

# EXPO

engineering ▲ design

**The longest-running student engineering  
innovation showcase in the Pacific Northwest**



**2019 Capstone  
Project and  
Event Guide**



**University of Idaho**  
College of Engineering



# World-Class Technology, Made in the Northwest

We're proud to partner with the University of Idaho to help develop the next generation of innovators through meaningful internships and the support of science, technology, engineering, and math education. More than 300 Vandals have joined our team.

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# WELCOME TO EXPO



The University of Idaho College of Engineering's annual Engineering Design EXPO is a Vandal tradition. Now in its 26th year, EXPO is the longest-running student engineering and technological innovation showcase in the Pacific Northwest.

Working in teams, engineering students from across disciplines present their projects from our college's senior capstone program, recognized by the National Academy of Engineering as one of the best in the nation. For most students, EXPO is the final culminating event before graduating and joining the workforce.

Business leaders and company sponsors attend EXPO to review student work and listen to them pitch their ideas and accomplishments, giving ample opportunity for students to meet and interact with companies looking to hire highly-skilled graduates.

Additionally, more than 500 students, grades K-12

as well as community colleges, attend EXPO each year to explore projects that push the boundaries of science and technology and learn more about the University of Idaho.

These younger students gain a better sense of what it's like to be an engineering student at U of I by meeting current students and faculty members, and exploring the many project and research opportunities available to undergraduates at U of I.

Over the years, EXPO has grown in significance, bolstering our educational process and our student's development. But EXPO is not possible without the support of our industry partners and friends of the College of Engineering. We depend on your generous support to produce this quality event.

I want to thank this year's corporate and academic presenting sponsors, Schweitzer Engineering Laboratories and Engineering Outreach at the University of Idaho, for their generosity and commitment to EXPO.

In addition, I want to thank all of the sponsors and partners that support EXPO activities from our K-16 Extended Experience program to providing meals for our judges and capstone students. Thank you to Wagstaff, J-U-B Engineers, Avista, Itron, Idaho STEM Action Center, Boeing, CCI-Spear, the Micron Foundation, ON Semiconductor, Idaho Power, HP, Power Engineers, DC Engineering, Lochsa Engineering and the J. R. Simplot Company.

As you visit EXPO, please engage with our students and ask them about their projects and designs and the future they hope to create as a Vandal engineer.

Sincerely,

Larry Stauffer, Dean  
College of Engineering  
University of Idaho

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# THANK YOU, EXPO SPONSORS!

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

**Corporate  
Presenting Sponsor:**



**Academic  
Presenting Sponsor:**



## ***Become a Sponsor***

*Planning the University of Idaho's Engineering Design EXPO is a yearlong activity.*

*To explore future opportunities to support EXPO, contact:*

**College of Engineering  
Development Team  
208-885-5888  
expo@uidaho.edu**

*We look forward to talking with you about how you can help support this event and current and future students.*

## **Event Sponsors**



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# MEET OUR JUDGES

*Judges are a critical part of the Engineering Design EXPO experience for University of Idaho College of Engineering students. Interaction between students and judges creates opportunities for students to gain new insight and learn about engineering career paths and the profession in general.*

## **Thank You for Joining Us!**

Edward Anderson, Battelle Energy Alliance

Phil Arpke, Wagstaff

Ralph Barker, Retired

Zane Blegen, The Boeing Company

Pat Blount, Moscow High School

Pietro Boyd, Nightforce Optics

Nathan Bradbury, Wagstaff, Inc.

Myles Brown, The Boeing Company

David Christiansen, University of North Carolina, Genentech (Retired)

Ed Cimbalik, Micron

Mitch Colburn, Idaho Power

Jason Dearien, Schweitzer Engineering Laboratories

Raymond Dixon, U of I College of Education Health & Human Sciences

Chris Dyer, POWER Engineers, Inc.

Sharon Eroschenko, US Bureau of Reclamation

Byron Flynn, GE

Gene Hamacher, U of I TechHelp

Gary Hermann, Velsicol and CH2M Hill (Retired)

David Hollenback, Berg Manufacturing

David Honcik, Geodetics

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

Paul Huber, The Boeing Company

Chris Hyde, University of Idaho

Ciarra Ioli, The Boeing Company

Richard Jacobsen, Idaho State University



Krista Kinsey, J.R. Simplot Company

Lisa Lewis, Boise VA Medical Center

Jim Linford, Eagle Creek Consulting, Inc.

Scott Linja, Keller Associates, Inc.

Ken Mays, The Boeing Company

Ben Medeiros, Esterline Interface Technologies

Tom Moore, Consultant

Angel Mora, The Boeing Company

Angel Mora, The Boeing Company

Nadine Morasci, Astronics AES

Douglas Overholtzer, Wagstaff, Inc.

Caitlin Owsley, Janicki Industries

Lyle Parks, Retired

Marc Patterson, Idaho Power

Behnaz Rezaie, University of Idaho

Jonathan Richards, Schweitzer Engineering Laboratories

Pete Robichaud, USDA Forest Service

Sarah Scholes, USDA Forest Service, Rocky Mountain Research Station

Brian Sielaff, Tamarack Grove Engineering

Steve Silkworth, Avista Corp

Alex Simon, The Boeing Company

Howard Skidmore, JR Simplot Company

Alistair Smith, University of Idaho

Todd Swanstrom, Western Trailer Co.

Cody Tews, Schweitzer Engineering Laboratories

Mike Thompson, Wagstaff, Inc.

Steven Wagner, PlayStation

Jeff Williams, Vista Outdoor

Calvin Williams, The Boeing Company

# EXPO KEYNOTE SPEAKER

## ENGINEERING, A LIFE WELL-LIVED

### Comma Optional



## Mark Bathrick

2 p.m. – 2:45 p.m.

Vandal Ballroom, Second Floor,  
Bruce M. Pitman Center



Graduating from the United States Naval Academy with an aerospace engineering degree, Mark Bathrick spent 25 years in the Navy, and even attended the Navy Fighter Weapons School TOPGUN. He's flown more than 40 different types of military and civilian aircraft, logging 3,700 hours of flight time along the way, and training at Britain's famed Empire Test Pilots' School.

Bathrick is now director of the Office of Aviation Services in the U.S. Department of the Interior (DOI) and manages the world's largest non-military drone fleet.

The DOI is the U.S.'s largest land steward, overseeing 1 of every 5 acres in the nation, and is responsible for management and conservation. That's a big responsibility, when you consider park management, wildfires, species control and other natural disasters. Thankfully, unmanned aircraft is making the job easier.

"Anybody can see what it's like from up in the sky," he said, "Get a drone, and you can see what before was limited to those who had invested significant time and money to become aircraft pilots. Drones have led to the democratization of the third dimension."

Bathrick has overseen more than 19,000 drone flights for the DOI's Unmanned Aircraft Systems (UAS) program. In May 2018, during the eruption of the Kilauea volcano on the Hawaiian Islands, after evacuations occurred, Bathrick's team helped a lone resident escape a breached lava lake. The UAS program was used to spot embers flying over the fire line in Oregon in 2017, saving \$50 million in power structure across the state. Drones are also used to track animals, keep an eye on flood conditions and more. Bathrick was inducted into the University of Idaho College of Engineering Academy of Engineers in 2017.



Nothing against lawyers or other professions, but engineers get to be part of something that stays, is physically tangible, and benefits many people.

**Mark Bathrick**

EXPO KEYNOTE SPEAKER



Mark Bathrick waiting to land aboard a carrier at sunset.



