver more business to Boda drivers and provide Uganda with a unified, simple, on-demand transportation solution.

Sankara Eye Records: Eye-Health Tracker for Children in India

4:40 – 5:05

Francis Cuenca, Amy Truong

ADVISOR: SILVIA FIGUEIRA

Sankara Eye Records is a mobile application created for Sankara Eye, an Indian social enterprise that provides eye care services in India. Our mobile application will make the process of creating and editing schoolchildren's eye health records quick and efficient for Sankara Eye screeners.

COMPUTER ENGINEERING SESSION 2

Sullivan Engineering 602

DyLMA

2:15 – 2:45

Arturo Aguilar, Ruben Luva, David Mora, Sunny Patel, Alejandro Rodriguez

ADVISOR: MARIA PANTOJA

DyLMA is a Dynamic Life Management Assistant developed for the Google Glass platform that integrates a user's schedules and tasks to increase user efficiency. This is accomplished by managing events and activities to maximize productivity, while at the same time providing personalized suggestions to promote a balanced lifestyle.

GPU-Accelerated Lip-Tracking Library

2:50 – 3:15

Alex DeBoni, Jesse Harder

ADVISOR: MARIA PANTOJA

This library will take in images of people's faces and output points that represent the contour of the lips in each image. Additionally, it will make use of a CUDA-enabled GPU if one is available. This would be used for a language-learning application.

Using Virtual Reality for Anxiety Therapy

3:25 – 3:50

Bryce Mariano, Paul Thurston

ADVISOR: MARIA PANTOJA

For our project, we are developing a system that employs virtual reality as a tool for therapists to treat various anxiety disorders, such as phobias, using exposure therapy. We will be developing a small library of simulations corresponding to the most prevalent phobias in our society.

Explorable 3-D Model of SCU Campus

4:05 – 4:30

Benjamin Giglione

ADVISOR: MARIA PANTOJA

This project produces a full 3D model of the Santa Clara University campus made explorable by the UDK and made 3D by the Oculus Rift.

COMPUTER ENGINEERING SESSION 3

Sullivan Engineering 618

GroupRight

2:15 – 2:45

Kenneth Bigler, Scott Sarsfield, Zachary Wilson

ADVISOR: KATERINA POTIKA

GroupRight is a comprehensive group decision-making platform for simplifying the organization of event scheduling, task management, and mass communication. Consisting of both a website and mobile application, GroupRight provides convenient tools for groups of all sizes to improve productivity.

Serendipity

2:50 – 3:15

Erik Chang, Stan Whitcomb

ADVISOR: YI FANG

Serendipity is a web-based musical search and recommendation system which classifies and recommends music by processing extracted traits from songs. Unlike other such systems which use human-based music classification, we have automated the recommendation process and created algorithms to do the work so our users discover new music.

OmniSplit

3:25 – 3:55

Jordan Buschman, Andy de Artola, Ashley Sehatti

ADVISOR: YI FANG

OmniSplit is a small to medium business solution that seeks to address the problem of poor restaurant dining experiences and to optimize restaurant feedback. OmniSplit combines customer payments, micro-transactions, food ratings, online ordering, and restaurant analytics all in one system.

FoodReader

4:05 – 4:30

Nate Matsunaga, Rick Sullivan

ADVISOR: YI FANG

Our project is a software tool that uses computer vision techniques, including image processing and optical character recognition, to extract relevant nutritional information from digital images of USDA food labels.

Energy Management Tool Suite

4:40 – 5:05

Julian Bliss

ADVISOR: RANI MIKKILINENI

The Energy Management Tool Suite is a web-based software suite designed to streamline computation of many of the algorithms taught in ELEN 288/COEN 282, which at the moment must be calculated by hand.

COMPUTER ENGINEERING SESSION 4

Sullivan Engineering 605

Code Girl

2:15 – 2:45

Tracey Acosta, Amanda Holl, Paige Rogalski

ADVISOR: DARREN ATKINSON

This web-based application allows girls aged 5 to 8 to create and customize their own doll or avatar and unlock new accessories by successfully completing challenges using Blockly, a visual coding editor.

Bookster

2:50 – 3:15

Kyle Alwyn, Taylor Roden

ADVISOR: DAN LEWIS

Bookster is a mobile application, built for both iOS and Android, which acts as a local selling platform for college textbooks. The hybrid application is powered by the Adobe Phonegap. Users can post books to sell and view books for sale based on their geolocation.

Low-Cost ECG for Rural Populations of Developing Countries

3:25 – 3:50

J.P. Ertola, Michael Whalen

ADVISOR: DAN LEWIS

Our device allows doctors to remotely screen patients for cardiovascular arrhythmias by sending them ECG data via text message. Additionally, our device was built with mostly open sourced electronic components, and our software will be made open source to encourage future development efforts.

WeJ Collaborative Playlists

4:05 – 4:35

Jason Dougherty, Nicholas Fong, Alek Hurst, Malia Lum

ADVISOR: AHMED AMER

WeJ (we-jay) is a mobile web application that provides users with the ability to collaboratively create music playlists and listen to them with each other in real time. Our goal is to bring people together through the power of music.

