

$$\begin{bmatrix} a & b \\ c & d \end{bmatrix}$$

$$\begin{bmatrix} a & b \\ c & d \end{bmatrix}^T = \begin{bmatrix} a & c \\ b & d \end{bmatrix}$$

$$\begin{bmatrix} a & b \\ c & d \end{bmatrix}^{-1} = \frac{1}{ad-bc} \begin{bmatrix} d & -b \\ -c & a \end{bmatrix}$$

JUNE 3, 2011 // SULLIVAN HALL

# PROJECTS DAY 2011

SEATTLE UNIVERSITY  
*Founded 1891*



# PROJECTS DAY 2011

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For over two decades, Seattle University's Project Center has partnered with businesses, government agencies and nonprofit organizations throughout the Puget Sound region. Student teams from either the College of Science and Engineering or the Albers School of Business and Economics work on projects in the fields of computer science and software engineering, electrical and computer engineering, mechanical engineering, civil and environmental engineering, as well as marketing, management, financial analysis, economics, international business, sustainable business, and new business ventures.

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The projects presented on Projects Day represent solutions to real engineering and business projects. This is the culminating event of the Project Center experience for the students, as well as an opportunity to thank project sponsors and faculty. This event also serves as an introduction to the Project Center program for potential sponsors.

Please visit [www.seattleu.edu/projectcenter](http://www.seattleu.edu/projectcenter) for more information and guidance for becoming a Project Center sponsor.

## WELCOME MESSAGES

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Welcome to Projects Day 2011! We are glad that you are here to take part in this important end-of-year celebration. Today, you'll see for yourself what employers already know: our graduates have a strong understanding of fundamental principles and are excellent communicators. We are able to achieve these enviable results here at Seattle University because we keep our class sizes small, we give our students lots of homework, and we ask them to make presentations often. Then we cap it off with the Project Center experience, where our seniors work in

teams, engage with external organizations, and apply the engineering skills they've learned to "real world" projects. It's clear that companies like what they see in Seattle University engineering and computer science students, because our graduates regularly take a full-time position with the company that sponsored their senior project.

We are proud of our students and what they have accomplished. I encourage you to look through this program, identify some projects of interest, and attend the team presentations. If you have a question, fire away! I'm confident you'll be impressed with the ability of our graduates to think on their feet and talk about technical issues.

The Project Center is one of the jewels in the crown of the College of Science and Engineering. I want to thank the project mentors and the faculty advisors who have worked with the teams throughout the academic year. Most especially, I want to acknowledge the corporate sponsors who make it possible for us to provide our students with this terrific educational experience. Thank you for your generous support!

**Michael J. Quinn, Ph.D.**  
Dean, College of Science and Engineering



On behalf of the Albers School of Business and Economics, I want to welcome you to Seattle University's Projects Day 2011.

Similar to the Science and Engineering students, Albers business students undertake real world projects as part of their programs. Their experiential learning comes in the form of consulting, market research, and various other business projects for corporations such as Philips Healthcare, Secure Development, Cashmap and many more. Sponsors

want to solve problems, identify new processes, and target opportunities for growth. Albers MBA students, working in teams with faculty oversight, deliver top-notch findings and recommendations to the company.

While these projects have been part of the Albers MBA curriculum for many years, the Albers connection to the Project Center began in 2008 when the two schools agreed to collaborate as one central point for building partnerships linking Seattle University with businesses, government agencies, and nonprofit organizations throughout the Puget Sound region. We look forward to continuing cooperation between the schools and our community partners.

The business projects you will be seeing were undertaken in our International Business and New Ventures and Consulting classes. These projects represent over 25 others that have been completed at Albers during this academic year.

Thank you for your support for these projects. Enjoy learning about them and getting to know the students involved.