# ENGINEERING DESIGN EXPO

# 2019 SCHEDULE

April 26, 2019 | 9 a.m. to 3:30 p.m.

Bruce M. Pitman Center, University of Idaho, Moscow Campus

***Free and open to the public***

## Explore EXPO Capstone Projects

**9 a.m. - 3:30 p.m.**

*International Ballroom, Second Floor, Bruce M. Pitman Center*

More than 60 engineering team projects on display.

## Free Film — *Dream Big: Engineering Our World*

**10 a.m. | 11 a.m. | 1 p.m.**

*Borah Theater, Second Floor, Bruce M. Pitman Center*

Narrated by Academy Award® winner Jeff Bridges, *Dream Big: Engineering Our World* is a first-of-its-kind film that will transform how we think about engineering.

## Technical Presentations

**9 a.m. – 12:30 p.m.**

*Vandal Ballroom South, Silver, Gold and Chiefs Rooms, Second Floor, Bruce M. Pitman Center*

15-minute presentations on project designs, problems and solutions. See insert for individual presentation times.

## Keynote Speaker: Mark Bathrick

**2 p.m. – 2:45 p.m.**

*Vandal Ballroom, Second Floor, Bruce M. Pitman Center*

Mark L. Bathrick manages the world's largest non-military drone fleet as Director of the Office of Aviation Services for the U.S. Department of the Interior.



# THE COLLEGE OF ENGINEERING CAPSTONE PROGRAM

Recognized by the National Academy of Engineering as one of the seven best in the nation, the University of Idaho College of Engineering Senior Capstone Design Program infuses real-world experiences into undergraduate engineering education.

Engineering students work in interdisciplinary teams on creative projects sponsored by valued industry partners, private individuals or U of I departments. Courses in the program emphasize the design process and the creation of a thoughtfully engineered, tested and validated outcome or prototype.

Our annual Engineering Design EXPO, the longest-running student engineering innovation showcase in the Pacific Northwest, is the culmination of the capstone program. Seniors present their work at EXPO through professional exhibits and technical presentations.



## EXPLORE CAPSTONE PROJECTS

### Biological Engineering

#### NEAR SPACE MICROBIOME SAMPLE COLLECTION

Little is known about microorganisms in Earth's atmosphere, raising the question: How safe are we from organisms spreading disease through the air? Our team is building a system to collect uncontaminated samples to help scientists study and classify these microorganisms. Our system will be trackable via GPS and launched with a high-altitude balloon.

##### Team Members

Carissa Hambidge – Biological Engineering  
 Brandon Gomez – Biological Engineering  
 Yikai Tian – Electrical and Computer Engineering  
 Alex Xu – Electrical and Computer Engineering

##### Client/Sponsor

U of I College of Engineering

##### Faculty Advisor

Dev Shrestha, Biological Engineering

#### AUTOMATED BIOCHAR INJECTION SYSTEM FOR CLEAN WATER MACHINE

To address water security, U of I's Clean Water Machine provides sustainable wastewater treatment. Our team will look at adding an automated injector that adds a charcoal, called biochar, to the treatment system, removing pollutants and recovering nutrients as wastewater is filtered in a more efficient continuous system.

##### Team Members

Courtney Wanke – Mechanical Engineering  
 Phillip Hagen – Electrical and Computer Engineering  
 Dylan Kirkpatrick – Biological Engineering  
 McKenzie Walquist – Biological Engineering

##### Client/Sponsor

U of I Department of Biological Engineering

##### Faculty Advisor

Dev Shrestha, Biological Engineering

#### EASY-TO-CONTROL TREADMILL FOR LAB RESEARCH

The University of Idaho and Idaho State University are partnering to study the effects of exercise on early muscle development using neonatal rats. The treadmill currently used to perform research is tedious to operate and breaks often. Our team's new treadmill design is robust and simple to control, allowing for less downtime and headache.

##### Team Members

Colin Burkhalter – Mechanical Engineering  
 Stuart Sater – Biological Engineering  
 Stephen Schoonen – Biological Engineering  
 Mitchell Williams – Mechanical Engineering

##### Client/Sponsor

University of Idaho, Idaho State University

##### Faculty Advisor

Dev Shrestha, Biological Engineering





## SILVER-BASED MICROBIAL CHECK VALVE FOR NASA WATER PURIFICATION SYSTEMS

NASA uses iodine to eliminate bacteria and viruses and provide drinking water for astronauts in space. Due to health concerns with iodine, our team is designing a system for delivering silver ions, a known drinking water disinfectant, from a check-valve-based system for use in the International Space Station's water purification system.

### Team Members

Bethany Kersten – Chemical and Materials Engineering  
Andrea Condie – Chemical and Materials Engineering  
Jarod Perko – Chemical and Materials Engineering  
Brandan Brewer – Chemical and Materials Engineering  
John McAlpine – Chemical and Materials Engineering

### Client/Sponsor

WERC, NASA Idaho Space Grant Consortium

### Faculty Advisor

Matthew Bernards, Chemical and Materials Engineering

## ENERGY RECOVERY FROM DAIRY WASTE VIA ANAEROBIC DIGESTION

Many companies desire green energy sources. Natural gas is a common source of energy, but renewable natural gas is not always viable. Anaerobic digestion, or creating energy through the breaking down of biodegradable materials without oxygen, is a potential solution for the Twin Falls, Idaho, area due to the high number of dairies and amount of manure produced. Our work focuses on modeling and designing the process of anaerobic digestion for potential industry implementation.

### Team Members

Brian Beatty – Chemical and Materials Engineering  
Matthew Morrow – Chemical and Materials Engineering  
Simon Shindler – Chemical and Materials Engineering

### Client/Sponsor

Michael McKellar, University of Idaho

### Faculty Advisor

Michael McKellar, Chemical and Materials Engineering

## CONTINUOUS FERMENTATION TO MAXIMIZE ETHANOL PRODUCTION

Continuous fermentation is an emerging field within the brewing industry. However, typically bottom fermenting yeasts have been used for research. This design team developed polymeric bio-beads to encapsulate top fermenting ale yeast through a batch fermentation process. The team used collected data to complete a scale-up model for a continuous system with the goal to improve brewing efficiency and economics.

### Team Members

Fitsum Wudneh – Chemical and Materials Engineering  
Carter West – Chemical and Materials Engineering  
Abdullah Aldousari – Chemical and Materials Engineering  
Alex Schlotterbeck – Major

### Client/Sponsor

U of I College of Engineering

### Faculty Advisor

Matthew Bernards, Chemical and Materials Engineering

## SEPARATION OF RADIOACTIVE MATERIAL IN DISCARDED EMERGENCY EXIT SIGNS

Certain emergency exit signs are illuminated by the decay of radioactive tritium gas, which generates a helium byproduct. At the end of the sign's useful lifetime, residual tritium still constitutes a sizable percentage of the gas. Both of these gases are valuable in purified form. Our team is developing a membrane separation process capable of isolating these gases for recycling purposes.

### Team Members

Sam Rasmussen – Chemical and Materials Engineering  
Keith Murdock – Chemical and Materials Engineering  
Saad Alanazi – Chemical and Materials Engineering

### Client/Sponsor

Vivek Utgikar, Chemical and Materials Engineering, University of Idaho  
Richard Christensen, Nuclear Engineering, University of Idaho

### Faculty Advisor

Matthew Bernards, Chemical and Materials Engineering

## 3D PRINTING TISSUE ENGINEERING SCAFFOLDS USING MICROFLUIDIC DEVICES

The ability to print polymers, cells and nutrients simultaneously in a controlled pattern could lead to a cure for individuals following an injury. Our group is designing a 3D printer to accomplish this goal by understanding the micro-mixing of three components and polymer reaction speeds.

