

The Northwest's longest-running
Student Engineering Showcase

XXI
TwentyFirst
Annual

engineering • design
expo 2014

May 2

UI Student Union Building

Presented by



University of Idaho
College of Engineering

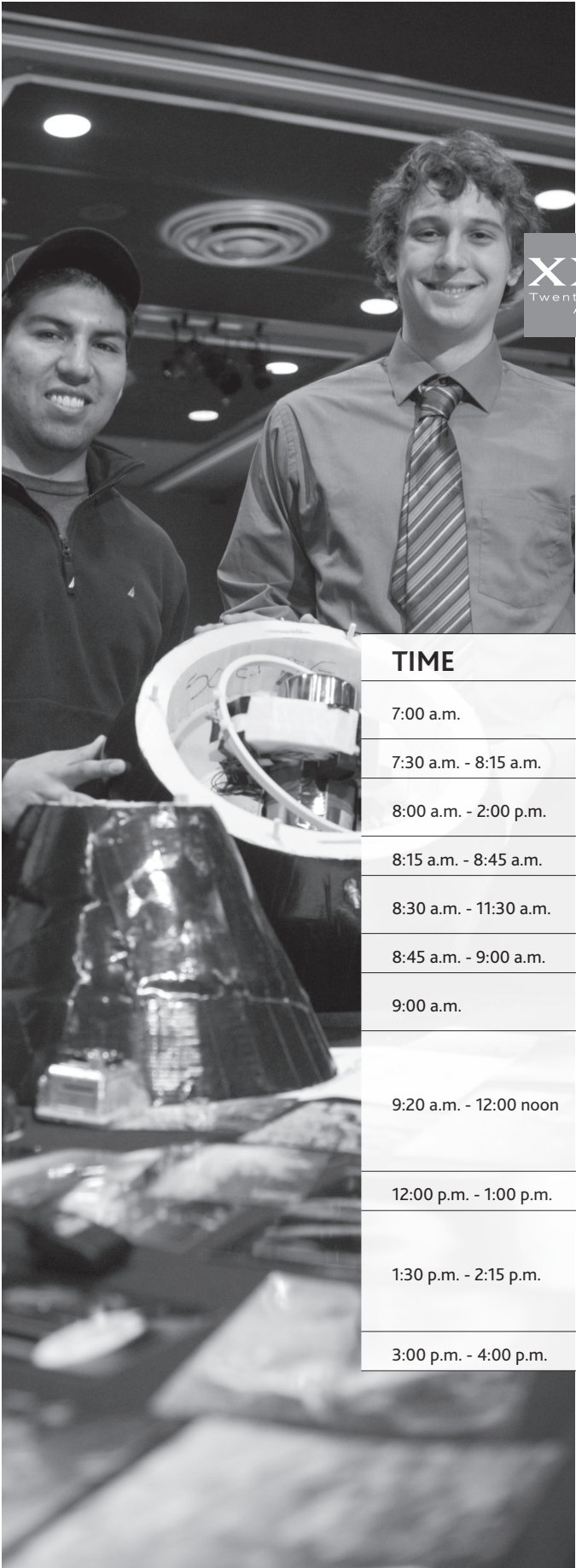


ENGINEERING the future

The Micron Foundation strives to build a strong community and promote robust education in the areas of science, technology, engineering and mathematics (STEM). Through our support of local non-profits, K-12 schools and universities, we support the communities where our employees live, work and volunteer.

We are proud to support students at the 2014 Engineering Design EXPO and the University of Idaho College of Engineering.





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expo2014

May 2

University of Idaho
Student Union Building (SUB) 2nd Floor

TIME	EVENT	PLACE
7:00 a.m.	EXPO Welcome Senior Design Students Registration Table Open	2nd floor foyer
7:30 a.m. - 8:15 a.m.	Judges Breakfast with Dean Larry Stauffer	Chief's Lounge
8:00 a.m. - 2:00 p.m.	EXPO Registration and Information Table Open	1st floor lobby
8:15 a.m. - 8:45 a.m.	EXPO Judges Orientation	Chief's Lounge
8:30 a.m. - 11:30 a.m.	Visiting High School Group Registration Table Open	1st floor Joe's Lounge
8:45 a.m. - 9:00 a.m.	Opening Ceremonies	Chief's Lounge
9:00 a.m.	Student Design Projects Booths, Posters & Patio Open	International Ballroom Outdoor Patio
9:20 a.m. - 12:00 noon	Technical Sessions	Borah Theater Vandal Ballroom South Vandal Gold Room Vandal Silver Room
12:00 p.m. - 1:00 p.m.	Engineering EXPO lunch	Chief's Lounge
1:30 p.m. - 2:15 p.m.	EXPO Keynote Lecture Presented by Honorary Design EXPO Chair Virginia B. Valentine "Embracing Failure as the Path to Succeeding in Engineering and Life"	Vandal Ballroom With live video feed to other EXPO locations
3:00 p.m. - 4:00 p.m.	EXPO Awards Ceremony	International Ballroom

THANK YOU

2014 Engineering Design EXPO Sponsors

The University of Idaho, College of Engineering thanks all of our corporate and educational sponsors for their generous support of the twenty-first annual Engineering Design EXPO. We value and appreciate their participation and continued commitment to EXPO and engineering education.



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Welcome from the College of Engineering Dean



It is my pleasure to welcome you to the 21st Annual Engineering Design EXPO, the longest-running exposition in the Pacific Northwest, showcasing senior engineering capstone projects. For more than 100 years, the College of Engineering has been providing highly talented engineers to Idaho and the world. Our capstone design experience is the highlight of our engineering program. University of Idaho students tackle real world issues with the help of industry partners. Companies provide a technical problem and we provide our students with a real, hands-on opportunity to solve it. It's a perfect match! In this program, students work in teams, learn about the design process, and are provided an opportunity to apply their entire college education towards an industry-sponsored project. EXPO is a signature event for the University of Idaho where student teams reveal the results of their work. In many instances they are demonstrating a working prototype or other deliverables that they turn over to their sponsors.

We have been hosting an exposition of our capstone projects annually for 21 years. This is a long time for any event. Over the years this event has grown in significance towards our educational process and our students' development. Thank you to all faculty, staff, students and industry partners who have helped shape EXPO these past two decades. Our capstone program which provides the content for EXPO has been recognized by the National Academy of Engineering as one of the best in the nation, highlighting it as one of seven capstone programs for infusing real-world experiences into engineering education. This recognition is impressive considering every engineering college has a capstone program. This recognition by the National Academy of Engineering is also a testament to the hard work and talents of our faculty, staff, students and industry partners. EXPO

is recognized by those in industry eager to hire our students for the skills and knowledge they demonstrate through these projects.

I also want to thank our judges who are industry partners and friends of the College of Engineering. They give of their time and expertise each year to make this a rich experience for our students. In addition, EXPO receives sponsorships from industry partners who help us engage young learners (K-12) to experience the excitement of engineering. We depend on generous sponsorships from our partners including the Micron Foundation, University of Idaho Engineering Outreach, British Petroleum Alaska, Schweitzer Engineering Laboratories, Avista, the Boeing Company, Lochsa Engineering, Idaho National Laboratories, Hewlett-Packard, Wagstaff and Best Western that enable us to provide these opportunities.

We are proud of the education and experiences that we provide to our students in the College of Engineering. I invite you to ask our students questions about their projects and engineering designs, and to explore the world of engineering today at our Engineering Design EXPO.

Thank you for your presence at this exciting event and your interest in our students' lives.

Sincerely,

Larry Stauffer, Dean
University of Idaho, College of Engineering

“EXPO is recognized by those in industry eager to hire our students for the skills and knowledge they demonstrate through these projects.”

2014 EXPO Honorary Chair and Keynote Speaker

Virginia Bax Valentine

B.S., Civil Engineering, University of Idaho, 1980

Virginia Bax Valentine graduated in 1980 from the University of Idaho with a Bachelor's of Science in Civil Engineering and earned a Masters of Public Administration from the University of Nevada Las Vegas, Phi Alpha Alpha (The National Honor Society for Public Affairs and Administration) in 2000.

During the summer of her junior year at Idaho, Ms. Bax Valentine did an internship for the City of Salem, in Salem, Oregon. She worked as a Construction Inspector for offsite improvements and became certified to conduct nuclear density tests.

After graduation, Ms. Bax Valentine started her first job at JUB Engineers in Coeur d'Alene, Idaho as a design engineer. She designed rural water and wastewater treatment systems including several pump stations.

She served as resident engineer for the construction of a river intake system, water treatment plan, reservoirs, and the water distribution system for the Three Mile Water District in Bonner's Ferry, Idaho.

In August of 1981, Ms. Bax Valentine moved to Las Vegas, Nevada where she went to work as a design engineer for VTN Nevada, Las Vegas, Nevada. She worked on the design of land development projects including grading and drainage plans, prepared flood studies, and designed infrastructure for land development projects including waste water collection systems, roadways, waterlines, and drainage systems.

