

XXIV
TwentyFourth
Annual

engineering • design
expo2017

the Northwest's Longest-Running Student Engineering Showcase

STUDENT PROJECTS AND DISPLAYS | TECHNICAL PRESENTATIONS | SPONSOR BOOTHS | KEYNOTE ADDRESS

ENGINEERING A

Prosperous Healthier Creative
Enjoyable Peaceful Awesome
Secure
Sustainable
Sustainable Exciting
Awesome Healthier
Connected Prosperous
Exciting
FUTURE

Presented by:

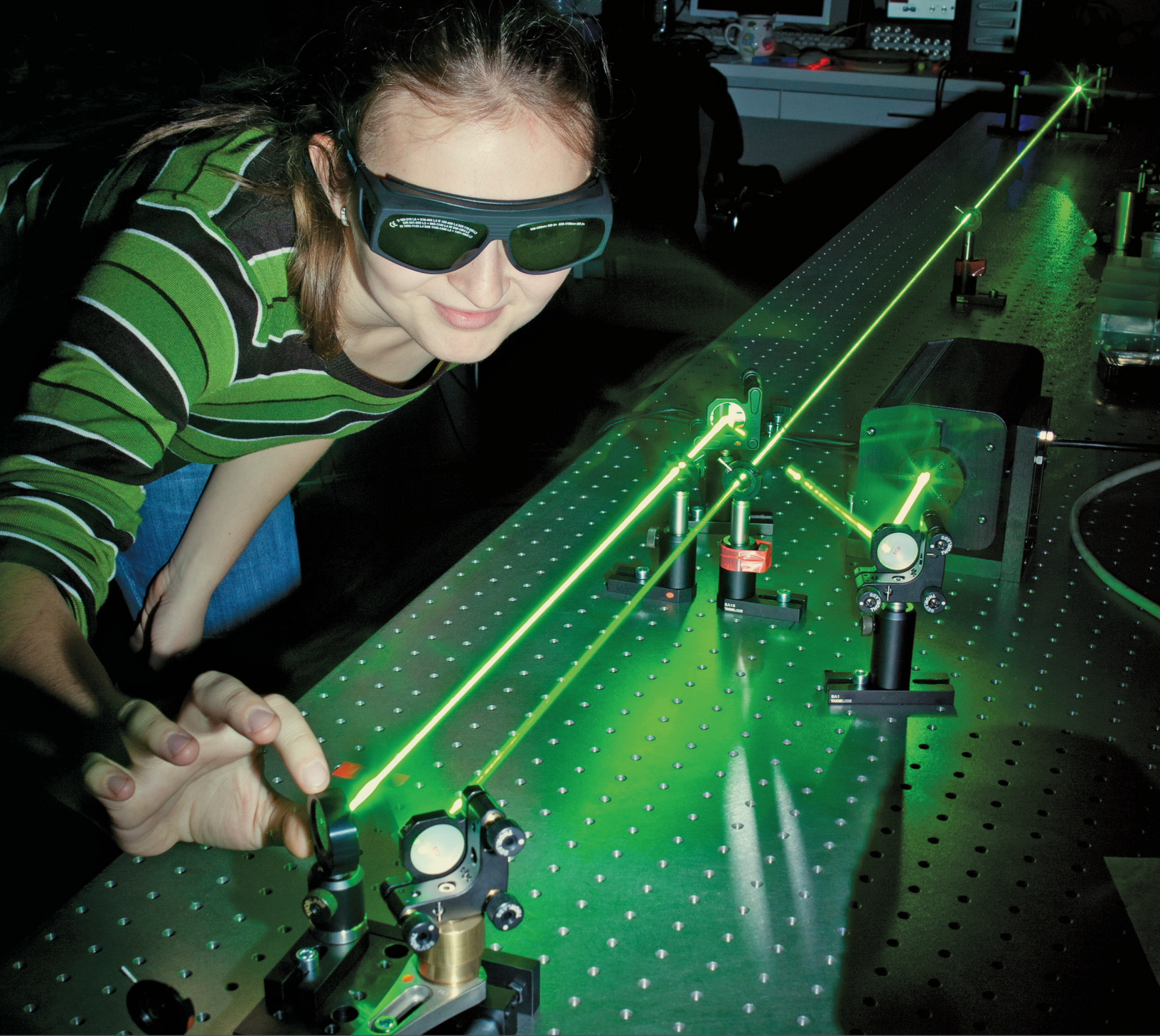


Engineering Outreach
at the University of Idaho

April 28, 2017

8:00 a.m. - 4:00 p.m. | Bruce M. Pitman Center

University of Idaho
College of Engineering



Official sponsors of tomorrow's tech



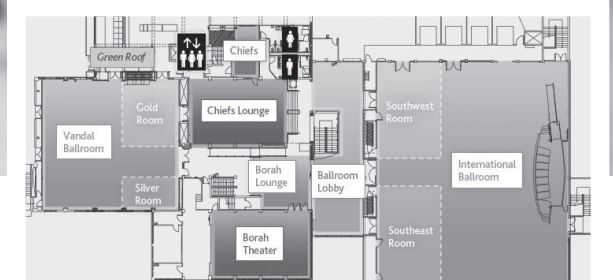
The Micron Foundation strives to build a strong community and promote robust education in the areas of science, technology, engineering and mathematics (STEM). Through our support of local non-profits, K-12 schools and universities, we support the communities where our employees live, work and volunteer.

We are proud to support students at the 2017 Engineering Design EXPO and the University of Idaho College of Engineering.



April 28

University of Idaho
Bruce M. Pitman Student Center
(Student Union Building)



SCHEDULE

STUDENT REGISTRATION AND SETUP

7 a.m. - 9 a.m.

International Ballroom 2nd Floor

EXPO INFORMATION

8 a.m. - 2 p.m.

Bruce M. Pitman Center 1st Floor

JUDGES BREAKFAST

7:30 a.m. - 8:15 a.m.

Vandal Ballroom 2nd Floor

JUDGES ORIENTATION

8:15 a.m. - 8:45 a.m.

Vandal Ballroom 2nd Floor

K-16 VISITOR REGISTRATION

8:30 a.m. - 11:30 a.m.

Bruce M. Pitman Center 1st Floor

OPENING CEREMONIES

8:45 a.m. - 9 a.m.

Bruce M. Pitman Center Foyer 2nd Floor

EXPO HALL OPEN

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

International Ballroom 2nd Floor

TECHNICAL PRESENTATIONS