### Team Members

Kasey Peach - Chemical and Materials Engineering  
Chris Kingsley - Chemical and Materials Engineering  
Joe Grover - Chemical and Materials Engineering  
Saugat Singh - Chemical and Materials Engineering

### Client/Sponsor

Matthew Bernards, University of Idaho

### Faculty Advisor

Matthew Bernards, Chemical and Materials Engineering



## CAPACITIVE-BASED SENSING IN MICROFLUIDIC DEVICES

Our project focuses on utilizing a capacitance sensor as a means to detect and identify particles that are flowing through a channel. This technique could ultimately be used in conjunction with microfluidic devices to characterize infected cells from a population of healthy cells.

### Team Members

Jamie Tatko - Chemical and Materials Engineering  
Jady Behm - Chemical and Materials Engineering  
John Lyons - Chemical and Materials Engineering

### Client/Sponsor

Soumya Srivastava, University of Idaho

### Faculty Advisor

Matthew Bernards, Chemical and Materials Engineering

## Civil and Environmental Engineering

### BONNERS FERRY WASTEWATER FORCE MAIN REPLACEMENT

The City of Bonners Ferry, Idaho, moves wastewater from areas south of the Kootenai River to its wastewater treatment plant. We were tasked with designing a replacement for a 1,300-foot force main attached to a 770-foot suspended bridge that crosses the river. The city desired the new force main to have redundancy and reliability.

#### Team Members

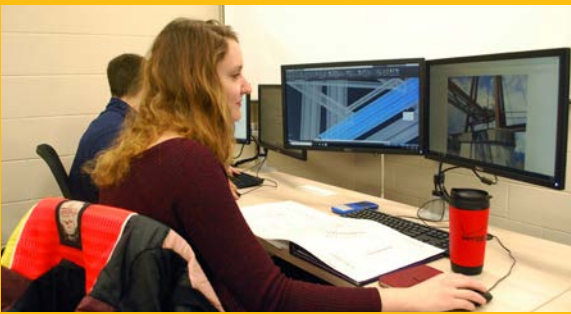
Josh Ellingson – Civil and Environmental Engineering  
Erik Eyre – Civil and Environmental Engineering  
Emily MacCoy – Civil and Environmental Engineering  
Christopher Holder – Civil and Environmental Engineering

#### Client/Sponsor

J-U-B Engineers

#### Faculty Advisor

Fritz Fiedler, Civil and Environmental Engineering



### IMPROVING COEUR D'ALENE AIRPORT TRAFFIC FLOW

We are improving the Coeur d'Alene Airport by designing a taxiway addition to a future aircraft hangar for corporate entities, resulting in improved traffic flow overall. The project will include establishing a location for the taxiway, and pavement and storm water systems design.

#### Team Members

Connor Aus – Civil and Environmental Engineering  
Pete Bauman – Civil and Environmental Engineering  
Anders Tvedt – Civil and Environmental Engineering  
Hampton Coogle – Civil and Environmental Engineering

#### Client/Sponsor

T-O Engineers

#### Faculty Advisor

Fritz Fiedler, Civil and Environmental Engineering

### RURAL ALASKA WATER AND SEWER SERVICE FOR 13 UNSERVED HOMES

Thirteen homes in the rural town of Huslia, Alaska, have no water or sewer service. Residents must use a community building that houses the town's only running water. Residents restricting their water use so drastically leads to conditions that are less than sanitary. Our project will evaluate three alternatives for bringing water and sewer service to these homes.

#### Team Members

Meghann Kolb – Civil and Environmental Engineering  
Jeffrey Silvera – Civil and Environmental Engineering  
Leonard Flett – Civil and Environmental Engineering  
Catherine Feistner – Civil and Environmental Engineering

#### Client/Sponsor

CRW Engineering Group

#### Faculty Advisor

Fritz Fiedler, Civil and Environmental Engineering



“As a civil engineer, if people notice the work, it means you've messed up. If people take it for granted, you've done a good job.

**Erik Eyre**

**SENIOR, CIVIL AND ENVIRONMENTAL ENGINEERING**



### BEAVERTON, OREGON, ROAD WIDENING OVER WILLOW CREEK

Our project focuses on the widening of NW Walker Road between NW 173rd Avenue and NW 185th Avenue over Willow Creek in Beaverton, Oregon, to improve traffic flow and safety for the general public. This project will include culvert, roadway and pavement designs.

#### Team Members

Shaun Carroll – Civil and Environmental Engineering  
Dylan Lamberton – Civil and Environmental Engineering  
Nicolas Brouillard – Civil and Environmental Engineering  
Austin Corley – Civil and Environmental Engineering

#### Client/Sponsor

3J Consulting, Inc.

#### Faculty Advisor

Fritz Fiedler, Civil and Environmental Engineering

### DALE RESIDENCE: CUSTOM TIMBER HOME

In this project, foundation design, gravity analysis, and lateral analysis will be performed. Following a complete gravity and lateral load analysis, calculations will be prepared to approve the construction set of this residence.

#### Team Members

Riley Langan – Civil and Environmental Engineering  
Nathan Johnson – Civil and Environmental Engineering  
Cooper Felton – Civil and Environmental Engineering  
Chaney Wood – Civil and Environmental Engineering

#### Client/Sponsor

Tamarack Grove Engineering

#### Faculty Advisor

Fritz Fiedler, Civil and Environmental Engineering

## OREGON WATER RESOURCE RECOVERY FACILITY UPGRADE

The Hoodland Water Resource Recovery Facility in Clackamas, Oregon, was constructed in 1981. It is significantly outdated in terms of treatment methods, equipment age and population capacity. Our project primary addresses the need to update the secondary treatment system that removes organic matter from the water, assess and improve the hydraulic capacity of the plant, and plan for population increases to keep the plant operational.

### Team Members

Josiah Milcic – Civil and Environmental Engineering  
Alexander Newton – Civil and Environmental Engineering  
Lindsey Smoot – Civil and Environmental Engineering

### Client/Sponsor

Water Environment Services

### Faculty Advisor

Fritz Fiedler, Civil and Environmental Engineering

## U OF I ARBORETUM IMPROVEMENTS

This project aims to enhance the University of Idaho Arboretum and Botanical Garden's accessibility and infrastructure through increased parking capacity, improved entryway, reduced weed presence, improved pond recirculation system, handicap accessibility, and improved irrigation system.

### Team Members

Jacob Cunnington - Civil and Environmental Engineering  
Julia Reese - Civil and Environmental Engineering  
Dakota Wilson - Civil and Environmental Engineering  
Bryce Logerwell - Civil and Environmental Engineering

### Client/Sponsor

U of I Arboretum and Botanical Garden

### Faculty Advisor

Fritz Fiedler, Civil and Environmental Engineering

## MOSCOW BRIDGE CONNECTING THIRD STREET AND MOUNTAIN VIEW

Our project is a bridge design to span Paradise Creek, connecting Third Street to Mountain View Road in eastern Moscow. The design emphasizes structural and hydraulic safety and improves transportation efficiency. The bridge accommodates both pedestrian and vehicular traffic.