ELECTRICAL ENGINEERING SESSION 1

Learning Commons, Training and Instruction 205

Smart Thermostat

2:15 – 2:45

Matthew Wade Allen, Samuel Hardy Billett, Kevin Michael Read

ADVISOR: MARYAM KHANBAGHI

Our goal is to create a thermostat which learns user behavior and intelligently manages the temperature. Through this control, we can maintain a more comfortable and energy efficient environment.

Dynamic Capacitor Bank

2:50 – 3:15

Jose Daniel Mendoza, Peter Nicholas Roguski

ADVISOR: MARYAM KHANBAGHI

Our project, a Dynamic Capacitor Bank, is a device that will allow higher efficiency in certain loads.

Assistive Reminder

3:25 – 3:50

Jocelyn Tan

ADVISOR: RADHIKA GROVER

Memory loss is enhanced by symptoms of autism, which is estimated to affect 1 percent of the world's population. Customizable and cost-effective, Assistive Reminder is a novel device aimed to remind users, such as individuals with autism, to complete tasks at various times of the day.

Electric Vibraphone

4:05 – 4:25

Benjamin Thong

ADVISOR: SARAH KATE WILSON

In this project, I will design and build a system to capture the sound of a vibraphone and use digital filtering to alter the output sound.

MECHANICAL ENGINEERING SESSION 1

Benson Center, Parlor B

Sunplanter

2:15 – 2:45

Matt Diaz, Joseph Gaither, Stephen Hight, Brandon Suehiro

ADVISOR: TIMOTHY HIGHT

Sunplanter, a modular, prefabricated residential solar-tracking system, provides a unique solution to high solar installation costs.

Legacy Borehole Project

2:50 – 3:20

Piper Connelly, Rhys Marks, Ronald Saavedra

ADVISORS: TIMOTHY HIGHT, CHRISTOPHER KITTS

This project is the second year of a three-year venture to design and build a steel structure and sensor package that will operate together as a tool for open ocean research, enabling scientists to collect data from boreholes on the sea floor.

One Ride Human Powered Vehicle

3:25 – 4:00

Alex Fisher, Alexander Sahyoun, Geoff Schmelzer, Brendan Taylor, CJ Toy

ADVISORS: DRAZEN FABRIS, CALVIN TSZENG

This project designs and builds a two-wheel recumbent bicycle for the ASME HPVC Competition. Designed to be a one-size-fits-all bike, it contains fully adjustable steering and seating that can accommodate riders of various sizes.

MECHANICAL ENGINEERING SESSION 2

Benson Center, Williman Room

Planetary Landing Capsule

2:15 – 2:45

Grant Goyette, Aja Hartman, Shane Hereford, Heather Montgomery

ADVISOR: NIK DJORDJEVIC

A proof of concept prototype planetary capsule for delivering an exploration rover designed for use as the last stage of landing in the existing entry, descent, and landing procedures used in previous Mars missions. The design improves upon previous designs by using mainly passive systems and increasing landing site accuracy.

AkaBot

2:50 – 3:20

Jay Dubashi, Brian Grau, Alex McKernan

ADVISOR: PANTHEA SEPEHRBAND

AkaBot is an extrusion machine that produces 3D printing filament by recycling PET plastic water bottles. This filament gives entrepreneurs in developing countries the tools to compete with foreign import filament while using sustainable technology.

Automated In-Row Weed Trimmer

3:25 – 4:00

Josh Baculi, Tyler Castrucci, Joshua Ding, Marit Knapp, Gaston Young

ADVISORS: TIMOTHY HIGHT, CHRISTOPHER KITTS

The Automated In-Row Weed Trimmer (AIRWT) is a weed removal system designed for sloped vineyards that will autonomously avoid vine trunks while thoroughly trimming weeds. The goal of this system is to reduce the need for manual labor and herbicides on organic vineyards while improving production rates of grapes.

Backpack Cooler

4:05 – 4:40

Sebastian Brisbois, Patrick Crane, Daniel Lee, Kaci McCartan, Connor O'Brien

ADVISOR: HOHYUN LEE

The project is a portable backpack cooler using thermoelectric modules to cool the chamber in order to provide a refrigeration system for off-grid communities. The cooler will be powered using a battery that will be charged using solar panels installed in the home.

MECHANICAL ENGINEERING SESSION 3

Benson Center, Parlor C

SkyPort: Controls

2:15 – 2:45

Drake Grady, Micah Klaeser, Robert McDonald, William Whitesides

ADVISOR: CHRISTOPHER KITTS

The goal of the SkyPort project is to develop a long-range VTOL UAV to transport medical supplies to rural health providers in the developing world, serving as a viable pilot product for the SkyPort Social Enterprise project. The controls team is responsible for controls, mechatronics, operations, and system engineering.