9:20 a.m. - 12:20 p.m.

Vandal, Gold, Silver, Chiefs, Cataldo Rooms

CAPSTONE STUDENTS/EXPO PRESENTERS LUNCH

12:00 noon - 1:30 p.m.

International Ballroom 2nd Floor

JUDGES LUNCH

12:30 p.m. - 1:30 p.m.

Vandal Ballroom 2nd Floor

KEYNOTE SPEAKER: BRENT STACEY

2:30 p.m. - 3:30 p.m.

Vandal Ballroom 2nd Floor

AWARDS CEREMONY

3:30 p.m. - 4 p.m.

Vandal Ballroom 2nd Floor

THANK YOU

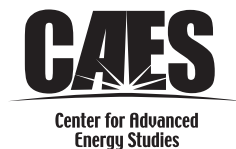
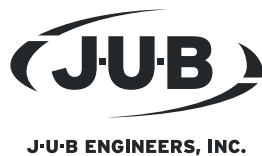
2017 ENGINEERING DESIGN EXPO SPONSORS

The University of Idaho, College of Engineering thanks all of our corporate and academic sponsors for their generous support of the 24th annual Engineering Design EXPO. We value and appreciate our sponsors' participation and continued commitment to engineering education and EXPO.

Corporate Presenting Sponsor:



Academic Presenting Sponsor:



Sponsorship Opportunities

Planning Engineering Design EXPO is a yearlong activity. To explore future opportunities to support the University of Idaho's Engineering Design EXPO contact Stacy Rauch, Associate Director of Development at 208-885-7978 or via email at srauch@uidaho.edu. We look forward to talking with you about how you can help support EXPO and our students.

Welcome to Engineering Design EXPO



It is my pleasure to welcome you to the 24th Annual Engineering Design EXPO, the longest-running exposition in the Pacific Northwest, showcasing senior engineering capstone projects. For more than 125 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 engineering students tackle real-world issues with the help of industry and academic partners. Our project sponsors provide the technical problems and our students provide solutions, gaining invaluable hands-on research and design experience in the process. It's a perfect match!