### Team Members

Sulaiman Almuhausen – Civil and Environmental Engineering  
Lucas Coutinho – Civil and Environmental Engineering  
Walker Noe – Civil and Environmental Engineering  
Heather Wethington – Civil and Environmental Engineering

### Client/Sponsor

Keller Associates

### Faculty Advisor

Fritz Fiedler, Civil and Environmental Engineering

## IDAHO DEEP CREEK LOOP PROJECT

Our project is dealing with the rehabilitation of asphalt on Deep Creek Loop in Bonners Ferry, Idaho. Other design aspects were added to the project to help us implement our design knowledge from class. We will also be including a realignment of the road in the form of an intersection and designing a drainage culvert.

### Team Members

Cody Hodgson - Civil and Environmental Engineering  
Joshua McCain - Civil and Environmental Engineering  
Paul Bomber - Civil and Environmental Engineering  
Meeloud Alhasyah - Civil and Environmental Engineering

### Client/Sponsor

HMH Engineering, Surveying, and Materials Testing

### Faculty Advisor

Fritz Fiedler, Civil and Environmental Engineering

## HARRISON, IDAHO RV PARK REDESIGN

Our project provides extensive site upgrades for an existing gravel RV park on Lake Coeur d'Alene in Harrison, Idaho. The optimized layout adds parking and picnic areas for each space, water and sewer hook-ups, an additional lift station for wastewater, a new shower house, stormwater mitigation, and improved aesthetics. This project will reinforce civil engineering design techniques in each area of the discipline.

### Team Members

Cara Jernigan – Civil and Environmental Engineering  
Braxton Klas – Civil and Environmental Engineering  
Nathan Haight – Civil and Environmental Engineering  
Ali Alishaq – Civil and Environmental Engineering

### Client/Sponsor

City of Hayden, Idaho; Welch Comer Engineers

### Faculty Advisor

Fritz Fiedler, Civil and Environmental Engineering



The people who like challenges lean toward engineering. That's all this is, very advanced problem-solving. It just made sense to me.

Joe Glover

SENIOR, CHEMICAL AND MATERIALS ENGINEERING





## Computer Science

### DARWIN'S DEMONS VR: EVOLUTIONARY VIDEO GAME

In Darwin's Demons VR, players put on a virtual reality headset and shoot evolving populations of aliens in space. It is an adaptation of U of I-housed game studio Polymorphic Games' first release, Darwin's Demons. The studio will use the game at outreach events such as conferences and STEM fairs, as well as to introduce engineering and STEM concepts to K-12 students.

#### Team Members

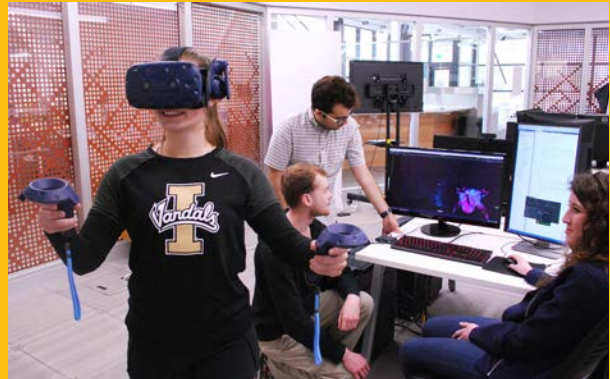
Clara Cannon - Electrical and Computer Engineering  
Samantha Heck - Computer Science  
Jorge Olivas - Computer Science

#### Client/Sponsor

U of I Department of Computer Science

#### Faculty Advisor

Bruce Bolden, Computer Science



### PARK MY RIDE

Finding parking is always a concern in urban areas, especially at popular sites. As cities grow, parking will become harder and harder to find. We are developing the initial prototype for a service called Park My Ride that provides a mobile interface for users to monitor and efficiently find parking near their destination.

#### Team Members

Alex Parenti - Computer Science  
Amanda Ward - Computer Science

#### Client/Sponsor

University of Idaho

#### Faculty Advisor

John Shovic, Computer Science

#### Team Members

Nick Avery - Computer Science  
Adam Odell - Computer Science  
Baylus Tunnicliff - Computer Science

#### Client/Sponsor

U of I Department of Computer Science

#### Faculty Advisor

Bruce Bolden, Computer Science

### MINECRAFT MODIFICATION FOR MODELING COMPUTER NETWORKS

Teaching the suite of communication protocols used to interconnect devices to the internet is a difficult task involving costly equipment and potential security risk. NetworkCraft is a modification for the popular block building video game Minecraft that can be used as a tool for modeling computer networks in a safe, virtual environment before purchasing expensive devices. By adding realistic devices and protocols to the game, this tool can be used to teach, research, and test network configurations.

### DEPTH AND VELOCITY MAPPING FOR THE VISUALLY IMPAIRED

Real-time stereo vision is used to calculate depths and speeds of objects that can then be transmitted to a visually impaired user via sound. There are not many resources in existence that assist visual disability, so our team is developing a mapping system that could be used in future innovations.

#### Team Members

Bailey Lind-Trefts - Mechanical Engineering  
Dustin Pierce - Computer Science  
Matthew Mills - Computer Science

#### Client/Sponsor

Dan Schneider

#### Faculty Advisor

Bruce Bolden, Computer Science

## Electrical and Computer Engineering

### LOW COST ELECTROENCEPHALOGRAPH TO TEACH STUDENTS ABOUT BRAIN SIGNALS

In order to better educate high school students about neuroscience, we are creating a low cost and easily reproducible electroencephalogram (EEG) with open source software. This allows teachers to be able to include an affordable EEG in their curriculum, as well as give students a valuable engineering opportunity and first-hand experience with brain signals.

#### Team Members

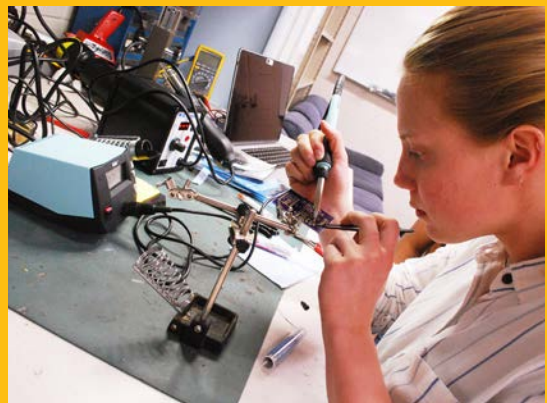
Allison Ellington - Electrical and Computer Engineering  
Corey Knapp - Electrical and Computer Engineering  
Yiting Gao - Electrical and Computer Engineering  
Ostin Arters - Biological Engineering

#### Client/Sponsor

U of I Department of Chemical and Materials Engineering

#### Faculty Advisor

Feng Li, Electrical and Computer Engineering



## SPEECH PATHOLOGY DATABASE TO HELP CHILDREN

Nearly 8 percent of children ages 4 to 12 require some sort of speech therapy. To make child speech data more accessible for therapy purposes, this project will provide an inexpensive and visually appealing tool for storing and searching data.

### Team Members

Hailey Johnson – Electrical and Computer Engineering  
Jordan Cates – Computer Science  
Wei Zhao – Computer Science

### Client/Sponsor

Micron

### Faculty Advisor

Feng Li, Electrical and Computer Engineering

## MAKING NASA DATA COLLECTION MORE SUSTAINABLE

Our project seeks to make data collection in space exploration more sustainable through two objectives. Our primary goal is to use consumer satellite phone modules to give satellites a constant internet connection, allowing them to stream data to Earth without the need for frequency licenses or expensive equipment. We are also building an aluminum capsule prototype intended to protect satellite electronics that normally burn up on reentry into the Earth's atmosphere.