Two years later, Ms. Bax Valentine joined URS Consulting Engineers in Las Vegas as a project engineer for wastewater treatment and pumping systems. She worked on resident engineering on the Henderson, Nevada Wastewater Treatment Plan.

In 1984, Ms. Bax Valentine moved to Black and Veatch Consulting Engineers in Las Vegas as a project engineer for environmental projects including feasibility, planning, design, and construction management. She managed the first comprehensive study of the Tropicana and Flamingo Hotel washes in Clark County.

Ms. Bax Valentine became the first Chief Engineer and General Manager of the Clark County Regional Flood Control District in Las Vegas in 1986. As general manager of a newly created agency, she developed all the District's programs including master planning, capital improvement, flood plain management regulations, flood warning system, and the District's first National Pollutant Discharge Elimination storm water discharge permit. She was successful in gaining authorization and appropriations for a \$250 million federal project with the USACE.

In 1993, Ms. Bax Valentine became a Senior Vice President of Post, Buckley, Schuh and Jernigan, (PBSJ) a national consulting engineering firm. At PBSJ, Ms. Valentine was responsible for overseeing the Public Works and Environmental Divisions in the Western Region. Her job included environmental services such as flood control and water resources projects from planning through construction. She was responsible for budgeting and management for environmental services in the region and managed multimillion dollar design and construction projects for flood control, transportation, and utilities. She was the Principal in charge for the Program Management Services provided to the City of North Las Vegas, instituted the GIS division within the Environmental Services in the Western Region and was the project manager for the first fully GIS Flood Control Master Plan for the Las Vegas Valley.

Ms. Bax Valentine became the City Manager for the City of Las Vegas, Las Vegas, Nevada in 1998. The City of Las Vegas has 16 departments, 2,800 employees, and in FY2002 a combined budget of \$740 million. At that time the City of Las Vegas was one of the fastest-growing cities in the country and had over 600,000 residents. The city has a council/manager form of government and Ms. Valentine reported to the Mayor and City Council.

Four years later, Ms. Bax Valentine became the Senior Vice President of the Las Vegas Chamber of Commerce, Las Vegas, Nevada. She was responsible for the Government Affairs Department including state and local government lobbying on business issues and represented the chamber at the 2003 special session of the legislature.

Ms. Bax Valentine was appointed as Assistant County Manager for Clark County in November of 2002. In that capacity she oversaw numerous County departments including Air Quality and Environmental Management, Assessor, Comprehensive Planning, Development Services, Fire, Public Works, Redevelopment, Real Property Management, Recorder and Water Reclamation. From 2006-11, she was the county manager for Clark County, Nevada where she managed regional and municipal services for over 2 million residents.

Ms. Bax Valentine is currently the President of the Nevada Resort Association (NRA). The NRA is an industry trade association representing Nevada's resort/casino industry. The NRA is involved in state and local regulations, lawmaking, and policies effecting gaming.

In 2000 Ms. Bax Valentine was recognized as one of the 20 Most Influential Women in Nevada. She is recipient of several awards and in 2006 was listed as an extraordinary woman engineer in Changing Our World: True Stories of Women Engineers. The book was launched at the National Press Club in Washington, D.C., on February 21, 2006.



Join us as Virginia Valentine presents the 2014 EXPO Keynote
“Embracing Failure as the Path to Succeeding in Engineering and Life”
in the Vandal Ballroom SUB 2nd floor at 1:30 p.m. on May 2.

THANK YOU

2014 Engineering Design EXPO Judges

A special thank you to all of the individuals who have taken time from their daily schedules to lend expertise as 2014 EXPO judges. Your commitment and dedication to the University of Idaho, College of Engineering is greatly appreciated. Thank you for joining us today. Together we recognize and congratulate our senior capstone students on their hard work this year, and welcome them as colleagues into the dynamic world of engineering.

Brad Acker - University of Idaho

Alan Baker - Risley Law Office, PLLC

Amanda Battles - Clearwater Paper

Pat Blount - Moscow High School

Bruce Bouton - The Boeing Company

Pietro Boyd - Nightforce Optics

Fred Brackebusch - Mine Systems Design, Inc.

Myles Brown - The Boeing Company

Martin Buehler - Decagon Devices

Ryan Carlson - Micron Technology

Kelly Courtright - U.S. Bureau of Land Management

Michael Cram - The Boeing Company

Andrew Crapuchettes - EMSI

John Crockett - Crockett Consulting

Raymond Dixon, PE - University of Idaho

Byron Flynn - General Electric

Gerry Galinato - Idaho Public Utilities Commission

F. Gregory Hall - Power Engineers, Inc.

Yvonne Hallock - Retired

Robert Hallock - Retired

Marjorie Hatter - Phillips 66

Chad Heimbigner - Coffman Engineers

Saied Hemati - University of Idaho

Scott Hodge - Schweitzer Engineering Laboratories

Chris Horgan - J-U-B ENGINEERS, Inc.

Paul Huber - The Boeing Company

Richard Jacobsen - Idaho State University

Valerie Jensen - The Boeing Company

Fred Jessup - Schweitzer Engineering Laboratories

Dave King - Omega Pacific, Inc.

Krista Kinsey - Idaho Power

Jay Larsen - Idaho Technology Council

Katie Leichliter - University of Idaho

Glen Little - The Boeing Company

Kenneth Mays - Sonnet Software

William McDougall, PE - Retired

David Minerath - Quest Integration

Thomas Moore - Consultant

Brad Okamoto - U.S. Bureau of Reclamation

Caitlin Owsley - Janicki Industries

Stacey Page - Power Engineers, Inc.

Marc Patterson - Idaho Power

Shawn Pratt - Hewlett-Packard

Gerry Queener - Retired

Kurt Ririe - INL

Pete Robichaud - Rocky Mountain Research Station

James Russell - BP Exploration (Alaska)

Steve Silkworth - Avista Corporation

Jamison Slippy - Quest Aircraft Company

Alistair Smith - University of Idaho

Steve Smythe - ATK CCI-Speer

Tom Stalick - Kapstone Paper and Packaging, Inc.

Eric Stubbs - Micron Technology

Ed Whitehead - Retired

Calvin Williams - The Boeing Company

Megan Willingham - Spokane Public Schools

Kara Yedinak - University of Idaho

Thomas Zysk - The Boeing Company

2014 Senior Capstone Project Advisors

Biological and Agricultural Engineering

- Thomas Hess
- Dev Shrestha

Chemical and Materials Engineering

- David Drown
- Dean Edwards
- Krishnan Raja
- Mark Roll

Civil Engineering

- Fritz Fiedler

Computer Science

- Bruce Bolden
- Paul Oman
- Robert Rinker

Electrical and Computer Engineering

- Touraj Assefi
- Fred Barlow
- James Frenzel
- Herbert Hess
- Greg Klemsrud
- Michael Santora

Mechanical Engineering

- David Alexander
- Steve Beyerlein
- Dan Cordon
- Karen Den Braven
- Edwin Odom
- Russ Porter
- Gabriel Potirniche
- Matthew Riley
- Bob Stephens
- Tao Xing

Virtual Technology & Design

- John Anderson

Engineering Department Chairs

Thomas Hess

Biological and Agricultural Engineering

Greg Donohoe

Computer Science

Wudneh Admassu

Chemical and Materials Engineering

Fred Barlow

Electrical and Computer Engineering

Richard Nielsen

Civil Engineering

John Crepeau

Mechanical Engineering

2014 EXPO Organizing Committee

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Dean

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Steve Beyerlein

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Marketing Communications Manager

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Brent Keeth

Micron Technology, Inc.

Mike Simon

Creation Logic, LLC

Ken Mays

Sonnet Softward

Ryne Stoker

GeoTek, Inc.

Bob Morris

Schweitzer Engineering Laboratories

David Nelson

Soteica Visual MESA, LLC



2014 ACADEMY OF ENGINEERS

Please join Dean Larry Stauffer, the college advisory board, faculty, staff and students in congratulating this year's College of Engineering, Academy of Engineers inductees.

The University of Idaho recognizes these individuals for their personal contributions to engineering achievement, leadership, engineering education, and service to the profession and society. We salute these leaders for their lifetime of commitment to advancing the quality of life through engineering innovation.



DONALD E. EDDY

*B.S., Mechanical Engineering, University of Idaho, 1955;
M.B.A., Wharton School, University of Pennsylvania, 1988*



LOUIS L. EDWARDS

*B.S., Chemical Engineering, Rensselaer Polytechnic Institute, 1958;
M.S., Chemical Engineering, University of Delaware, 1960*



ROBERT M. GRIFFITH

B.S., Chemical Engineering, University of Idaho, 1951



JAMES H. MILLIGAN

*B.S., Civil Engineering, Utah State University, 1963;
Ph.D., Civil Engineering, Utah State University, 1969*



JAMES C. OKESON

*B.S., Chemical Engineering, University of Idaho, 1962
University of Idaho Fulbright Scholar, Netherlands*



JAMES H. RITTER

*B.S., Mechanical Engineering, University of Idaho, 1968;
M.S., Mechanical Engineering, University of Idaho, 1971*



FRANK J. THOMAS

*B.S., Electrical Engineering, University of Idaho, 1952;
M.S., Nuclear Engineering, University of California at Berkeley, 1957*

About the College of Engineering Senior Capstone Project

The interdisciplinary senior capstone program is the core of Engineering Design EXPO. The program has evolved over its 21 year history become a catalyst for local design infrastructure development. The progress of the capstone program has occurred as the result of a continuous stream of projects from regional industry, equipment donations from alumni and industry supporters, graduate student support, and educational research grants from the National Science Foundation. In tandem Engineering Design EXPO has become the Pacific Northwest's longest running engineering showcase and a signature event for the University of Idaho. The annual event is a unique opportunity for senior capstone students to share the results of their team projects with the public, elementary and high school students, alumni, and industry partners.