SkyPort: Airframe

2:50 – 3:20

Thomas Clark, Michael Dewane, Siosiua Faleta, Robert Llanos-Hinson

ADVISORS: NIK DJORDJEVIC, CHRISTOPHER KITTS

The objective of the SkyPort: Airframe Team is to design and construct the structural system, lifting surfaces, and fuselage of the SkyPort UAV. This is part of the effort to create a rugged and reliable last-mile delivery system for medical goods in the developing world.

Skyport: Payload

3:25 – 3:55

Madison Gee, Hector Lopez, Victor Magana

ADVISORS: CHRISTOPHER KITTS, HOHYUN LEE

With a focus on improving global healthcare, SkyPort is developing a UAV to deliver vaccines and blood samples to and from rural villages in developing nations. The Payload Team is designing the vaccine chamber using thermoelectric modules as an active cooling method.

INTERDISCIPLINARY SESSION 1

Bannan Engineering 326

Pilot-1 Fixed Wing Drone Controller

2:15 – 2:45

Nathan Garvey, Faisal Hayat, Christopher Millsap

ADVISORS: DAN LEWIS, SARAH KATE WILSON

Our project is an attempt to make professional-grade fixed-wing drone control available on a consumer budget, and to create a flight controller that is adaptable to meet widely varying mission parameters.

RSL Rover

2:50 – 3:20

Cris Madrigal, Brogan O'Hara, Nick Peacock, Jiachi Zhang

ADVISORS: CHRISTOPHER KITTS, SAMIHA MOURAD

RSL Rover is an off-road vehicle that uses an autopilot system integrated with LIDAR and sonar technology. The vehicle will be able to adapt and make decisions in order to autonomously traverse an area set by the user while avoiding obstacles along its path.

UAVino

3:25 – 4:00

Matt Belesiu, Nathan Carlson, Aaron Chung, Phillip Coyle, Kirby Linvill, Megan Peekema

ADVISORS: CHRISTOPHER KITTS, SHOBA KRISHNAN

UAVino is a drone solution that uses aerial imagery to determine the overall plant health and water content of vineyards. The project's key innovation is an auto-docking system that allows the drone to automatically return to its launch point and recharge in order to extend mission duration.

INTERDISCIPLINARY SESSION 2

Bannan Engineering Labs, Frugal Innovation Lab

Mobile Music

2:15 – 2:45

Andy Giang, Alex Hildebrand, Tanner Malkoff

ADVISOR: SHOBA KRISHNAN

Music has proven to encourage and advance physical therapy among young children afflicted with cerebral palsy. Our assistive technology, Mobile Music, combines media devices with any physical therapy walker in a way that develops gait therapy alongside progressive technological trends.

Might-E Wheel

2:50 – 3:20

Daniel Doke, Abby Grills, Zach Jesberger, Jared O'Rourke

ADVISORS: TIMOTHY HEALY, ROBERT MARKS

The Might-E Wheel converts existing bicycles into electric bicycles by an easy and approachable installation. Through a rear wheel replacement containing the motor, batteries, and control system, efficient travel by electric bicycle is made affordable and accessible.

Low Cost 3D Bioprinter

3:25 – 3:55

Andrew Shi, Connor Smith, Victor O'Brien

ADVISORS: PRASHANTH ASURI, CHRISTOPHER KITTS

We are repurposing a RepRap printer into a low cost 3D bioprinter that will be printing biomaterials and proteins.

AquaSift: Point-of-Use Microfluidic Detection System

4:05 – 4:35

Daniel Beyers, Jasper Tan, Brandon Young

ADVISORS: SILVIA FIGUEIRA, SHOBA KRISHNAN

We present a simple, affordable, and portable system that works with a three-electrode device to detect contaminants in drinking water. The system comprises a potentiostat to perform voltammetric sweeps, an Android application to interface with a smartphone, and a database application for the mapping of results.

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.

Jeff Abercrombie ’84
Dept. of Transportation

Thomas Akins ’10
Eaton

Kishore Akshintala ’14
Hewlett-Packard Co.

Gabriel Alcantar ’08
Langan Engineering

J.P. Allport ’14
Multitouch Ltd.

Frank Altamura ’08

Patrick Arevalo ’06
Level 10 Construction

Samit Ashdhir ’00
Facebook

Doug Aumack ’71
Trescal

Cathy Avila ’86
Avila and Associates

Ernie Avila ’83
Avila and Associates

Jonathan Azoff ’09
Taviti

Nikhil Balram
Ricoh Innovations Corporation

Mario Baratta ’64
Baratta & Associates

Laura Bica ’11, ’12
ViaSat

Melissa Bica ’14
University of Colorado Boulder

Chris Brady ’98
Stanislaus County Public Works

James Brady ’65

Derrick Breska ’13
Zilka Kotab P.C.

Erik Burd ’05

Collin Burdick ’11
Slalom Consulting

Lawrence Burke ’52

Maria Campbell ’11
BMA Construction Engineers, Inc.

Charles Cantoni ’57

Steffany Castro ’08, ’11
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