### Team Members

Hunter Barnett – Computer Science  
Avery Brock – Electrical and Computer Engineering  
Hunter Kannianen – Mechanical Engineering  
Tim White – Mechanical Engineering  
Yi Yang – Electrical and Computer Engineering

### Client/Sponsor

NASA Idaho Space Grant Consortium, NASA Ames Research Center

### Faculty Advisor

Feng Li, Electrical and Computer Engineering



Playing with electronics and building stuff — it's what I do for fun, and it's going to be my career.

Avery Brock

SENIOR, ELECTRICAL AND  
COMPUTER ENGINEERING

## A LOW-COST, COMPACT ELECTROMAGNETIC RADIATION MEASUREMENT SYSTEM FOR IoT APPLICATIONS

Wireless communication devices are everywhere, and the number of Internet of Things (IoT) devices are on the rise. Conventional measurement systems have remained bulky, expensive, and difficult to use for average consumers. By sacrificing some accuracy, our team is developing a low-cost, portable system to allow consumers to see how their wireless devices are behaving, be it signal strength or overall antenna efficiency.

### Team Members

Zouning Dai – Electrical and Computer Engineering  
Thomas Parks – Electrical and Computer Engineering  
Hui Xie – Electrical and Computer Engineering  
Shuhan Zhang – Electrical and Computer Engineering

### Client/Sponsor

U of I Department of Electrical and Computer Engineering

### Faculty Advisor

Feng Li, Electrical and Computer Engineering

## UNIVERSITY POWER MEASUREMENT AND PLANNING

Using equipment from Schweitzer Engineering Laboratories, this team is building a framework for monitoring power flowing into the U of I from its two main power feeds. This equipment is capable of taking measurements more frequently than what is currently installed, and will lay the framework for the installation of a smart grid, which would open up the possibility for advanced energy monitoring, control and independence.

### Team Members

Daniel Allen – Electrical and Computer Engineering  
Jordan Chapman – Electrical and Computer Engineering  
Meng Liu – Electrical and Computer Engineering  
Yang Ge – Electrical and Computer Engineering  
Zhenyu Tang – Electrical and Computer Engineering

### Client/Sponsor

University of Idaho Facilities

### Faculty Advisor

Herb Hess, Electrical and Computer Engineering

## AUTOMATED DATA ACQUISITION SYSTEM FOR SYNCHRONOUS GENERATOR TRANSIENT

Researching power systems, like those that provide electricity to where we live, is imperative to consumer protection, improving system stability and minimizing equipment damage. Using a lab generator as a model, our team is developing an automated scheme to determine power generator parameters while they are in operation.

### Team Members

Abdulwahab Aljabrine – Electrical and Computer Engineering  
Elliott Sher – Electrical and Computer Engineering  
ZhenWei Wu – Electrical and Computer Engineering  
RenJie Xia – Electrical and Computer Engineering

### Client/Sponsor

Schweitzer Engineering Laboratories, U of I College of Engineering Department of Electrical and Computer Engineering

### Faculty Advisor

Feng Li, Electrical and Computer Engineering

## WIND-INDUCED CROP FAILURE DATA ACQUISITION PLATFORM

Wind-induced crop failure results in economic losses totaling tens of billions of dollars each year. A data acquisition computing platform has been designed that will enable researchers to understand this issue and breed more resilient crop varieties. The device features custom electronics hardware and embedded firmware, with an emphasis on design for manufacturability and reliability.

### Team Members

Kennedy Caisley – Electrical and Computer Engineering  
Ryan Donahue – Electrical and Computer Engineering

### Client/Sponsor

U of I Department of Mechanical Engineering

### Faculty Advisor

Daniel Robertson, Electrical and Computer Engineering

## NASA LOCAL POSITIONING SYSTEM

GPS is only available on Earth's surface, but space exploration demands accurate positioning on places like Mars. By substituting tethered weather balloons for satellites, and using similar radio signals to GPS, our team seeks to create a relatively cheap and easy to assemble method of tracking people, vehicles, and equipment in real time in an area without GPS access.

### Team Members

Andrew Petrehn – Mechanical Engineering  
Jonathan Preheim – Electrical and Computer Engineering  
Paul Dania – Electrical and Computer Engineering

### Client/Sponsor

NASA Office of Education, College of Engineering Department of Electrical and Computer Engineering

### Faculty Advisor

Feng Li, Electrical and Computer Engineering

## ELDERLY CARE MONITORING SYSTEM TO MAINTAIN PRIVACY

While elderly care requires a level of monitoring to ensure individual safety, maintaining a person's sense of privacy is also important. Using small, remotely accessible devices that do not use cameras, microphones or other intrusive methods, our team is building a prototype of small sensors to monitor appliances and actions within the household, including the opening and closing of doors and tracking the placement of objects like whether or not a vehicle is in the garage or not.

### Team Members

Jeremy Perhac – Electrical and Computer Engineering  
Fanghao Han – Electrical and Computer Engineering  
Yizhou Ye – Electrical and Computer Engineering  
Xiao Liu – Electrical and Computer Engineering

### Client/Sponsor

U of I College of Engineering Department of Electrical and Computer Engineering

### Faculty Advisor

Feng Li, Electrical and Computer Engineering

## SOLAR PANEL FEASIBILITY STUDY FOR THE UNIVERSITY OF IDAHO

This study will investigate the solar panel options available for installation on campus. Our team reviewed unique solar panel features to combine into a more versatile prototype. The final product will generate power at increased efficiencies and house an original LED display capable of a range of demonstrations.

### Team Members

Jesse Strange – Electrical and Computer Engineering  
Tavara Freeman – Electrical and Computer Engineering  
Violet Gomm – Electrical and Computer Engineering

### Client/Sponsor

U of I College of Engineering Department of Electrical and Computer Engineering

### Faculty Advisor

Feng Li, Electrical and Computer Engineering

## LOW-COST, HANDHELD SCATTEROMETER

Optical scatterometry is a method of characterizing bacteria, proteins, or other particulates by measuring the reflection or absorption of laser radiation passing through a sample. We have designed a handheld device for field, clinical, or research application, with a focus on cost, ease of use, and portability.

### Team Members

Jeremy Cram – Electrical and Computer Engineering  
Kodi Cumbo – Computer Science  
Jeremiah Rodgers – Electrical and Computer Engineering  
Weihang Wang – Electrical and Computer Engineering

### Client/Sponsor

K2 BioMicrosystems, LLC

### Faculty Advisor

Feng Li, Electrical and Computer Engineering

## CYBERSECURITY TEST-BED FOR POWER SYSTEMS

Partnering with Schweitzer Engineering Laboratories, our team will develop a dashboard to highlight cyberattacks on smart grid power systems. The dashboard will enhance cyber security research and help system operators detect and prevent vulnerabilities in power grids.

### Team Members

Tori Overholtzer – Computer Science  
Hayden Lepla – Computer Science  
Josue Espinosa Godinez – Computer Science  
Liyu Rao – Electrical and Computer Engineering  
Chen Yang – Electrical and Computer Engineering  
Jiajia Liu – Electrical and Computer Engineering

### Client/Sponsor

Schweitzer Engineering Laboratories

### Faculty Advisor

Feng Li, Electrical and Computer Engineering

## STABLE ENERGY TRANSACTIONS FOR HOMEOWNERS USING SOLAR PANELS

With the increase of homeowners generating their own power from solar panels, power flows are even more complex in a distribution system. Excess power is fed back into the system and can cause reverse power flow and line congestion. The team will develop a control approach that will enable transactions from homeowners while insuring the stability of the grid.