The University of Idaho's commitment to this program is evident. Each year a team of faculty and staff from the College of Engineering serve as mentors for capstone projects. The University has constructed a 6000 ft. design suite within the Gauss-Johnson engineering building that includes a machine shop, metrology lab, project assembly area, advanced CAD laboratory, 3D printer, conference and study area, design review studio, and nearby graduate student offices. These physical and virtual prototyping spaces are on display for all who visit through an extensive set of windows in the building entry way. The overall learning environment is engaging for upperclassmen as well as enticing to prospective freshmen, transfer students, engineering underclassmen, and project sponsors.

To make the capstone program self-sustaining, a system of knowledge management has evolved to retain both explicit and implicit knowledge. Explicit knowledge is captured and transferred through a program website that contains over 400 videos, quick references, and project vignettes. Implicit knowledge is transferred through Idaho Engineering Works (IEW), where a group of graduate students is given specialized training in hardware, software, manufacturing, and leadership with the expectation that they will mentor undergraduate students in their design and manufacturing work across the capstone curriculum. Because of the program's unique attention to project learning, the capstone program was recognized by the National Academy of Engineering as an exemplar for infusing real world experiences into engineering education.

Our design program is continuously being rediscovered, tested, revised, and adapted. This self-renewing process is a collaborative consensus-building activity that easily integrates new faculty and students, and also allows veteran faculty to step away to pursue other academic interests, and then seamlessly return to lend additional value to the program.

Six core values underlie the implementation of our senior capstone program:

PROFESSIONAL INTEGRITY: day-to-day and long-term actions, aligned with professional codes of ethics in ways that are relevant and meaningful, responding to the needs of clients and society at large.

GROWTH ORIENTED: awareness of current knowledge, skills, and learning styles, informing self, peer, and mentor actions that elevate performance expectations while providing needed support for measurable change in professional behaviors and attitudes.

TECHNICALLY COMPETENT: enlightened use of engineering principles, early prototyping, modeling, experimentation, application of appropriate software tools, selection of state-of-the-art components, problem formulation & decomposition, and specification of manufacturing methods.

COLLABORATIVE: respectful, supportive, empowered community of practitioners promoting mutual understanding of diverse motivations and complementary skills while working towards a shared vision.

RESOURCE RICH: inspiring work environment providing ready access to prior work products, catalogs, instructional videos, software tutorials, and expert consultation as well as multiple opportunities to learn and use state-of-the-art tools for computation and manufacturing.

VALUE ADDED: significant return on investment by developing compelling project goals that respond to stakeholder needs, innovating, measuring progress through systematic collection and analysis of data, assuming responsibilities needed for efficient and effective results, and compiling documentation that allows others to adopt solutions.

Engineering Design EXPO Student Projects

3D PRINTER POLYMER FILAMENT EXTRUDER

The polymer filament necessary to operate a 3D printer is costly to purchase for regular use. To reduce costs, a shredding and extruding process was devised to recycle flawed or unused prints as well as other plastic sources to use as filament.

Sponsor: Instrument Shop

Sponsor Organization: University of Idaho, Chemical and Materials Engineering Department

Team Members:

Khaled Abdel-Rahim – Chemical & Materials Engineering

Mitchell Flynn – Chemical & Materials Engineering

Richard Munn – Chemical & Materials Engineering

Kirk Riedner – Chemical & Materials Engineering

Faculty Adviser(s): David Drown

Mentor(s): David MacPherson, Charles Cornwall

ADVANCED MANUFACTURING SPECIAL OPS

This booth displays locally produced prototypes and innovative design/manufacturing processes explored in the ME Machine Shop as part of a graduate elective course. Projects on display include a generative design synthesizer, 125 anniversary UI seal, Stirling engine, rehabilitation delta robot, Alboka Basque wind instrument.

Sponsor Organization: University of Idaho, Department of Mechanical Engineering

Team Members:

David Eld – Mechanical Engineering

Stephen Goodwin – Mechanical Engineering

Dan Keane – Mechanical Engineering

Matt Kologi – Mechanical Engineering

Rory Lilley – Mechanical Engineering

Luke Nelson – Mechanical Engineering

Phillip Petersen – Mechanical Engineering

Jeffrey Reznicek – Mechanical Engineering

Jon Teske – Mechanical Engineering

Faculty Adviser(s): Edwin Odom, Steve Beyerlein

ALLISON CREEK HYDROELECTRIC PROJECT

The University of Idaho's Design Team will design portions of a run-of-river hydroelectric plant located on the south side of Port Valdez for the Trans-Alaska Pipeline. The objectives of this project are to design the diversion structure, the penstock, and access roads to connect Allison Creek to a powerhouse.

Sponsor: Mort McMillen

Sponsor Organization: Mort McMillen LLC

Team Members:
Bryant Charlo – Civil Engineering

Ryan Cook – Civil Engineering

Brett Khoring – Civil Engineering

John Swidecki – Civil Engineering

Faculty Adviser(s): Fritz Fiedler

AMPS COMMUNICATION

The current Analog Model Power System (AMPS) uses equipment which is becoming obsolete. The purpose of our project is to upgrade the protection equipment to more modern, Ethernet based technology, and to document the system to make it a user friendly and modern teaching tool.

Sponsor: Normann Fischer

Sponsor Organization: Schweitzer Engineering Laboratories

Team Members:
Fahad Alhajeri – Electrical & Computer Engineering

Jorge Rios – Electrical & Computer Engineering

Garrett Stauffer – Electrical & Computer Engineering

Corneliu Turturica – Electrical & Computer Engineering

Faculty Adviser(s): Amrit Dahal, Touraj Assefi

Mentor(s): Brian Johnson

ASME MICRO BAJA

The goal of this project is to design and manufacture a fully functional remote controlled car to compete in the ASME Micro Baja Regional Competition. Key features include an isolated gear box, slipper differential, carbon fiber chassis, double wishbone suspension, and Ackerman steering.

Team Members:

Corbin Basler – Mechanical Engineering

Kris Davis – Mechanical Engineering

Zane Jesser – Mechanical Engineering

Jake Johnson – Mechanical Engineering

Darren Mabe – Mechanical Engineering

Zach Maryon – Mechanical Engineering

Alan McMurray – Mechanical Engineering

Jonathan Paul – Mechanical Engineering

Dillon Turnbull – Mechanical Engineering

Jon Wheless – Mechanical Engineering

Faculty Adviser(s): Steve Beyerlein

Mentor(s): David Eld



AUTONOMOUS COTS BOTS

The goal of this project is to use the Commercial-Off-The-Shelf (COTS) Bots platform and add inter-robot communication and autonomy to perform cooperative tasks.

Sponsor: Terrance Soule

Sponsor Organization: University of Idaho, Department of Computer Science

Team Members:

Robert Meine – Computer Science

Chris Waltrip – Computer Science

Faculty Adviser(s): Bruce Bolden

Mentor(s): Robert Heckendorn

Engineering Design EXPO Student Projects

AUTONOMOUS UNDERWATER VEHICLE (AUV) DEVELOPMENT

This project, a collaboration between the University of Idaho and Washington State University Mechanical, Electrical, and Computer Engineers and Computer Scientists, consisted of designing, fabricating, and testing the mechanical and electrical components of an autonomous submarine. This submarine includes the ability to maneuver, launch torpedoes, drop markers, and grasp objects.

Sponsor: Mike Kapus

Sponsor Organization: NAVSEA

Team Members:

Ingrid Kooda – Mechanical Engineering

Kyle Newell – Mechanical Engineering

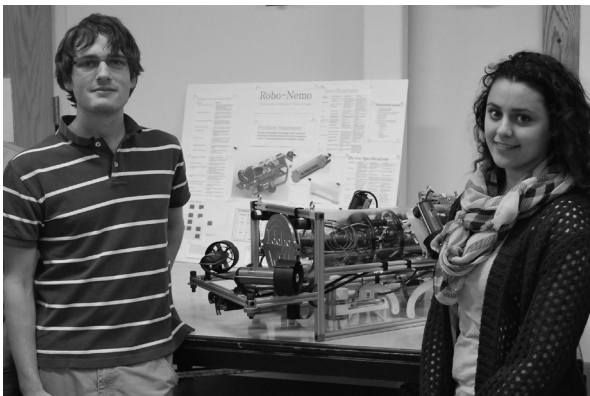
Christopher Pratt – Mechanical Engineering

Alexander Rowson – Electrical & Computer Engineering

Michelle Spear – Mechanical Engineering

Faculty Adviser(s): Matthew Riley

Mentor(s): Matt Kologi



BASSOON FINGERING FINDER

A web application that will allow bassoonists to quickly and easily look up a variety of approved fingerings.