**Joseph M. Phillips, Ph.D.**  
Dean, Albers School of Business and Economics

## PROJECTS DAY SCHEDULE

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### 12:00 – 12:30 PM

Registration

### 12:30 – 1:30 PM

Poster Session

### 1:30 PM

Welcome, Provost Isiaah Crawford, Ph.D, Project Center Director Jean Jacoby, Ph.D, Dean Joseph Phillips, Ph.D and Dean Michael Quinn, Ph.D

## PRESENTATION SESSION 1 // 1:45 – 2:45 PM

### ROOM C5

CSSE 11.1 **Microsoft** Imagine Cup Voting Application  
CSSE 11.2 **Philips** Healthcare Ultrasound Image to User Device Interface  
Business Project: **Philips** Healthcare Marketability of User Device Interface

### ROOM C6

CEE 11.1 **EWB/Seattle University** Ethiopia Orphanage Building Design  
CEE 11.7 **Emerald City Rotary/Seattle University** Safe Drinking Water Project  
CEE 11.3 **Tetra Tech** Colombia Community Center Design

### ROOM 109

ECE 11.1 **The Boeing Company** Sound Attenuated Aircraft Lining Panels  
ECE 11.3 **PACCAR** Electrical System Diagnostic Device

### ROOM 110

CEE 11.2 **Seattle City Light** Cedar Falls Dam Handrail Retrofit  
ME 11.1 **Seattle City Light** Boundary Dam Trashrake  
ME 11.3 **Solution Recovery Services** Algae Lipid Extraction

### 2:45 PM – 3:00 PM

Break

## PRESENTATION SESSION 2 // 3:00 – 4:00 PM

### ROOM C5

Business Project: **Secure Development** Marketing Analysis  
Business Project: **Cashmap** iPad Application

### ROOM C6

CEE 11.4 **Pierce County Public Works** Street Sweepings and Decant Solids Remediation  
CEE 11.5 **Snohomish County Public Works** Street Planter Design  
CEE 11.6 **King County/Seattle University** Green Storm Water Initiatives

### ROOM 109

ECE 11.4 **The Other Roadside Attraction** Angst Warrior Sculpture  
ECE 11.2 **IEEE/Seattle University** Electromagnetic Modeling of Open Source Generator  
CSSE 11.3 **Alstom Grid** Dynamic Simulation Tool

### ROOM 110

ME 11.4 **National Park Service** Camp Muir Waste Management  
ME 11.5 **Kenworth Truck Company** Shutter Thermal Study  
ME 11.2 **FSI Fabrication** In-cab Vehicle Control System

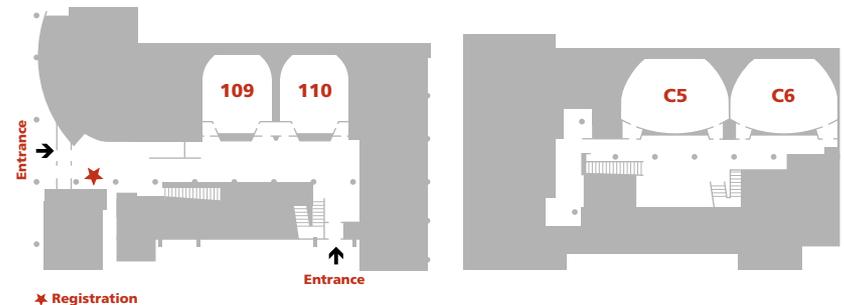
### 4:00 PM

Reception  
Featuring live music from Easy Street Band

## SULLIVAN HALL MAP

Main Level

Lower Level



# PROJECTS



## CIVIL AND ENVIRONMENTAL ENGINEERING

### CEE 11.1 // GATEWAY OF HOPE ORPHANAGE

**SPONSOR:** Seattle University and Engineers without Borders-Puget Sound Chapter

**SPONSOR LIAISONS:** Girma Haile-Leul, Eset Alemu, Mahi Demissie

**FACULTY ADVISOR:** Prof. Jhon Paul Smith

**STUDENTS:** Bea Elise Casem, Farzin Komizi, Sidney Nakao, Scott Stainer

Seattle University and the Engineers Without Borders-Puget Sound Chapter partnered with property owner, Frehiwot Bruce, and the project team to design an orphanage near the capital city of Addis Ababa, Ethiopia. The project team prepared preliminary architectural layouts, 30% design plans, structural member sizing, and corresponding structural calculations for a dormitory and a community center hall. The structural design of the buildings followed standard construction practices and used materials available in Ethiopia, including steel trusses on reinforced concrete frames and masonry block as infill for non-bearing walls. In addition, the design team created a cost analysis for each structure based on the cost of the building materials and labor expenses.