### Team Members

Matthew Springer – Electrical and Computer Engineering  
Joshua Ropp – Electrical and Computer Engineering  
Liwei Liu – Electrical and Computer Engineering  
Fan Meng – Electrical and Computer Engineering  
Zhiyu Chen – Electrical and Computer Engineering

### Client/Sponsor

U of I Department of Electrical and Computer Engineering

### Faculty Advisor

Feng Li, Electrical and Computer Engineering



## ADVANCED MULTI-ROTOR DRONE

Nearly every drone user wants to fly for as long and as far as possible, but current drone designs have limited battery life and inefficient power systems. Our team took a novel approach to this problem by designing a drone with a custom frame supported by a Mylar balloon to reduce weight, and a custom control system to maximize flight time and distance.

### Team Members

Preston Stephens – Electrical and Computer Engineering  
 Matthew Shryock – Electrical and Computer Engineering  
 Pengqiang Ge – Electrical and Computer Engineering  
 Caleb Smith – Mechanical Engineering  
 Makynzie Zimmer - Mechanical Engineering

### Client/Sponsor

Design Magnitude

### Faculty Advisor

Feng Li, Electrical and Computer Engineering



## SIMULTANEOUS SCADA CONTROL SYSTEM

With the continued automation of utility systems, teaching students how to operate equipment using supervisory control and data acquisition (SCADA), control systems that use computer and network data, is more important than ever. This team will develop a system to take what is currently being controlled manually and allow SCADA control simultaneously, so users can learn how both control systems work.

### Team Members

Kevin King– Electrical and Computer Engineering  
 Hui Ma – Electrical and Computer Engineering  
 Ziang Xu – Electrical and Computer Engineering

### Client/Sponsor

U of I Department of Electrical and Computer Engineering

### Faculty Advisor

Feng Li, Electrical and Computer Engineering

## SMART AND AFFORDABLE ANIMAL MONITORING SYSTEM

GPS-based animal monitoring systems for cattle and other livestock can be an economical and more humane alternative to more rudimentary fencing methods like barbed wire. Using a long-range, low-power radio receiver, our team is building a system that could work remotely in areas with no internet connection to keep animals in or out of a pre-determined area.

### Team Members

Yixun Qian - Electrical and Computer Engineering  
 Wenhao Chen - Electrical and Computer Engineering  
 Ziqi Zhang - Electrical and Computer Engineering  
 Dan Zhang - Electrical and Computer Engineering

### Client/Sponsor

U of I Department of Electrical and Computer Engineering

### Faculty Advisor

Feng Li, Electrical and Computer Engineering



“

To run technology, you have to know code. To learn code, you study computer engineering and computer science.

**Hailey Johnson**

**SENIOR, COMPUTER ENGINEERING**

”

## Mechanical Engineering

### MAPPING HYDROTHERMAL VENTS TO AID LONG-TERM GEOLOGICAL STUDY

The goal of this project is create a 2D temperature map for hydrothermal vents, areas where hot fluids exit the seafloor. Hydrothermal fluids affect ocean chemistry by raising volatile concentrations of hydrogen, metal and carbon content, but they are home to some of what is believed to be Earth's first lifeforms, who feed off these chemicals. Mapping allows geologists to study the long-term ocean chemistry and the ecosystems supported by the vents.

#### Team Members

Colton Artis – Mechanical Engineering  
Kiana Pitman – Electrical and Computer Engineering  
Brady Hislop – Mechanical Engineering

#### Client/Sponsor

U of I Department of Geological Sciences

#### Faculty Advisor

Dan Cordon, Mechanical Engineering

### WINDOW TINT ENERGY SAVING PERFORMANCE EVALUATION

An enormous amount of energy needed to heat and cool buildings is wasted as air escapes through window glass. Liquid NanoTint is a coating that claims to block most ultraviolet and infrared radiation rays with a minimal reduction in visibility. We applied Liquid NanoTint to the of U of I Golf Course Pro Shop to assess its effectiveness by measuring energy usage before and after application. Benefits will be presented in a real-time demonstration.

#### Team Members

Kendra Wallace – Materials Science and Engineering  
Russell Stein – Mechanical Engineering  
Oscar Lopez – Mechanical Engineering  
Chancler Vander Woude – Materials Science and Engineering

#### Client/Sponsor

DryWired, Avista

#### Faculty Advisor

Matthew Swenson, Mechanical Engineering

### CENTER OF GRAVITY MEASUREMENT DEVICE FOR SEL PRODUCTS

Schweitzer Engineering Laboratories invents, designs and builds digital relays that protect power grids around the world. To further increase the quality of their products and ability to do testing, they need to measure the relays' 3-dimensional center of gravity (CG) coordinate. CG coordinates of internal electrical components are difficult to measure, as components are very small and difficult to model. We designed a device that automatically measures the coordinate of SEL's products.

#### Team Members

Kendall Gray – Mechanical Engineering  
Kaleb Cartier – Electrical and Computer Engineering  
Eric Smead – Mechanical Engineering

#### Client/Sponsor

Schweitzer Engineering Laboratories

#### Faculty Advisor

Michael Maughan, Mechanical Engineering

### GESTURE-CONTROLLED ROBOTICS EXHIBIT AT DISCOVERY CENTER OF IDAHO

The Discovery Center of Idaho in Boise is looking to incorporate interactive exhibits that expose K-12 students to modern robotics technology. Our team is developing code for a robotic arm that can mimic the hand motions of a user to perform a number of sorting activities.

#### Team Members

Austyn Sullivan-Watson – Mechanical Engineering  
Zhihui Wang – Mechanical Engineering  
Chaeun Kim – Computer Science  
Evangelos Stratigakes – Computer Science

#### Client/Sponsor

Discovery Center of Idaho

#### Faculty Advisor

Steve Beyerlein, Mechanical Engineering



“Biological engineering is such an amazing intersection of all major fields of science. We are able to link living systems into engineering design.”

Carissa Hambidge

SENIOR, BIOLOGICAL ENGINEERING



## INL REMOTE VISUALIZATION SYSTEM FOR WORKING WITH RADIOACTIVE MATERIALS

Idaho National Laboratory is a national leader in nuclear energy research. Given the radioactive nature of the work, most research is conducted within isolated containment chambers using robotic handling equipment causing difficulties when viewing specimens. Our solution provides a remote visualization system, enabling real-time monitoring of several microscopy instruments.

### Team Members

Nick Sentieri – Mechanical Engineering  
David Severud – Mechanical Engineering  
Jack Armstrong – Materials Science and Engineering

### Client/Sponsor

Idaho National Laboratory

### Faculty Advisor

Matthew Swenson, Mechanical Engineering

## UNIVERSAL AIRPLANE TUG

Every day, airplanes are moved in and out of hangars, up gradients and through different surface conditions using airplane tugs. While airplane-specific tugs can be purchased, a universal tug that can move a variety of airplanes is not yet commercially available. We have developed a simple device that adapts to a variety of airplane tire sizes to move many different varieties.

### Team Members

Nick Locke – Mechanical Engineering  
Max Johnson – Mechanical Engineering  
Josh Frei – Mechanical Engineering  
Chase Anderson – Mechanical Engineering

### Client/Sponsor

Inceptus, Inc.