Sponsor: Susan Hess

Sponsor Organization: Lionel Hampton School of Music

Team Members:

Eric Doman – Computer Science

Charles Miller – Computer Science

Faculty Adviser(s): Bruce Bolden

Mentor(s): Luke Bakken

BOLSTER RIVET PRESS

Our project goal is to create a test fixture and calibration methods in order to measure the force required to compress and seat rivets in the production of knives. These tools are intended to aid designers and machine operators; improving product quality and consistency across a spectrum of knife families.

Sponsor: Kenneth Fisher

Sponsor Organization: Buck Knives

Team Members:

Ryan Borth – Mechanical Engineering

David Erickson – Mechanical Engineering

Luke Nelson – Mechanical Engineering

Mitch Miller – Mechanical Engineering

Faculty Adviser(s): Steven Beyerlein

Mentor(s): Rory Lilley

CLEAN SNOWMOBILE TEAM

The University of Idaho Clean Snowmobile Competition (UICSC) team develops a clean, quiet, and powerful snowmobile to compete in the clean snowmobile competition. It is primarily undergraduate work and design. The UICSC team has been competing since 2001.

Sponsor Organization: National Institute for Advanced Transportation Technology

Team Members:

Amos Bartlow – Electrical & Computer Engineering

Marc Compton – Mechanical Engineering

Chris Fraser – Mechanical Engineering

Joey Gibson – Mechanical Engineering

Crystal Green – Mechanical Engineering

Megh Hester – Mechanical Engineering

Parker Hill – Mechanical Engineering

Tony Keys – Mechanical Engineering

Trevor Lutz – Mechanical Engineering

Dillon Quenzer – Mechanical Engineering

Justin Ruehl – Mechanical Engineering

Dillon Savage – Mechanical Engineering

Chase Smith – Mechanical Engineering

Tygh Weyand – Mechanical Engineering

Mark Woodland – Mechanical Engineering

Alex Wright – Mechanical Engineering

Faculty Adviser(s): Dan Cordon, Karen Den Braven

CLEANROOM CLEANING ROBOT

Design and construct a system that can be used autonomously to spray sanitization solutions on the floor of a cleanroom used in the production of clinical drug products.

Sponsor: Chad Schrader

Sponsor Organization: Revalerio Corporation

Team Members:

Gregory Atkinson – Mechanical Engineering

Justin Herrick – Mechanical Engineering

Nathan Pueschel – Mechanical Engineering

Nicholas Rodriguez – Electrical & Computer Engineering

Faculty Adviser(s): Dan Cordon

Mentor(s): Jeremy Cuddihy

COGENERATION TURBINE

The design goal for the UI Cogeneration Turbine team was to conduct a feasibility analysis for utilizing the campus steam plant to generate power in addition to supplying campus heat. The second semester goal was to perform an economic analysis of the project.

Sponsor: Scott Smith

Sponsor Organization: University of Idaho Steam Plant

Team Members:

Chris Anderson – Biological & Agricultural Engineering

Chad Dunkel – Biological & Agricultural Engineering

Donald Haines – Electrical & Computer Engineering

Ryan Oliver – Electrical & Computer Engineering

Faculty Adviser(s): Tao Xing, Steve Beyerlein, Herb Hess

Mentor(s): Amrit Dahal



UNIVERSITY OF IDAHO CLEAN SNOWMOBILE CHALLENGE TEAM

A Young Team Continues U-Idaho's Legacy of Success and Builds for the Future

As with the past 14 years U-Idaho once again sent a student team to the annual SAE Clean Snowmobile Challenge (CSC).

This year's competition in Houghton, Michigan was hosted by Michigan Tech University and sponsored by the Keweenaw Research Center. But unlike the past there were a couple differences with this year's 16 member team.

One was that there was only one senior on the team, Amos Bartlow of electrical and computer engineering. That, in addition to the absence of long-time faculty advisor and founder of the U-Idaho CSC team, Professor Karen Den Braven, meant that much was literally riding on the team's ability to tap into the knowledgebase passed down from past challenge teams.

Despite potential drawbacks in experience the U-Idaho CSC team rode away from the competition with the third place overall award and a total of five other awards, one more than Kettering University which placed first overall. Of the 20 awards presented the Vandal team won: Third Place Winner

Overall (ACSA) \$500, Best Performance Winner Camoplast Trac, Best Ride Winner (Denso), Best Design Winner (SAE) and Best Handling (Polaris).

Junior team captain, Dillon Savage of mechanical engineering, explains, "our success this year is a real testament our team's passion, regardless of age or experience. That coupled with continued mentoring from faculty and alumni, helped us avoid any significant pitfalls. Luckily we have a great group of freshmen and sophomores that put in the time this year which makes me very excited for next year's competition."

The SAE International Clean Snowmobile Challenge is an engineering design competition for college and university student members that challenge engineering students to reengineer an existing snowmobile to reduce emissions and noise. Their modified snowmobiles then compete in a variety of events including emissions, noise, fuel economy/endurance, acceleration, handling, static display, cold start and design.

Engineering Design EXPO Student Projects

DUAL-MODE PROPULSION SYSTEM FOR CUBESATS

We're promoting development of an affordable, low-mass, off-the-shelf propulsion system for CubeSats. With development of a low cost, low-mass propulsion system; these satellites are capable of expulsion from low earth orbit to various destinations in the outer solar system – making outer planet based research more affordable and readily available.

Sponsor: Stephen Howe

Sponsor Organization: Center for Space Nuclear Research

Team Members:

Artemio Ambriz – Virtual Technology & Design

Christopher Chesnut – Virtual Technology & Design

Samuel Horton – Virtual Technology & Design

Dylan Johnson – Virtual Technology & Design

Matt Ziegler – Virtual Technology & Design

Faculty Adviser(s): John Anderson

DYNAMIC COMMERCIAL FISHERY CLEANING SYSTEM

Fine particulate in the raceway is easily re-suspended during cleaning operations. Our objective is to design an automated cleaning system with little maintenance to reduce fine particulate from accumulating in raceways without sacrificing flow rates to maintain fish health through computational and experimental analyses.

Sponsor Organization: Clear Springs Inc.

Team Members:

Levi Dawes – Biological & Agricultural Engineering

Matt Francis – Biological & Agricultural Engineering

Jeremiah Schroeder – Mechanical Engineering

Kate Wicher – Biological & Agricultural Engineering

Faculty Adviser(s): Tao Xing

Mentor(s): Jeremy Cuddihy

ENGINEERING SCHOLARS STUDENT DESIGN PROJECTS

Engineering Scholars Undergraduate Design Projects include four STEM-based projects designed and developed by Mechanical Engineering DeVlieg Scholars and two multi-disciplinary team-based projects. Projects range from hands-on experiments for K-12 students, to demonstration tools for undergraduates in engineering, to proof of concept designs for manufacturing.

Sponsor Organization: College of Engineering, Engineering Scholars

Team Members:

Mark Garber – Mechanical Engineering

Jonathan Hanson – Mechanical Engineering

Chris Jurue – Mechanical Engineering

Jesse Jutson – Civil Engineering

Harrison Pugeseck – Mechanical Engineering

Eric Silk – Electrical & Computer Engineering

James Tigue – Mechanical Engineering

Tygh Weyand – Mechanical Engineering

Jonathan Wheless – Mechanical Engineering

Amanda White – Mechanical Engineering

Kevin Woodruff – Mechanical Engineering

Faculty Adviser(s): Bob Stephens

FORMULA ELECTRIC VEHICLE POWERTRAIN

This project is continuing the progress of last year's FEV (Formula Electric Vehicle) power-train team. The project has two goals: 1) Integrate our new battery system with the existing battery management and regeneration systems. 2) Create a test stand for our next generation in-hub motor.

Sponsor Organization: National Institute for Advanced Transportation Technology

Team Members:

Tate Bischoff – Mechanical Engineering

Jay Nair – Mechanical Engineering

Chinmay Subhedar – Electrical & Computer Engineering

Micah Wilson – Mechanical Engineering

Victor Zarate – Electrical & Computer Engineering

Faculty Adviser(s): Herbert Hess, Steve Beyerlein, Dan Cordon

Mentor(s): Jaz Veach, Jon Teske

FROM FREEWAY TO FRAGRANCE: RECOVERING LIMONENE FROM RECYCLED TIRES

Every year millions of tires reach the end of their usable life. To reduce the number of tires that end up in landfills, Reclaim Inc., has developed a way to convert used tires into carbon black, a chemical product in high demand. Currently, Reclaim's process has two byproducts: a gas used to fuel the plant and an oil rich in hydrocarbons. Our goal was to economically design a process to separate the oil into the most profitable commodities based on Reclaim's process and financial workup.