### CEE 11.2 // CEDAR FALLS DAM SAFETY FEATURE RETROFIT

**SPONSOR:** Seattle City Light

**SPONSOR LIAISONS:** Robert Cochran, Bernie O'Donnell, Wanda Schulze

**FACULTY ADVISOR:** Prof. Katherine Kuder

**STUDENTS:** Wilmurf de Vera, Jamie Mellies, Royce Miyahara, Dan Pickering

Completed in 1914, Cedar Falls Dam provides electricity and drinking water for the Seattle area, and is recognized as a historic site by the National Register of Historic Places. Seattle City Light (SCL) requested the team to retrofit the safety features on the dam, which do not comply with current building codes (American Society of Civil Engineers/ Structural Engineering Institute 7-10 and the 2009 International Building Code). The team analyzed the existing handrail, vehicle barrier, and concrete parapet (short wall) using as-builts, site visit observations, and load testing. Load testing included: (1) determining the compressive strength of the wall from concrete cores, (2) evaluating the load-deflection response of the existing parapet wall, and (3) measuring the pullout capacity of embedded anchorage bolts. Considering environmental issues and the historical aesthetics of the dam, the team developed designs to satisfy the relevant building codes for geometric and loading requirements. The final project deliverable is a design basis memorandum for the safety features and includes a cost estimate.

### CEE 11.3 // PODER JOVEN FOUNDATION COMMUNITY CENTER

**SPONSOR:** Tetra Tech, Inc.

**SPONSOR LIAISONS:** Chad McDonald, Hamid Naderi

**FACULTY ADVISOR:** Prof. Jhon Paul Smith

**STUDENTS:** Elizabeth Lenker, Khashayar Mirani, Amy Reinke, Gyan Sinha

Poder Joven Foundation (PJF) plans to build a community center for underprivileged children in Medellín, Colombia. The building will provide space for educational programs for children, job retraining programs for adults, and community meetings. The team created a 30% design of a three story building with a reinforced concrete frame consisting of columns, beams, floor slabs, and footings. Member sizing and reinforcement detailing were also provided. The design and construction are proceeding simultaneously through spring 2011. PJF is a nonprofit organization and works within a limited budget, so the construction is largely completed by unskilled laborers. The design team created a simple design that can be constructed in phases as funds become available. Thus, the cost analysis for the community center specified the cost to construct in phases.

### CEE 11.4 // VACTOR DECANT SOLIDS REMEDIATION AND RE-USE

**SPONSOR:** Pierce County Public Works Road Operations

**SPONSOR LIAISONS:** Jeff Rudolph

**FACULTY ADVISOR:** Prof. Mike Marsolek

**STUDENTS:** Liz Kendall, Michele Myers, Zack Pittman, Brynn Watanabe

Pierce County Public Works Road Operations (PCPWRO) is investigating the viability of bioremediation as a treatment option for contaminated street waste. Street waste is generated from the cleaning of storm drainage facilities and roadways. It is collected by vactor trucks or street sweepers and then tested for contaminants such as carcinogenic polycyclic aromatic hydrocarbons (cPAHs), hydrocarbons, and metals. In recent years, concentrations of cPAHs have been increasing in street waste. Waste materials can be reused if the cumulative cPAH concentration is below 1 part per million, otherwise it must be disposed of at a landfill. PCPWRO would prefer to re-use all of its street maintenance solids to increase overall process sustainability and to reduce costs. PCPWRO requested the design team to identify, test, and model multiple options to remediate their contaminated vactor solid waste. The team created an experimental design; field tested the efficacy of each option, and developed models describing the concentration rate of change over time for each option. From these results a treatment process was developed and a cost/benefit analysis was performed.



### PROJECT CENTER STAFF

From left: Greg Scully, Susan Weihrich, Jean Jacoby, Amy Haedt, Hilary Northcraft

### CEE 11.5 // SNOHOMISH COUNTY PLANTER STRIP DESIGN

**SPONSOR:** Snohomish County Public Works

**SPONSOR LIAISONS:** Max Phan, Brook Chesterfield

**FACULTY ADVISOR:** Prof. Kari Watkins

**STUDENTS:** John Conway, Jennifer Kuzaro, Katie Rawson, and Catherine Wilcox

Snohomish County Public Works (SCPW) is interested in developing new design, retrofit, and maintenance options for planter strips and medians along roadways with the goal of decreasing current maintenance costs while still providing an aesthetically pleasing appearance to the general public. As a first step, SCPW asked the design team to account for the unmaintained planter strips by creating a comprehensive inventory of all county planter strip areas, and a GIS layer to demonstrate which roadways contained planter strip areas. Current maintenance practices of Snohomish County were analyzed, comparing their designs and maintenance practices to other agencies in the Pacific Northwest, as well as other areas across the country. Best management practices were recommended to reduce maintenance requirements and costs. The final product includes several new designs and retrofitting strategies providing the benefits of infiltrating and treating storm water runoff, as well as a cost-benefit analysis for new construction design alternatives. The project reflects SCPW's request to implement Low-Impact Development principles while designing planter strips that are aesthetically appealing and low in cost.