### Faculty Advisor

Matthew Swenson, Mechanical Engineering

## NIGHTFORCE OPTICS AUTOMATED THREAD BURNISHING

Nightforce Optics builds precision rifle scopes used by military, competition and long-range shooters. These scopes include optical adjustment mechanisms powered by lead screws, the threads of which are currently burnished by hand to maintain precision. Our job is to design, manufacture, and test an automated machine to improve precision and efficiency of the thread burnishing process.

### Team Members

Morgan Kerby – Mechanical Engineering  
Jake Elliott – Mechanical Engineering  
Tom White – Mechanical Engineering  
David Rutherford – Electrical and Computer Engineering

### Client/Sponsor

Nightforce Optics

### Faculty Advisor

Dan Cordon, Mechanical Engineering

## ROBOTIC TOTE EXTRACTION SYSTEM FOR AUTOMATED WAREHOUSES

Package delivery is becoming more and more automated as consumer demand grows. Companies often fulfill orders for merchandise that is stored in bins and accessed by computer-controlled robots. Up against demanding speed and accuracy requirements, our project demonstrates a new method for picking and placing tote bins from storage racks.

### Team Members

Aaron Burton – Mechanical Engineering  
David Kennedy – Mechanical Engineering  
Braden Sprenger – Mechanical Engineering  
Daniel Sorenson – Electrical and Computer Engineering

### Client/Sponsor

Bastian Solutions

### Faculty Advisor

Steven Beyerlein, Mechanical Engineering

## SMART CITY WATER SUSTAINABILITY

By 2025, water could be scarce for 1.8 billion people, and even more will be water-stressed. One human-caused source of water loss is the use of cooling towers by oil refineries and other chemical plants – some lose about 34,870 gallons per hour through evaporation. Our project is to design a data acquisition system for more accurate water evaporation estimates, making water loss mitigation designs possible.

### Team Members

Conal Thie – Mechanical Engineering  
Henry Hill – Computer Science  
Clarice Gentillon – Electrical and Computer Engineering

### Client/Sponsor

Itron, Inc., University of Idaho Facilities

### Faculty Advisor

Behnaz Rezaie, Mechanical Engineering

## INFECTION PREVENTION URINARY CATHETER

Catheter-associated urinary tract infections are the most common hospital-acquired infection, affecting 80 percent of patients receiving catheters and causing over 13,000 deaths in the U.S. each year. We are designing a catheter that will flush the urethra to rid the urinary tract of harmful bacterial buildup. This has the potential to save lives, millions of dollars in treatments, and provide peace of mind for patients.

### Team Members

Amy Macias – Biological Engineering  
Ed Hall – Mechanical Engineering  
Elena Tipton – Mechanical Engineering

### Client/Sponsor

U of I College of Engineering, U of I College of Business and Economics

### Faculty Advisor

Michael Maughan, Mechanical Engineering

## AERODYNAMIC JUMP AND BULLET STABILITY

It is difficult to manufacture small objects in high quantity that are both inexpensive and precise. When national outdoor product manufacturer Vista Outdoor makes bullets, accuracy and cost are imperative. To detect bullet imbalance, we invented a device that measures the location of the center of mass of any small object, so Vista Outdoor can conduct quality control checks to predict bullet accuracy.

### Team Members

Atticus Zborowski – Mechanical Engineering  
Dustan Paul – Mechanical Engineering  
Dustin Gross – Mechanical Engineering  
Geoffrey Wood – Mechanical Engineering

### Client/Sponsor

Vista Outdoor

### Faculty Advisor

Dan Cordon, Mechanical Engineering

## INDUSTRIAL BATTERY COOLING SYSTEM USING ELECTRIC VEHICLE TECHNOLOGY

Maintaining proper temperatures within batteries used to power electric vehicles is vital to optimizing performance and efficiency. We have developed a battery cooling system that will advance electric vehicle technology for use in industrial forklifts. Applying electric vehicle technology to more industries will lead to a lower fossil fuel dependency.

### Team Members

Beau Nuxoll – Mechanical Engineering  
Chase Dinning – Mechanical Engineering  
Christopher Standley – Mechanical Engineering  
Trevin Kretz – Mechanical Engineering

### Client/Sponsor

Hyster-Yale Materials Handling, Inc.

### Faculty Advisor

Matthew Swenson, Mechanical Engineering



## CIRCUIT BOARD TRAY EJECTOR MECHANISM

The force required to insert and eject SEL circuit board trays by hand currently raises ergonomic concerns, both in manufacturing and in the field. The goal is to design a cost-effective and vibration-tolerant mechanism that will reduce the required user force needed, making the process more user friendly and ergonomic.

### Team Members

Nikki Imanaka – Mechanical Engineering  
Jaime Ayala – Mechanical Engineering  
Emily Chambers – Mechanical Engineering  
Davis Hill – Mechanical Engineering

### Client/Sponsor

U of I College of Engineering

### Faculty Advisor

Steven Beyerlein, Mechanical Engineering

## U OF I ENGINE TESTING FACILITY IMPROVEMENTS

Our team is making improvements to U of I's engine testing facilities, with a focus on capturing synchronized data and processing it for engine calibration. Hardware and software have been implemented to conduct combustion analysis, and the cooling system design has been improved to allow increased engine use.

### Team Members

Ian Sullivan - Mechanical Engineering  
Jared Kellerer - Mechanical Engineering  
Benjamin DeRuwe - Mechanical Engineering

### Client/Sponsor

U of I Clean Snowmobile Challenge Team

### Faculty Advisor

Dan Cordon, Mechanical Engineering

## FEASIBILITY STUDY FOR THE STORAGE OF THERMAL ENERGY IN MINING FACILITIES

After closing a mine, massive reclamation efforts must be done to restore unusable land. Our project tested the feasibility of using these mining pits as storage for thermal energy from concentrated sunlight. The team built an apparatus to test the heat transfer of hot air moving through the waste rock typically used to fill the pits.

### Team Members

Emily Kliewer – Mechanical Engineering  
Jakob Hemphill – Mechanical Engineering

### Client/Sponsor

BiMBy Power Company, LLC

### Faculty Advisor

Behnaz Rezaie, Mechanical Engineering

## IMPROVING INSTALLATION OF AEROSPACE TUBING INSULATION

It is more prevalent than ever for commercial aircraft to use tubing with tight-fitting insulation to carry hydraulic fluid, compressed air, and fuel. Designed with stable and lightweight construction for manual handling, our team has prototyped novel tooling for installing insulation onto complex aerospace tubing. Our design reduces ergonomic risk to operators, reduces processing time, and improves production capacity.

### Team Members

Richard Baptista – Mechanical Engineering  
Isaac Fisher – Mechanical Engineering  
Kaleb Halen – Mechanical Engineering  
Michael Odell – Mechanical Engineering

### Client/Sponsor

The Boeing Company

### Faculty Advisor

Steven Beyerlein, Mechanical Engineering

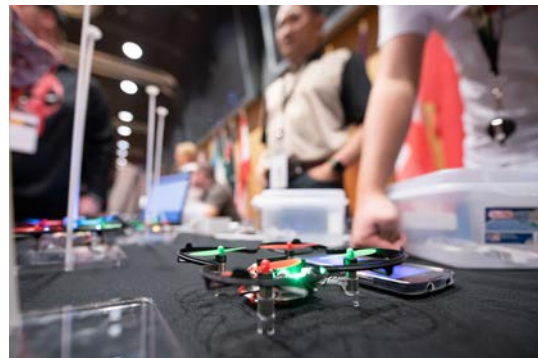
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- Introduce students to best practices in industry for design and manufacturing.

Projects for the year are identified, scoped and budgeted by Aug. 1.