Sponsor Organization: Capstone Technology Corporation

Team Members:

Tianna Drew – Chemical & Materials Engineering

Amanda Eagle – Chemical & Materials Engineering

Brice Sumner – Chemical & Materials Engineering

Sara Sumner – Chemical & Materials Engineering

Faculty Adviser(s): Mark Roll, David Drown

Mentor(s): David MacPherson

GEOTHERMAL HEAT PUMP

Design and optimization of a geothermal heat pump system using computer models and simulations.

Sponsor: Sue Tacke

Sponsor Organization: Saint Gertrude's Monastery

Team Members:

Mitchel Gogert – Mechanical Engineering

Samuel Qualls – Mechanical Engineering

Desiree Reed – Mechanical Engineering

Colin Ryan – Mechanical Engineering

Faculty Adviser(s): Tao Xing

GRAPHENE FOR A BETTER BATTERY

Graphene from University of Idaho Thermalized Asphalt Reaction (GUITAR) produces a carbon compound similar to graphene, but with more useful conductive properties. Our goal was to produce enough high quality GUITAR coated additives for testing a battery and design a full-scale production plant to meet possible demand.

Sponsor: Dean Edwards

Sponsor Organization: Advanced Hybrid Power Systems LLC

Team Members:

Aimen Alamoudi – Chemical & Materials Engineering

Matthew Chapin – Chemical & Materials Engineering

Joshua Payne – Chemical & Materials Engineering

Landon Sturgeon – Chemical & Materials Engineering

Faculty Adviser(s): Dean Edwards, David Drown

Engineering Design EXPO Student Projects

GREENSFERRY ROAD OVERPASS

Geotechnical and structural design of an overpass spanning Interstate 90 and connecting the north and south arterials of Greensferry Road in Post Falls, ID.

Sponsor: Jay Hassel

Sponsor Organization: JUB Engineering

Team Members:

Jesse Clark – Civil Engineering

Nathan Eddy – Civil Engineering

Stephanie Fischer – Civil Engineering

Kyle Staab – Civil Engineering

Faculty Adviser(s): Fritz Fiedler

Mentor(s): Sunil Sharma

HIGH TUNNEL GREENHOUSE

The University of Idaho's high tunnel greenhouse team, Stand Your Ground, is tasked with designing a greenhouse for harsh environmental conditions. Current greenhouses have failed due to high wind load. The goal of this project is to design a greenhouse to prevent such damage.

Sponsor: Tony McCammon

Sponsor Organization: University of Idaho Extension

Team Members:

Faisal Alahmadi – Mechanical Engineering

Christopher Kreps – Mechanical Engineering

Kyle MacLean – Mechanical Engineering

Stephen VanPatten – Mechanical Engineering

Faculty Adviser(s): Thomas Hess

Mentor(s): Jeremy Cuddihy

HILL ROAD/ 36TH STREET / CAPALPA DRIVE ROUNABOUT DESIGN

The 5-way intersection of Hill Road, 36th Street and Catalpa Drive in Boise, Idaho has been functioning near capacity for several years. The Ada County Highway District and City of Boise are looking at the possibility of a modern roundabout design to solve this problem.

Sponsor: John Ringert

Sponsor Organization: Kittelson & Associates

Team Members:

Charles Linja – Civil Engineering

Harvey McHugh – Civil Engineering

Spencer Payne – Civil Engineering

Faculty Adviser(s): Fritz Fiedler

Mentor(s): Fritz Fiedler

IMAGE-BASED REAL-TIME TRAFFIC DETECTION

In response to the need for real-time traffic control, less intersection congestion, and reduced emissions, Team New Perspective has developed a unique vehicle speed detection system using a revolutionary low-power image sensor. The design is realized in hardware for future single-chip implementations.

Sponsor: Suat Ay

Sponsor Organization: National Institute for Advanced Transportation Technology, VSRG

Team Members:

Paul Bailey – Computer Science

Mitch Bodmer – Electrical & Computer Engineering

Jacob Grinestaff – Electrical & Computer Engineering

Carson Stauffer – Computer Science

Francis Sziebert – Electrical & Computer Engineering

Faculty Adviser(s): Touraj Assefi

Mentor(s): Kyle Swenson, Ismail Cevik

IMPROVED DRINKING WATER TREATMENT FOR SMALL COMMUNITIES USING ELECTROCOAGULATION

Electrocoagulation treats water by creating flocculent with contaminants which allows for easy separation. The goal of this project is to demonstrate the economic value of this technology and its ability to treat multiple contaminants simultaneously. In particular, this will benefit small communities which have difficulty in providing adequate water treatment.

Sponsor: WERC

Sponsor Organization: New Mexico State University

Team Members:

Ben Carleton – Chemical & Materials Engineering

Arnold Pelayo – Chemical & Materials Engineering

Kelli Quist – Chemical & Materials Engineering

Sidney Suggs – Chemical & Materials Engineering

Faculty Adviser(s): David Drown

Mentor(s): David MacPherson

KIBBIE DOME LIGHT SHOW

The goal of this project is to provide a prototype design for a Kibbie Dome ceiling LED-display. This project aims to utilize the Raspberry Pi as a controller to operate high-powered LEDs to create images and patterns on the ceiling panels in the Kibbie Dome, a successor of Tower Lights.

Sponsor: Bob Rinker

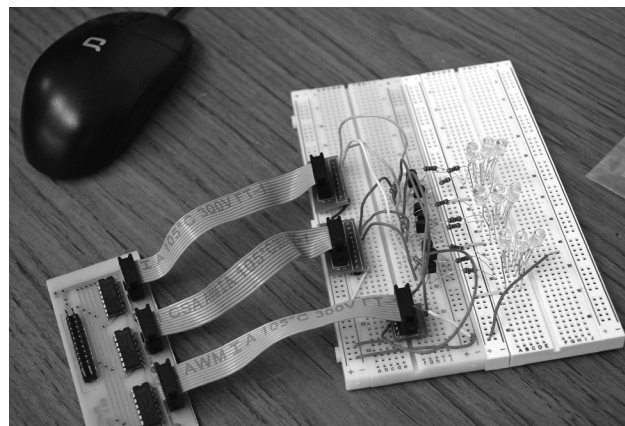
Sponsor Organization: Computer Science Department

Team Members:

Michael Crawl – Electrical & Computer Engineering

Heather Tallman – Electrical & Computer Engineering

Faculty Adviser(s): Touraj Assefi



KICKSHOT FOR ANDROID

KickShot for Android is a mobile application developed to bring KickShot, the board game, to the Android platform.

Sponsor: Aziz Akhani

Sponsor Organization: KickShot

Team Members:

Jordan Leithart – Computer Science

Robert Kleffner – Computer Science

Tao Zhang – Computer Science

Faculty Adviser(s): Bruce Bolden

MICRON TECHNOLOGY FOUNDATION GIFT WILL HELP MAKE THE UNIVERSITY OF IDAHO A LEADER IN MICROELECTRONICS EDUCATION & RESEARCH



The Micron Technology Foundation announced a \$1 million gift to the University of Idaho to fund an endowed professorship in microelectronics in the College of Engineering. The gift from the Foundation will support the UI's College of Engineering as it continues to grow its leadership position in microelectronics education and research. The gift brings the College of Engineering within reach of its December 2014 \$15 million dollar *Inspiring Futures* goal.

"One of the missions of the Micron Foundation is to help cultivate the next generation of scientists and engineers. The impressive work being done in UI's College of Engineering is helping accomplish this objective," said Micron CEO Mark Durcan. "We are pleased to be able to contribute to UI's microelectronics program as part of our support for STEM education in our state, country and around the world."

The Micron Foundation gift is unique in that it establishes the first fully-funded endowed professorship at the College of Engineering. An endowed professorship awards faculty members who have notable achievements in research, teaching and outreach, and provides compensation and funds to support students, travel, and other research costs. Earned interest on the initial investment will allow for the professorship to reside at the university in perpetuity.

Dr. Fred Barlow, current chair of the electrical engineering department has been selected as the first recipient of the Micron Professorship in Microelectronics. Barlow is internationally recognized in the field of electronic packaging with more than 100 publications on the subject. Barlow is a Fellow of the International Microelectronics and Packaging Society (IMAPS) and a senior member of the Institute of Electrical and Electronics Engineers (IEEE).

"Micron has made a significant investment in the University of Idaho over the last few years which has led to a strengthening of the microelectronics program at UI. This Endowed Professorship is an opportunity to take this collaboration to a new level that will benefit the university, the company, and students throughout the state of Idaho," says Barlow.

The Micron Professor in Microelectronics will help enable the College of Engineering to attract and retain outstanding faculty members to provide leadership, teaching, and research in key areas of interest to the microelectronics industry.

"Endowed faculty positions enable us to support very talented faculty like Fred who are leaders in teaching and research," said Larry Stauffer, Dean of the UI's College of Engineering. "They create a ripple effect, attracting other bright faculty and students. This is valuable for Idaho's economy."

The Micron Endowed Professor in Microelectronics will also head up the Next Generation Microelectronics (NGeM) Research Center in the College of Engineering. NGeM is a new interdisciplinary research center with faculty from electrical and computer engineering, mechanical engineering, materials engineering, and mathematics.