### CEE 11.6 // GREEN STORMWATER INFRASTRUCTURE MASTER PLAN

**SPONSORS:** Seattle University and King County

**SPONSOR LIAISON:** Robin Kirschbaum, PE, LEED

**FACULTY ADVISOR:** Prof. Wes Lauer

**STUDENTS:** James Appleyard, David Julian, Darton Riely-Gibbons, James Smith

Much of Seattle is drained by an aging combined sewer system. During periods of intense rainfall, the system frequently exceeds capacity, triggering the release of untreated sewage in events called combined sewer overflows (CSOs). King County is currently updating its long-term CSO Control Plan to incorporate green stormwater infrastructure (GSI), such as rain gardens, bioretention swales, green roofs, and pervious pavement. The goal is to address stormwater runoff near the source, thereby reducing or potentially eliminating the need for downstream CSO control infrastructure in some basins. Seattle University is located within King County's Hanford/Lander basin, which is one of the basins prioritized for GSI. The County requested that the design team, with the aid of local engineering firm HDR, create a GSI Master Plan for the University. The design team developed a comprehensive inventory of existing stormwater infrastructure, identified opportunities and constraints for on-site stormwater management, developed a list of prioritized GSI projects, and used the EPA's Stormwater Management Model (SWMM) to evaluate the expected cost-effectiveness of high-priority projects. The plan incorporates preliminary designs for the top two high-priority projects.

### CEE 11.7 // THE SAFE WATER PROJECT

**SPONSOR:** Seattle University and Rotary International

**SPONSOR LIAISON:** Prof. Phillip Thompson

**FACULTY ADVISOR:** Prof. Dave Jacobs

**STUDENTS:** Amanda Connell, Chris Kemly, Katie Nolan, Omar Ongoco

Water is a basic necessity for survival, yet over 1.1 billion people in the world lack access to clean drinking water. In an effort to address this issue, Rotary International designed a small-scale community drinking water treatment system for medical clinics in the developing world and for areas affected by natural disasters. The design team analyzed the water quality produced by the current system and evaluated other means of disinfection that could be implemented. Laboratory testing was performed to analyze the effectiveness for removing bacteria, viruses, and turbidity. A triple-bottom-line analysis was then performed to analyze long-term operation and maintenance (O&M) costs, short-term capital costs, size constraints, removal efficiencies, and ease of use. Two different system configurations were recommended based on the evaluations. A system utilizing an ultrafiltration device was suggested for long-term use at medical clinics and another system was suggested for disaster relief applications. The team was also tasked with testing a method of disinfecting containers used for transporting the treated water and devised a chlorine generation dosage plan to provide adequate residual. Other deliverables included O&M manuals and a final report.



## MECHANICAL ENGINEERING

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### ME 11.1 // BOUNDARY DAM TRASH RAKE

**SPONSOR:** Seattle City Light

**SPONSOR LIAISON:** Kevin Marshall

**FACULTY ADVISOR:** Prof. Robert Cornwell

**STUDENTS:** Brad Buczkowski, Sean Froese, Nick Spada, and Patrick Yumang

Boundary Dam, which is owned and operated by Seattle City Light (SCL), is located on the Pend Oreille River in Northeastern Washington. The focus of this project was the operation of the dam's trash rack system, which keeps debris out of the turbines. As a result of a buildup from logs and twigs on the trash rack, the water velocity through the system has increased. The restricted flow, due to the debris buildup, has resulted in decreased overall plant efficiency and could eventually lead to structural damage. Team ME 11.1 conducted a three-step study to address SCL's concerns with respect to the trash rack. First, a structural and economic analysis of the current situation was conducted. Second, criteria were developed from which several possible methods of cleaning the trash rack were identified. Finally, a system for cleaning the trash rack, which can be implemented without modifications to the existing structure, was recommended to SCL.