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# DEVLIEG INNOVATION SCHOLAR PROJECTS

The following projects are supported by the DeVlieg Foundation, promoting educational experiences with emphasis in science, engineering, renewable energy and preservation of natural resources.

## Automated Plant Watering System

Avery Brock – Electrical Engineering  
Emily Chambers – Mechanical Engineering  
Joseph Dennison – Computer Engineering  
Kim Hyun – Computer Engineering  
Kaitlyn Lindholm – Biological Engineering  
Patrick Paulus – Mechanical Engineering  
Damon Schafer – Computer Science  
MacKenzie Sexton – Mechanical Engineering

Integrated directly into a plant's pot, this device dispenses water from a refillable reservoir when dry soil is detected. The device is WIFI-enabled to send alerts via email or Amazon Alexa when a battery recharge or water refill is needed.

## Robotic Arm

Melissa Curry – Virtual Technology and Design  
Jason Floyd – Electrical Engineering  
Brian Penney – Biological Engineering  
Jake Varney – Biological Engineering  
Katheryn Warner – Electrical Engineering

This team is building a soft robotics arm that can pick up an egg without breaking it. The arm will consist of a plastic exterior, a pneumatic system and a remote control system.

## INVENT IDAHO FINALISTS

Young inventors grades 1st through 8th are invited to EXPO each year to present their final competition projects. Learn more at [inventidaho.com](http://inventidaho.com).

**Rory Spurway** - "The Heated Playground"

**Carter Wallgren** - "iCaddie"

**Cole Andres** - "Pig Patch"

**Vibodh Ayyapureddi** - "Alzeron"



U of I College of Engineering Dean Larry Stauffer poses for a photo with the 2019 Invent Idaho Finalists.

## STUDENT CLUBS AT EXPO

Visit the following student clubs outside the International Ballroom at EXPO

### Grand Challenge Scholars Program

One of the only programs of its kind in the Pacific Northwest, preparing students to solve the 14 Grand Challenges of Engineering in the 21st century.

### Society of Women Engineers

Empowering women to succeed and be recognized for their achievements as engineers and leaders.

### Vandal Atmospheric Science Team

Allowing students to explore the challenges of near space engineering.

### SAE Clean Snowmobile Challenge Team

This team strives to make a clean, quiet and efficient snowmobile, while maintaining performance standards.

### Humanitarian Engineers Corps

Challenging students to design a water-supply system to provide clean water for the rural community of Karani, Bolivia.

### American Society of Mechanical Engineers

Meet industry professionals and take tours of major engineering companies around the northwest.



SAE Clean Snowmobile Challenge Team

# 2019 EXPO ORGANIZING COMMITTEE

For questions related to sponsorship, K-12 outreach and other ways you can get involved, please email [expo@uidaho.edu](mailto:expo@uidaho.edu) or contact an individual representative below.

## Event Management

- John Crepeau, 2019 EXPO Organizing Chair  
*Associate Dean for Undergraduates*  
[crepeau@uidaho.edu](mailto:crepeau@uidaho.edu)
- Sandy Spear, Alumni and Donor Relations Coordinator  
[sspear@uidaho.edu](mailto:sspear@uidaho.edu)
- Aarika Dobbins, Management Assistant  
[aarika@uidaho.edu](mailto:aarika@uidaho.edu)
- Patty Riedl, Administrative Coordinator  
[pattyr@uidaho.edu](mailto:pattyr@uidaho.edu)
- Sue Branting, Department Manager  
*Department of Computer Science*  
[sueb@uidaho.edu](mailto:sueb@uidaho.edu)

## Sponsorship

- Bobbi Hughes, Executive Director of Advancement  
[bhughes@uidaho.edu](mailto:bhughes@uidaho.edu)
- Chloe Rambo, Associate Director of Development  
[crambo@uidaho.edu](mailto:crambo@uidaho.edu)

## Senior Capstone Design Program

- Matt Swenson, Capstone Program Director  
*Assistant Professor, Mechanical Engineering*  
[swenson@uidaho.edu](mailto:swenson@uidaho.edu)
- Dan Cordon, Capstone Instructor  
*Clinical Faculty Assistant Professor, Mechanical Engineering*  
[dcordon@uidaho.edu](mailto:dcordon@uidaho.edu)

## EXPO Extended Experience

- Paulette House, Director of Student Services  
[phouse@uidaho.edu](mailto:phouse@uidaho.edu)
- Marie Wagner, Student Services & Programs Coordinator  
[mariew@uidaho.edu](mailto:mariew@uidaho.edu)

## Marketing & Communications

- Alexis Turner, Marketing & Communications Manager  
[alexisst@uidaho.edu](mailto:alexisst@uidaho.edu)
- Jenine Cordon, Web Coordinator  
[jenine@uidaho.edu](mailto:jenine@uidaho.edu)

## THANK YOU, COMMITTEE PARTNERS!

*Planning our Engineering Design EXPO is a yearlong activity that requires the collaboration, time and efforts of many. The 2019 EXPO Organizing Committee would like to thank the following for their partnership:*

- ArtBeat, Inc.
  - Best Western University Inn
  - Idaho Commons & Bruce M. Pitman Center Events and Support Services
  - Tri-State Outfitters
  - University of Idaho Creative Services
  - Vandals Catering at the University of Idaho
- ... and all the U of I colleges, departments, faculty, staff and students who made this event possible!*



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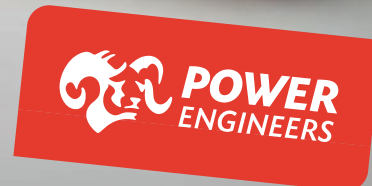
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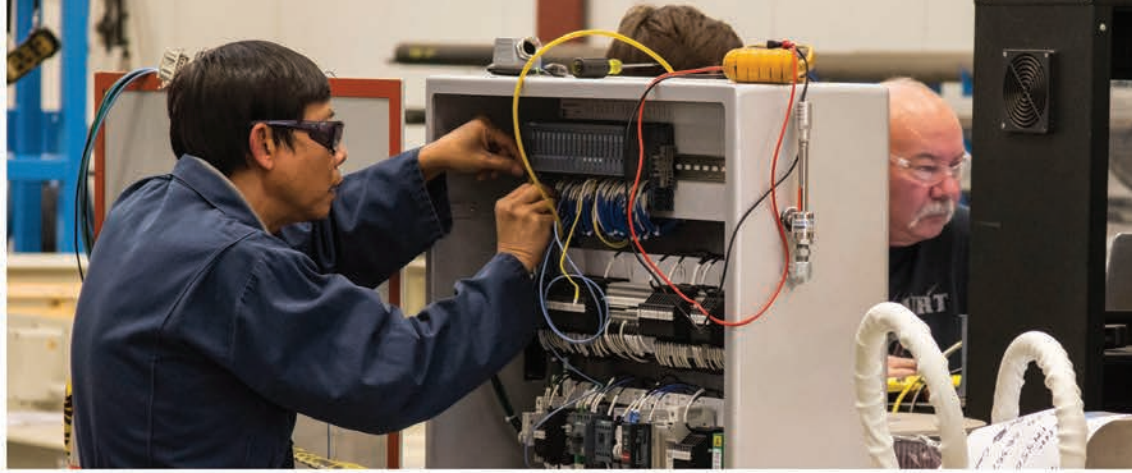
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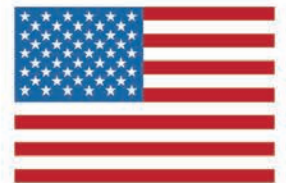
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