The mission of the center is to provide an environment for faculty and students to expand and develop the entire range of expertise associated with microelectronics from applied mathematics to materials science and electronic packaging. It also educates students to be future leaders in the microelectronics industry, which makes the center's relationship with Micron all that more valuable.

"The microelectronics industry plays a key role in the economy of Idaho and the Pacific Northwest," said endowed professor Barlow.

"Students that receive degrees in this field are well positioned to contribute to the industry while pursuing a rewarding career. Since this industry faces a number of technical challenges and has a need for well-educated employees, the NGeM center will help create the next generation of leaders for this industry while assisting with some of the key technological barriers."

Engineering Design EXPO Student Projects

LED VIDEO PLAYER

This project allows the user to play videos on an array of 32x32 pixel LED panels.

Sponsor: Robert Rinker

Sponsor Organization: Computer Science Department

Team Members:

Alex Eklund – Computer Science

Tell O’Neal – Computer Science

Faculty Adviser(s): Bruce Bolden, Robert Rinker

LUCKY FRIDAY MINE BORROW PIT DESIGN FOR TAILINGS IMPOUNDMENT

Hecla Mining has developed a borrow pit on company property to support the second stage of expansion on its active tailings pond at its Lucky Friday Mine in Mullan, Idaho. This project will evaluate borrow pit reactivation, stormwater & environmental controls, and a pit design for the current borrow pit.

Sponsor: Craig Shiner

Sponsor Organization: Hecla Mining Company

Team Members:

Matt Klepfer – Civil Engineering

Molly McGee – Civil Engineering

Garrett Rodgers – Civil Engineering

Faculty Adviser(s): Fritz Fielder

MARCHING BAND ENGINEERING

The goal of this project is to construct a human-powered mobile drum set for the UI Vandal Marching Band to use in halftime performances. We have also worked on various side projects, including wood turning mallets, modifying drum attachments and creating video tools to generate support for future musical performances.

Sponsor: Spencer Martin

Sponsor Organization: University of Idaho, Vandal Marching Band

Team Members:

Scott Blee – Mechanical Engineering

Jack Housley – Mechanical Engineering

Nadine Morasci – Mechanical Engineering

Theo White – Mechanical Engineering

Faculty Adviser(s): Edwin Odum, Steve Beyerlein

Mentor(s): Rory Lilley



MEASUREMENT OF OCEAN PH USING A NON-CONVENTIONAL QUINHYDRONE ELECTRODE

Accurate, durable pH sensors are needed to measure acidifying ocean pH due to rising atmospheric CO₂. Conventional pH meters cannot adequately meet these needs. A quinhydrone electrode with no platinum wire, a solid graphite composite interface, and a rugged encasement may. Adaption of this simple design could help spur the development of a more complete prototype design.

Sponsor: Wendy Schmidt

Sponsor Organization: Ocean Health XPrize

Team Members:

Moyd Alamri – Chemical & Materials Engineering

Reid Hattaway – Chemical & Materials Engineering

Alexander Schoenfelder – Chemical & Materials Engineering

Faculty Adviser(s): David Drown, Mark Roll

Mentor(s): Dennis Macpherson

MENAN INTERSECTION REDESIGN

The Menan Lorenzo Highway and State Highway 48 (SH 48) intersection will be redesigned to accommodate the increased traffic flow going east on the Menan Lorenzo Highway and the reduced flow heading south on SH 48.

Sponsor: Ben Burke

Sponsor Organization: Idaho Transportation Department

Team Members:

Greg Elmore – Civil Engineering

Riannon Heighes – Civil Engineering

Breanna Logerwell – Civil Engineering

Faculty Adviser(s): Fritz Fiedler

MODEL POWER SYSTEM

Create a digital model of an industrial plant that will be simulated in real time on the specialized Real Time Digital Simulation (RTDS) computer. Design and implement power system controls in real time automation controller (RTAC) donated by SEL. Interface the RTAC to the RTDS and test the controls scheme.

Sponsor: Scott Manson

Sponsor Organization: Schweitzer Electric Laboratories

Team Members:

Adel Al Mater – Electrical & Computer Engineering

David Eldredge – Mechanical Engineering

Chris Foiles – Electrical & Computer Engineering

Ann McConnell – Electrical & Computer Engineering

Faculty Adviser(s): Amrit Dahal

Mentor(s): Mahi Appannagari, Brian Johnson

MULTI LIPO BATTERY CHARGER

The University of Idaho Marching Band has been incorporating multimedia displays into their performances, including synchronized light emitting diodes powered by Lithium-Polymer battery packs. There is a need for a charging system capable of charging approximately 200 packs safely and efficiently within a one week time frame.

Sponsor: Robert Rinker

Sponsor Organization: ACM (Association for Computing Machinery), University of Idaho, Department of Computer Science

Team Members:

Ryler Adams – Electrical & Computer Engineering

Pankaj Dhyani – Electrical & Computer Engineering

Abraham Martinez – Electrical & Computer Engineering

Faculty Adviser(s): James Frenzel

Engineering Design EXPO Student Projects

NASA TOPPS (TENSEGRITY OPTIMIZED PAYLOAD PROTECTION SYSTEM)

Building and testing a physical prototype of a tensegrity structure to validate a computational model. The validated model will be used to design tensegrity based payload protection systems for interplanetary exploration.

Sponsor: Vytas SunSpiral

Sponsor Organization: NASA Ames Research Center, Intelligent Robotics Group

Team Members:

Alex Ackerman – Mechanical Engineering

Nick Clyde – Mechanical Engineering

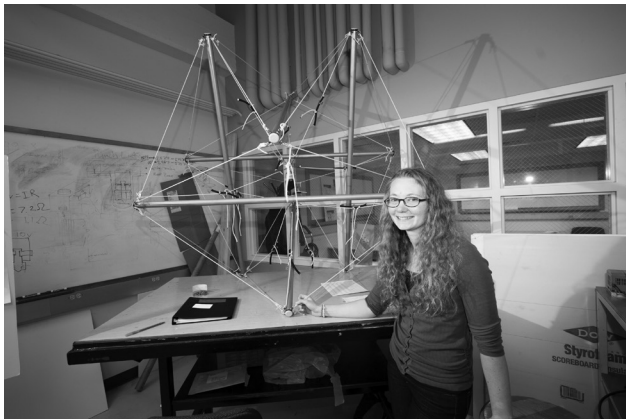
Will Hoffman – Mechanical Engineering

Brenden Kaschmitter – Mechanical Engineering

Mary Yovanoff – Mechanical Engineering

Faculty Adviser(s): Matthew Riley

Mentor(s): Sophie Milam, Kyle Morse



ORCHARD PICKER POSITIONING PLATFORM

We are designing a prototype that will aid orchard workers in picking and pruning apple and pear trees. Our goal is to speed up the picking and pruning process by using a leveling platform that moves up and down. The platform will make picking safer by removing the ladder hazard.

Sponsor: Joe Rumble

Sponsor Organization: Rumble Orchards

Team Members:

Cole Lewis – Mechanical Engineering

Spencer Marquis – Mechanical Engineering

Sydney Osterloh – Mechanical Engineering

Jordan Schwes – Biological & Agricultural Engineering

Faculty Adviser(s): Steve Beyerlein, Edwin Odum

Mentor(s): David Eld

OWSLEY CANAL BRIDGE

This project will select a culvert to replace the Owsley Canal Bridge near Mud Lake, Idaho. The design will involve traffic re-routing during construction, hydrologic analysis of the water in the canal, hydraulic analysis for culvert selection, pavement analysis and highway design of the new roadway above the culvert.

Sponsor: Michael McKee

Sponsor Organization: Idaho Transportation Department

Team Members:

John Cozens – Civil Engineering

Derek Probst – Civil Engineering

Mitch Skiles – Civil Engineering

Arthur Thomas – Civil Engineering

Faculty Adviser(s): Fritz Fiedler

POTABLE WATER FOR CHIWRAPI, BOLIVIA

Chiwirapi, Bolivia is a 250 person community in the Andes mountains. We are designing a clean drinking water and irrigation distribution system. The first step will be shallow wells with hand pumps and surveying for irrigation in the future.

Sponsor Organization: University of Idaho Chapter, Engineers Without Borders

Team Members:

Megan Dempsy – Civil Engineering

Riannon Heighes – Civil Engineering

Nate Hill – Civil Engineering

Rachel Hill – Civil Engineering

Meg Licht – Civil Engineering

William Parker – Electrical & Computer Engineering

Kelby Sommers – Civil Engineering

Nate Suhr – Civil Engineering

Faculty Adviser(s): Fritz Fiedler

PROSTHETIC LINER DONNING DEVICE

Our project is to design a device to aid lower limb amputees in donning their prosthetic liner. The device will ensure that the liner sits flush against the limb, properly aligns the pin, and enables those with low hand dexterity, vision, or flexibility to don their liner independently.