### ME 11.2 // DIGITIZATION OF AN IN-CAB CONTROL SYSTEM

**SPONSOR:** FSI Fabrication

**SPONSOR LIAISON:** Silas Curfman

**FACULTY ADVISOR:** Prof. Greg Mason, Prof. Christopher Stipe

**STUDENTS:** Zack Luker, Lance Miller, Ryan Shepard, Matthew Taylor

FSI Fabrication specializes in converting farmer-provided semi-trucks into material-spreading vehicles. These materials include feed, mulch, fertilizer, sand, and snow. The current hydraulically-controlled systems require long installation times, provide little adaptability to new systems, and are limited to manual monitoring and control. FSI recognized that by giving their current system a technological upgrade they could gain a competitive advantage in the agricultural market. The team's goal was to replace all hydraulic components with electronic ones and use an electronic controller and digital user interface to read, interpret and react to live data from the vehicle. The system will provide greater interchangeability in installation, the ability to record data, increased operator safety, and greater reliability in spreading. FSI plans to implement this system in their current models and build upon the system to provide a better product in the marketplace.

### ME 11.3 // RAPID MICROALGAE CONCENTRATION AND SETTLING IN LOW-ENERGY USE BATCH AND CONTINUOUS

**SPONSOR:** Solution Recovery Services

**SPONSOR LIAISON:** Puneet Chandra

**FACULTY ADVISOR:** Prof. Teodora Shuman

**STUDENTS:** Makenna Coe Smith, Mirela Isic, Narud Wongsirikul, Sean Woodward

Algae have the potential to replace crude oil as the source of biofuels and numerous chemicals, as well as to provide animal food. Several scientific and technical breakthroughs are needed for algae to become commercialized, one of which is to reduce length of time and energy input for settling of algae from the liquid it is grown in. SRS Energy asked the team to collect data on energy levels required to settle algae rapidly using a novel electrochemical method, and to design and test a continuous flow device that uses that method. The team conducted extensive testing and demonstrated that this method reduced algae settling from weeks to minutes, while using less than a tenth of the energy needed for centrifugation. The process also verified that the new method is commercially viable.

#### ME 11.4 // CAMP MUIR HUMAN WASTE MANAGEMENT

**SPONSOR:** Mount Rainier National Park Service

**SPONSOR LIAISON:** Richard Lechleitner

**FACULTY ADVISOR:** Prof. Mike Larson

**STUDENTS:** Roald Dietzman, Sarah Kahr, Yi-Chun Lien, Kim Nguyen

The National Park Service manages facilities at Mount Rainier National Park and is responsible for providing safe access for visitors. Camp Muir is a high-altitude facility on Mount Rainier that is used by day hikers and climbers summiting the mountain. Due to very low temperatures and its remote location, the camp has no plumbing. This requires intensive maintenance of human waste facilities, as well as excessive amounts of propane to melt snow for drinking water. The team researched and analyzed alternatives to current toilet systems using thermal energy audit software and finite element analysis. The camp currently uses solar dehydrating and pit toilets, which the team found to be more effective than alternatives. However, the amount of propane used to produce drinking water can be effectively reduced with a solar powered snow melting system.

#### ME 11.5 // THERMAL SHUTTER SYSTEM

**SPONSOR:** Kenworth Truck Company

**SPONSOR LIAISON:** Alec Wong

**FACULTY ADVISOR:** Prof. William Baratuci

**STUDENTS:** Carlo Itchon, Adam Kollgaard, Sari Mira and Kevin Manalo

Kenworth Truck Company designs and manufactures medium and heavy duty trucks. They are industry leaders in fuel efficiency and aerodynamics. Kenworth tasked the team to develop a grille shutter system to reduce aerodynamic drag and improve fuel efficiency on the T660 truck. The team developed an active rolling grille shutter system that responds to changing cooling requirements. This design maintained the original cooling capacity of the truck while reducing drag, improving fuel efficiency, and maintaining the aesthetic appearance.

#### ELECTRICAL AND COMPUTER ENGINEERING

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#### ECE 11.1 // SOUND ATTENUATING AIRCRAFT LINING PANELS

**SPONSOR:** The Boeing Company

**SPONSOR LIAISON:** Adam Weston, Mark Cloud

**FACULTY ADVISOR:** Prof. Al Moser

**STUDENTS:** Jonathan Lauwardi, Ha Tran, Gary Wiryawan

The project team's objective was to improve the transmission loss performance of aircraft lining panels by exploiting Helmholtz resonance principles. The team placed Helmholtz resonators in the gap inside cabin walls to reduce airborne noise in an aircraft. Increased transmission loss was simulated using an insulated wooden test box as the aircraft cabin with actual portions of aircraft panel in the lid. Sound reduction devices can be suspended from the panel. The team then used multiple Helmholtz designs to determine which were most effective. Sound equipment, such as microphones and guitar amplifiers, were used to generate sound and acquire digitized sound-data from inside the test box to computer storage. This allowed the team to analyze the transmission loss using data comparisons. This particular experiment tested sound in a wide frequency range from 400Hz to 2000Hz but it also focused on the lower frequency sound range of 400Hz-500Hz. The weight of the Helmholtz resonators was a major concern and had to be considered in the project's design.



“The consulting courses offer our graduate business students the opportunity to blend theory with real world action. Our students develop the ability to think independently and provide counsel to their sponsoring companies. It’s an incredible process for both the sponsor and the students.”

**Professor Peter Raven, Director International Business Programs**

### **ECE 11.2 // ELECTROMAGNETIC MODELING OF OPEN SOURCE GENERATOR DESIGNS**

**SPONSOR:** Seattle University and IEEE PES Community Solutions Initiative

**SPONSOR LIAISON:** Steve Szablya

**FACULTY ADVISOR:** Prof. Henry Louie

**STUDENTS:** Yousef Algannas, Steven Cruz, Vinh Ho, Wayne Urubio

Today over 1.7 billion people are without ready access to electrical power. The majority of these people live in rural, impoverished communities, which means they must often travel great distances to charge batteries that power their radios, cellular phones and other important devices. The project—sponsored by the IEEE PES Community Solutions Initiative—helps to alleviate this problem through designing an open source model for electricity generation. The generator can be constructed and used in the local community to provide small amounts of electricity. An electromagnetic field modeling program was used to design, test and simulate efficient axial flux generators. The generator design is independent of the prime mover; that is, any form of mechanical energy can be used to turn the generator. The goal is to make the generator design open source, so that it will be freely available to anyone, and thus enable micro-enterprises within the rural communities.

### **ECE 11.3 // ELECTRICAL SYSTEM DIAGNOSTIC DATA LOGGER**

**SPONSOR:** PACCAR Inc

**SPONSOR LIAISONS:** Jim Collins, Mark Fredrickson, Chris Harry

**FACULTY ADVISOR:** Prof. Paul Neudorfer

**STUDENTS:** Ronald Carrion, Jun Eric Delossantos, Eric French

PACCAR is a leader in the design and manufacture of heavy duty trucks. When PACCAR's trucks experience intermittent faults in their electrical systems, it can be costly in terms of both time and money to identify and fix a problem. The company requested the team to design and prototype a portable device that will detect intermittent electrical faults in a truck and send the data wirelessly to PACCAR's engineers for diagnosis. The team designed and built a diagnostic data logger prototype using the GHI FEZ Cobra development board. This device collects data from three sources: analog signals from sensors placed at chosen locations on the truck; GPS data from the onboard GPS module; and digital data from the J1939 truck data bus. Upon operator input, the data are packaged and transmitted to PACCAR using the onboard cellular modem.



“Senior Design projects prepare students for what they can expect to encounter in the real world: deadlines, teamwork, open-ended design problems, working with a budget and communicating with sponsors. Students learn to take pride in their work, and it’s wonderful to watch them progress throughout the year.”