Sponsor: Lisa Huffman

Sponsor Organization: Biological & Agricultural Engineering Department

Team Members:

Matthew Guthrie – Mechanical Engineering

Allyson Labrum – Mechanical Engineering

Jennifer Rainey – Biological & Agricultural Engineering

Jordan Simonson – Biological & Agricultural Engineering

Samantha Sutherland – Biological & Agricultural Engineering

Faculty Adviser(s): Thomas Hess

Mentor(s): Matt Kologi, Chris Ohlinger



Engineering Design EXPO Student Projects

RAPID BIOEX ETHANOL FERMENTER

MuPor Industries has patented a rapid fermentation system for ethanol production using yeast encapsulated in bio-beads. Our project designed a scale up of bench-top reactors, using these BioEx beads, to proof-of-concept production scale. The reactors are designed to ferment sugars to ethanol within hours instead of days.

Sponsor: Ryan Meek

Sponsor Organization: Fostail BioSystems

Team Members:

Daniel Kang – Mechanical Engineering

Kevin Kruger – Biological & Agricultural Engineering

Kalven Metz – Biological & Agricultural Engineering

Matt Williams – Biological & Agricultural Engineering

Isaac Wilson – Mechanical Engineering

Faculty Adviser(s): Thomas Hess

Mentor(s): Jeremy Cuddihy

ROBOTIC WORKSTATION

Team RoboShow was tasked with the design and fabrication of a robotic workstation and safety enclosure to house the 6-Axis robots recently donated to the College of Engineering by the Boeing Company. The workstation will be used by the college as a platform for hands-on coursework and exciting new research.

Sponsor: Eric Wolbrecht

Sponsor Organization: University of Idaho, Mechanical Engineering Department

Team Members:

Will Edwards – Mechanical Engineering

Jacob Herrington – Electrical & Computer Engineering

Stephen Goodwin – Mechanical Engineering

Andrew Gregory – Mechanical Engineering

Kyle Kausen – Electrical & Computer Engineering

Kevin Witkoe – Mechanical Engineering

Faculty Adviser(s): David Alexander, Michael Santora

Mentor(s): David Eld

SMALL SATELLITE TECHNOLOGY

Demonstrate proof of concept for measuring planetary winds using Doppler shift. Provide end to end manufacturing and testing of system, including a capsule. Testing includes an in flight test working with Idaho VAST to perform in air flight.

Sponsor: David Atkinson

Sponsor Organization: Idaho Space Grant Consortium

Team Members:

Aaron Kitchen – Mechanical Engineering

Rhys Perry – Electrical & Computer Engineering

Philip Petersen – Mechanical Engineering

Jessica Slater – Electrical & Computer Engineering

Faculty Adviser(s): Touraj Assefi, Amrit Dahal

Mentor(s): David Eld, Stephan Wayne, Jason Bjur

SOLAR BRINE CONCENTRATOR

The brine solution from a solar water distillation is concentrated with a spray dryer and heat pump process powered by solar energy. The process is accomplished by preheating the air and the brine solution, raising the temperature so the water evaporates out of the solution when atomized leaving behind salt crystals. The exhaust is then condensed to produce clean water. The separation produces agricultural grade salts. The brackish solution is used at a rate of one gallon per hour.

Team Members:

Kirsten Hillyer – Chemical & Materials Engineering

Frank Ramirez – Chemical & Materials Engineering

Jared Reynolds – Chemical & Materials Engineering

Brennett Rodseth – Chemical & Materials Engineering

Faculty Adviser(s): David Drown

Mentor(s): David MacPherson, Charles Cornwall

SOLAR POWERED WATER FILTRATION

Developed in collaboration with Orphans to Ambassadors, our design project is a solar powered water filtration unit designed to be implemented in rainwater catchment systems. The design will provide clean, safe, pathogen-free water to remote orphanages that are without readily available power sources.

Sponsor: Jake Gentry

Sponsor Organization: Orphans to Ambassadors

Team Members:

Amy Cox – Biological & Agricultural Engineering

Tyler Marines – Mechanical Engineering

Kyle Rainer – Biological & Agricultural Engineering

Sharon Strom – Biological & Agricultural Engineering

Nick Stroud – Mechanical Engineering

Faculty Adviser(s): Thomas Hess

SOLDER JOINT RELIABILITY

Thermal expansion and impact stress is a concern to manufacturers dealing with solder joint reliability. The Solder Joint Reliability capstone project produced a finite element analysis model, validated with experimentation data, capable of predicting the failure rate of an electronic component's solder ball array caused by repeated thermal cycling.

Sponsor: Owen Fay

Sponsor Organization: Micron Technology, Inc.

Team Members:

Chadd Bergland – Mechanical Engineering

Josh Carlson – Mechanical Engineering

Trevor MacLean – Mechanical Engineering

Faculty Adviser(s): Fred Barlow, Gabriel Potirniche, David Alexander

Mentor(s): Victor Wolemiwa, Dominic Nwoke, Jose Ramirez Ruiz

SOLID MODELING WITH SOLIDWORKS AND CATIA

Students in ME 301 (Introduction to Solid Modeling w/Solidworks) and ME 421 (Advanced CAD w/CATIA) engage in challenging end of semester projects that bring them into close contact with classic mechanisms, design of new learning spaces, integration of CAD with metrology, and exploration new software toolkits. Their work products leave a valuable legacy to future students in these courses.

Sponsor Organization: University of Idaho, Mechanical Engineering Department

Team Members:

ME 301 Students

ME 421 Students

Faculty Adviser(s): Edwin Odom, Steve Beyerlein, Dan Cordon

Mentor(s): Chris Jerue, Luke Nelson, Ingrid Kooda, Matt Guthrie, Nadine Morasci, Amanda White, Matt Kologi, Jeff Reznicek, Bryce Gill

Engineering Design EXPO Student Projects

SPRINGFIELD SOCKEYE SALMON HATCHERY

Springfield Hatchery is a Sockeye Salmon hatchery in southern Idaho that will be designed to produce 1 million Sockeye smolts to feed the Salmon River run to Redfish Lake. This project involved the design of the main hatchery facility including the structural, geotechnical and hydraulic analyses.

Sponsor: Morton McMillen

Sponsor Organization: McMillen LLC

Team Members:

Beau Donaldson – Civil Engineering

Eric Holmberg – Civil Engineering

Vance Leavitt – Civil Engineering

Kelby Sommer – Civil Engineering

Ben Sonnen – Civil Engineering

Faculty Adviser(s): Fritz Fiedler

Mentor(s): Olivia Weick

STROKE REHABILITATION ROBOT – ROBOTIC ARM ASSIST

Assisting TECNALIA's venture in designing a rehabilitation robot to aid in stroke victim's recovery. The mission is to design and build a gripping, wrist rotation, and arm elevation mechanism and a computer interface to depict the state of these mechanisms to extend the functionality of the existing rehabilitation robot.

Sponsor: Joel Perry

Sponsor Organization: TECNALIA

Team Members:

Joe Osborn – Mechanical Engineering

Roman Pacheco – Electrical & Computer Engineering

Brenden Staab – Biological & Agricultural Engineering

Kadrie Swanson – Biological & Agricultural Engineering

Steven Witkoe – Mechanical Engineering

Faculty Adviser(s): Matthew Riley

Mentor(s): Jon Teske

SUNSHINE ISLAND: A FLOATING SOLAR CELL

A floating solar cell unit has been developed to generate power for a mining site. The unit will be placed on a tailings pond and have single axis solar tracking for better efficiency. The bench scale model will consist of a single unit that will create a fraction of what the full scale model will demand.

Sponsor Organization: WERC

Team Members:

Michael Cron – Chemical & Materials Engineering

St. John Richardson – Chemical & Materials Engineering

Kelsey VanderWaal – Chemical & Materials Engineering

Breanna Wong – Chemical & Materials Engineering

Faculty Adviser(s): David Drown

Mentor(s): David MacPherson, Charles Cornwall

SYNTHESIS AND CHARACTERIZATION OF PERFLUORINATED CALIXARENES

Calixarenes like resorcinol[4]arene and pyrogallol[4]arene have been studied for decades. Their functionalized counterparts, however, have received markedly less attention despite presenting with potential applications in separation science (Chu, O'Neal and Osipov) and biphasic reaction chemistry. The standard reaction method to generate these macrocycles was involved reflux under argon for upwards of 72 hours, a time and material intensive process. Using green chemistry microwave technology, however, the reaction time is reduced from 72 hours to 15-20 minutes. In addition, the volume of solvent needed is

greatly diminished, as is the input power required to drive the reaction.

Team Members:

Sara Sumner – Chemical & Materials Engineering

Faculty Adviser(s): Mark Roll, David Drown

Mentor(s): Mark Roll

UNIVERSITY OF IDAHO'S INDUSTRIAL ASSESSMENT CENTER

The purpose of the University of Idaho's Industrial Assessment Center is to train a generation of energy engineers and provide local industries with energy and process efficiency improvements.