**Professor Henry Louie, Electrical and Computer Engineering**

### **ECE 11.4 // PROJECT TITLE: ANGST WARRIORS**

**SPONSOR:** Pam Hom of the Other Roadside Attraction

**SPONSOR LIAISON:** Dean Hoaglan

**FACULTY ADVISOR:** Prof. Agnieszka Miguel

**STUDENTS:** Ian Absher, Brian Fox, Che Yi Kung, Jake Weaver

Pam Hom is a metal sculpture artist from Mount Vernon, Washington. Pam’s art focuses on the courage and fear that exist in the daily lives of people and the struggles they endure. Angst Warriors, Pam’s current project, is a series of nine-foot tall metal statues that represent people walking through a busy city street. Pam asked the team to design and prototype an art installation in which the sculptures move to express and reflect the social angst manifested in our interactions with each other. This is the third year of the project; in previous years, two prior teams developed wirelessly communicating robotic bases and a basic implementation of navigation. Team ECE 11.4 combined the efforts from the past two years into a fully-functional system with three intelligently moving robots. The navigational system, which was the team’s main focus, is based on RFID sensors embedded in the floor and mapped into position information. Each robot base, equipped with an RFID sensor, transmits its RFID identification tag to a central computer. The computer converts the tag into coordinates and communicates with the robot to adjust its position. The movements of the sculptures simulate how people move when constrained by anxiety. The robots move in a slow, seemingly random fashion. They approach each other but deflect in time to prevent collision, exhibiting an inherent bravery as they continue to plunge around in spite of the disconnect.

## COMPUTER SCIENCE

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### CSSE 11.1 // IMAGINE CUP APP

**SPONSOR:** Microsoft

**SPONSOR LIAISONS:** Kent Foster, Hilary Pike

**FACULTY ADVISOR:** Prof. Adair Dingle

**STUDENTS:** Peter Daughtry, Alvaro Martin, Jesse Sharp

Imagine Cup is a global student technology competition hosted by Microsoft. Students compete in several categories and submit videos of their projects. The job of Seattle University's Imagine Cup senior project was to create a mobile experience for the Software Design and Game Design categories. The team's solution allows users to vote on their favorite submissions, read more information about projects, watch videos, and share projects in different social networks. The team designed and implemented a mobile website, providing consistent functionality across all mainstream mobile browsers. Additionally, an iPhone app, a Windows Phone 7 app, and an Android app were designed and implemented for the project

### CSSE 11.2 // PHILIPS MEDICAL IMAGERY MANAGER (PMI MANAGER)

**SPONSOR:** Philips Healthcare Ultrasound Research Division

**SPONSOR LIAISONS:** Steve Metz, Thomas Gauthier

**FACULTY ADVISOR:** Prof. Yingwu Zhu

**STUDENTS:** Guillaume Barroux, Lindsay Stetson, Kyle Zielinski

Though ultrasound technology continues to advance, the technology for sharing and distributing ultrasound images lags behind. Philips Healthcare seeks to connect users efficiently and simply with the digital images ultrasound machines provide. Philips will shift away from providing images to interested parties on a physical disk, and instead leverage the increasing popularity of smartphones and utilize them as storage and sharing devices for ultrasound images. Philips Healthcare understands that expedient and convenient delivery of ultrasound images is essential for driving business. The Seattle University project team has designed and implemented a mobile software solution for the Apple iOS line of products (iPhone, iPad) that facilitates placing digital ultrasound images on the client's mobile device and sharing these images using standard social networking sites. The software engineering project fulfills Philips' goal of gaining momentum in the area of electronic sharing of medical images, while keeping performance and usability at the forefront of its design.

### CSSE 11.3 // PHASOR MEASUREMENT UNIT SIMULATOR

**SPONSOR:** Alstom Grid

**SPONSOR LIAISONS:** Barbarra Motteler, Manu Parashar

**FACULTY ADVISOR:** Prof. Annie Dai

**STUDENTS:** Nassim Amar Artavazard, Ginosian, Edgar Herbo, Dalis Sreng

Alstom Grid provides software to energy companies worldwide to help them manage their data grids. Data grids contain several high-precision voltage monitoring devices, called Phasor Measurement Units (PMUs), which send data back to monitoring software provided by Alstom Grid. One Alstom Grid product, Phasor Data Concentrator Servers, receives measurements from PMUs, displays the current state of the grid, and allows energy companies to make informed, real-time decisions about managing their power grid. It is difficult for Alstom Grid to develop software such as the Phasor Data Concentrator without a stream of PMU data. However, it is impractical and expensive to use real PMUs, so this project developed a simulator to stream data exactly like a real Phasor Measurement Unit. This tool speeds up testing and removes the need to use real devices, which in turn accelerates Alstom Grid's software development.

## BUSINESS

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### MBA INTERNATIONAL BUSINESS CONSULTING

**SPONSOR:** Philips Healthcare

**SPONSOR LIASON:** Stephen Metz, Thomas Gauthier

**FACULTY ADVISOR:** Prof. Thomas Kelley

**STUDENTS:** Yvonne Reichardt, Val Foster, Dimitri Pletz, Benjamin Wesley

Given the growing trend for medical records and information to be converted to electronic formats, and for such information to remain secure, Philips has identified an opportunity to put specific medical information into the hands of patients through the development of a mobile device application. The project will consist of a market analysis of a mobile device application capable of receiving, viewing and transferring images from a Philips Ultrasound machine to atherosclerosis (narrowing and hardening of the artery walls by fatty deposit buildup) patients in the United States, Germany and France, including any privacy, ethical and regulatory considerations and implications. Ultimately, this will provide Philips with the marketing research to develop an application that provides atherosclerosis patients with images they can retain, transport and transfer to other healthcare providers in the continued management of their medical condition.

## MBA NEW VENTURES BUSINESS CONSULTING

**SPONSOR:** Cashmap, LLC

**SPONSOR LIASON:** Dennis Williams, Jr.

**FACULTY ADVISOR:** Prof. Chuck Porter

**STUDENTS:** Allen Branch, Matthew Johnson, Heidi Han Yu

CashMap is an interactive educational finance application built exclusively for the iPad. The educational components are free. For a nominal fee, the end user can create their own scenarios and see their potential savings. The concepts presented are simple to implement but are counterintuitive. The impact is so dramatic that it seems too good to be true. Users learn to save thousands of dollars, protect themselves from rising interest rates, payoff loans faster and boost their savings. They can realize these benefits without changing their spending. The MBA students created and tested alternative sales messages and pricing strategies and recommended sales channels to reach potential consumers and professionals. They also researched obstacles that prevent consumers from purchasing the application and made recommendations for improving the product.

## MBA NEW VENTURES BUSINESS CONSULTING

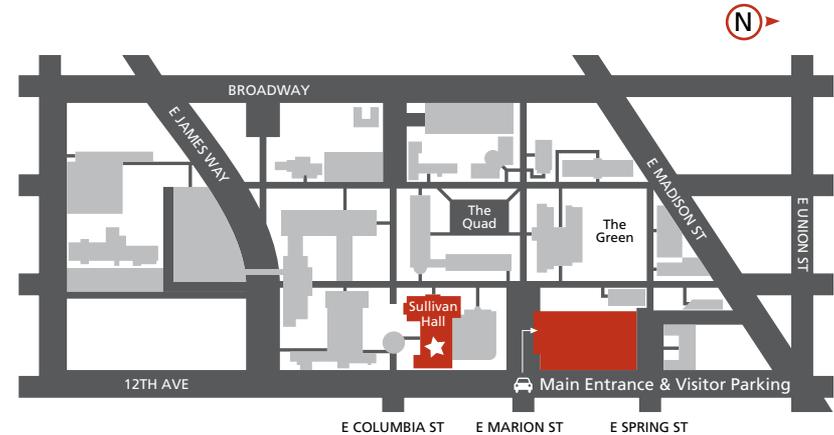
**SPONSOR:** Secure Development, Inc

**SPONSOR LIASON:** Brad Simmons

**FACULTY ADVISOR:** Prof. Chuck Porter

**STUDENTS:** Claude Distin, Yang Du

Secure Development is a technology firm located in the Seattle Area. Secure Development produces Field Service Management software. Field Service Management software mainly deals with the scheduling and routing of field service technicians with maximum efficiency. The project with Secure Development helped the company with their marketing analysis. Secure Development needed to choose a market to focus their limited resources. The MBA students were charged to help the company find an untapped market with the highest potential for the adoption of Field Service Management Software.



### DIRECTIONS

#### FROM THE NORTH

- Head south on I-5
- Take exit 165A to James Street
- Left onto James Street
- Left onto 12th Avenue
- Left onto East Marion Street

#### FROM THE SOUTH

- Head north on I-5
- Take exit 164A to James Street
- Right onto James Street
- Left onto 12th Avenue
- Left onto East Marion Street

## THANK YOU TO OUR SPONSORS

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Cash Map Consulting  
Engineers Without Borders  
FSI Fabrication  
IEEE  
Kenworth Truck Company  
King County  
Microsoft  
National Park Service  
The Other Roadside Attraction

PACCAR  
Philips Healthcare  
Pierce County Public Works  
Rotary International  
Seattle City Light  
Seattle University  
Secure Development  
Snohomish County Public Works  
Solution Recovery Services  
Tetra Tech

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