Sponsor: Dev Shrestha

Sponsor Organization: U.S. Department of Energy

Team Members:

Chris Anderson – Biological & Agricultural Engineering

Chad Dunkel – Biological & Agricultural Engineering

Ibrahim Ibrahim – Civil Engineering

Andrew Lake – Mechanical Engineering

Luke Nelson – Mechanical Engineering

Vignesh Jayaraman Muralidharan – Biological & Agricultural Engineering

Ryan Oliver – Electrical & Computer Engineering

Vince Schwartz – Mechanical Engineering

Chance Sundquist – Mechanical Engineering

Faculty Adviser(s): Dev Shrestha, Steve Beyerlein

WIND RESOURCE ASSESSMENT

The project is an assessment of the wind resource on the U of I campus. The assessment is accomplished by placing four instrument packages, consisting of an anemometer, a wind direction vane, and a data logger, at four sites and collecting wind data. The sites are on top of the water tower at the UI golf course, on top of Theophilus Tower, on top of the Anderson grain elevators down town, and on top of 20 meter tower at the UI farm on 6th street. This project is funded by a grant from the University of Idaho Sustainability Center

Sponsor Organization: University of Idaho Sustainability Center

Team Members:

Kelly Moore – Mechanical Engineering

Jordan Scott – Electrical & Computer Engineering

Faculty Adviser(s): Tao Xing

#YOCO (YOU-ONLY-COAT-ONCE)

Magnesium alloys have a lower density than aluminum but are more susceptible to corrosion. In order to increase feasibility the magnesium alloys were anodized with NH₄F. The effectiveness of the coating was tested using electrochemistry/weight loss to determine its effect on corrosion resistance.

Sponsor: Krishnan Raja

Sponsor Organization: University of Idaho Materials Engineering Department

Team Members:

Zach Campbell – Chemical & Materials Engineering

Diane Edwards – Chemical & Materials Engineering

Adam Grebil – Chemical & Materials Engineering

Quinn MacPherson – Chemical & Materials Engineering

Faculty Adviser(s): David Drown, Krishnan Raja

JOIN THE IDAHO TRADITION

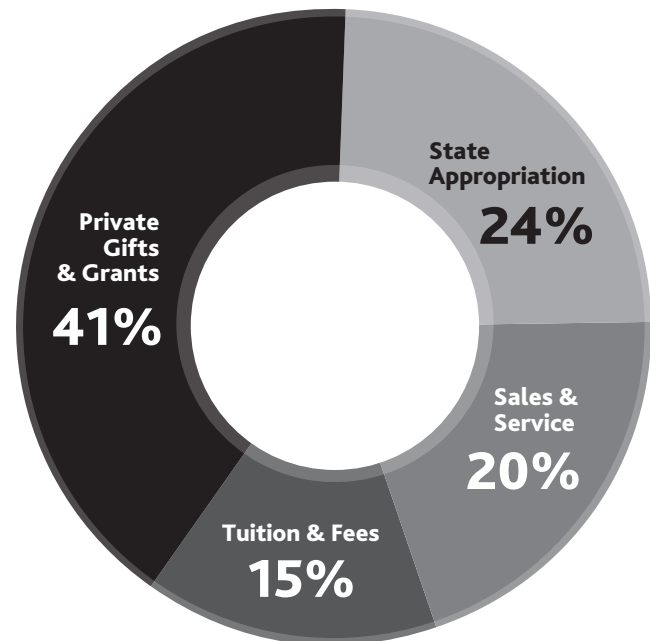
At the University of Idaho, you've developed meaningful relationships and earned a degree that will take you down the road to success in both engineering and in life. Now that you're graduating and entering into the workforce consider giving back. More than 40% of College of Engineering alumni have given back to the university. Now is your opportunity to continue the legacy of giving back to the university that has given to you. Help make the class of 2014 the most generous graduating class in history.

Idaho engineering alumni have a long-standing tradition of philanthropy that is key to the future of the university. Support from our alumni, friends and industry partners ensures the continued strength of our senior capstone program and the future of Engineering Design EXPO. You can make a gift to any program that interests you, or to scholarships in any of our departments.

Each year, private donations become more important to our ongoing success. As you can see from the chart, the University of Idaho depends on private donations and grants for more than 40% of its annual budget. No matter the size of your gift, it makes a difference every day.

Thank you in advance.
Congratulations on your upcoming graduation, senior capstone and EXPO success and welcome to the Vandal alumni family!

UNIVERSITY OF IDAHO BUDGET



For more information about giving to the College of Engineering contact one of our Development staff:

Mary Lee Ryba

Assistant Dean for
Development
mryba@uidaho.edu
208-755-4916

Christina Randal

Director of Development
cdrandal@uidaho.edu
208-885-6774

Eric Billings

Development Coordinator
ebillings@uidaho.edu
208-885-7978

Sandy Spear

Development Administrative
Coordinator
sspear@uidaho.edu
208-885-5201

To learn more about giving to the College of Engineering, visit: uidaho.edu/inspire/ways/academics/engineering

Inspiring Futures

Invest in the University of Idaho

Idaho TECH 2014: Mars Rover Challenge

Idaho TECH is a STEM oriented competition for fourth, fifth and sixth grade students sponsored by the NASA Idaho Space Grant Consortium (ISGC). Students design and construct Mars Rover models out of Leg and non-Lego components, which are tested in the Engineering Design Competition (EDC).

Idaho TECH: Mars Rover Challenge has been designed to help meet the National Science Education Standards laid out by the National Research Council (NRC) for grades 5-8. The goals are to facilitate abilities in technological design and to promote basic understanding about science technology. In Idaho TECH, these goals are being actively pursued through group collaboration, the use and promotion of the engineering design process, and the clear communication of the design process to others. Idaho TECH is specifically designed to meet the NRC's recommendation that all of these components be appropriately utilized to meet their standards.

Idaho TECH is a fun, yet intensive, program which requires a high level of both teacher and student dedication. Also, parental support is a key to any Idaho TECH team's success. Idaho TECH provides a wonderful and enjoyable opportunity for teachers to get parents actively involved in the education of their children.

IDAHO TECH DESIGN COMPETITION

Friday, May 2, 2014

8:00 - 8:45 a.m.

Registration

8:45 - 9:00 a.m.

Welcome and Competition Briefing

9 a.m. - 12:30 p.m.

Transportation to the University of Idaho Engineering EXPO at the SUB

9 a.m. - 1:20 p.m.

Competition Events

1:20 p.m. - 1:50 p.m.

Special guest speaker, Tony Leavitt, NASA Education Specialist

1:50 p.m. - 2:30 p.m.

Presentation of Awards





WOMEN IN ENGINEERING DAY
October 24, 2014

WOMEN *in* ENGINEERING Day

For additional information on WIE Day visit: www.uidaho.edu/wie

Women in Engineering Day (WIE) is a one-day workshop for female high school students, grades 11-12. WIE Day is designed to introduce young women to career options in engineering and computer science.

Participants will have the opportunity to:

PARTICIPATE in hands-on engineering design activities.

INTERACT with current students involved in the Society of Women Engineers, faculty and industry professionals.

EARN a scholarship toward your undergraduate degree in engineering.

LEARN about the diversity of careers in engineering.

TOUR engineering labs at the University of Idaho.

BECOME AN ENGINEER AND CHANGE THE WORLD!

The University of Idaho, College of Engineering prides itself on providing students many opportunities to grow both inside and outside the classroom. Engineering Design EXPO is one of those opportunities but there are many others.

Engineers Without Borders | University of Idaho Chapter
EWB-UI is currently working with their partner community, Chiwirapi, Bolivia to design and construct a sustainable water supply system.



These organizations enrich the personalities of students and help them understand the need for lifelong learning and continued professional development for a successful and rewarding career.

- American Society of Civil Engineers
- American Society of Mechanical Engineers
- Engineers Without Borders
- Institute of Electrical and Electronics Engineers
- International Microelectronics & Packaging Society
- National Society of Black Engineers - UI Chapter
- Society of Hispanic Professional Engineers
- Society of Women Engineers - UI Chapter

To learn more about University of Idaho, College of Engineering Student Organizations visit:
uidaho.edu/engr

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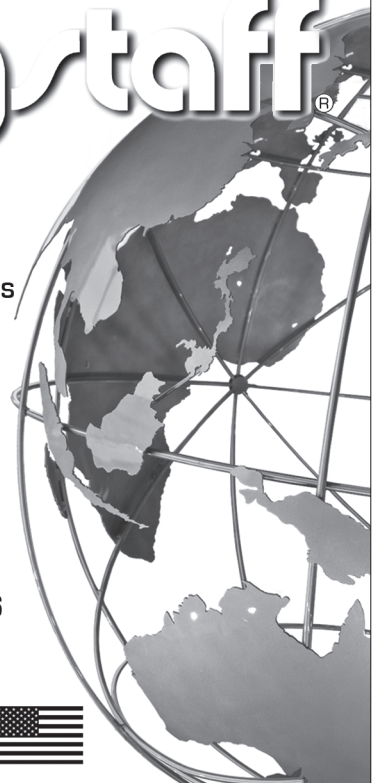
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Working together as a community, we can bring out the best in all of us. Boeing is proud to support the University of Idaho's 21st Annual Engineering Design EXPO and all who make the places we call home the best they can be.



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Design Expo
Participants**

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