We have been hosting an exposition of our senior capstone projects for twenty-four years. Every year we make an effort to not only showcase our students' work but to do something different that demonstrates the importance of engineering to our world. This year we are focused on how our students are shaping the future. This past fall we established the Grand Challenges Scholars program – an academic program designed to prepare students to solve the 14 Grand Challenges of Engineering in the 21st century. Several of our Grand Challenge Scholars are featured in this program – and the program cover even includes the four key themes of the program which are: sustainability, security, health and joy of living. It is these students' work and the future work of all of our students, motivated by passionate faculty, which has the potential to make a difference in our world.

Over the years EXPO has grown in significance bolstering our educational process and our students' development. But it is not possible without the support of our industry partners and friends. We depend on their generous support to produce this quality event.

I want to specifically thank this year's corporate and academic presenting sponsors the Micron Foundation 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 that support EXPO activities from our K-16 Extended Experience program to providing meals for our judges and capstone students. Thank you to the Boeing Company, BP, the Center for Advanced Energy Studies, HP Inc., Idaho National Laboratories, Idaho Power, Itron, J-U-B Engineers, Lochsa Engineering, NASA Idaho Space Grant Consortium, Power Engineers, Schweitzer Engineering Laboratories and Wagstaff.

We are proud of the education and experiences that we provide to our students. As you visit EXPO I invite you to engage with our students to ask them about their projects and engineering designs, and to ask them about the future they hope to create.

Finally, I want to thank all of our faculty, staff, students, judges and industry and academic partners who have helped shape EXPO these past two decades. We look forward to celebrating the 25th anniversary of EXPO with you all next year.

Thank you for attending our event and your interest in our students' engineering excellence.

Sincerely,

Larry Stauffer, Dean
University of Idaho, College of Engineering

2017 EXPO KEYNOTE ADDRESS

Transforming the Nation's Approach to the Protection of Critical Infrastructure

Awareness of the growing cyber threat to our critical infrastructure is rapidly increasing within government and industry. A relevant question is: Can the nation quickly rally to the transformational changes necessary to protect our most critical infrastructure from a damaging cyber-attack? Brent Stacey will share a path forward and the important role engineers play in the transformation of critical infrastructure. He will also share the leadership and unique capabilities that INL brings to this grand national challenge.



BRENT STACEY

*Strategic Advisor National & Homeland Security
Idaho National Laboratory*



Keynote Address | 2:30 p.m. | Vandal Ballroom

THANK YOU

2017 Engineering Design EXPO Judges



Thank you to all of the individuals who have taken time to lend their expertise to serve as Engineering Design EXPO judges. Judges play an essential role in the EXPO experience. Our senior design students gain invaluable insights through their interaction with EXPO judges. To all of our 2017 EXPO judges, thank you for joining us today, your participation is greatly appreciated.

Edward Anderson - Battelle Energy Alliance
Ralph Barker - Hecla Ltd.
Amanda Battles - Clearwater Paper
Taylor Blanc - Schweitzer Engineering Laboratories
Pat Blount - Moscow High School
Pietro Boyd - Nightforce Optics
Myles Brown - The Boeing Company
Ed Cimbalik - Micron Technology
Jason Dearien - Schweitzer Engineering Laboratories
Raymond Dixon - University of Idaho
Dylan Dixon - Vista Outdoor
Byron Flynn - GE Energy Connections
Tom Gorman - University of Idaho
Alan Griffiths - Navy Acoustic Research Detachment
Bob Hallock - Retired
Yvonne Hallock - Retired
Gene Hamacher - TechHelp - UI
Chris Hazelton - Coffman Engineers, Inc.
Chad Heimbigner - Coffman Engineers, Inc.
Saied Hemati - University of Idaho
Gary Hermann - CH2M Hill and then Velsicol
David Hollenback - Berg Manufacturing

Christopher Hyde - University of Idaho
Dave Joerger - Idaho Power Company
Chris Jones - Self-employed
Kurran Kelly - BP
Krista Kinsey - Simplot
John Kumm - POWER Engineers
Lisa Lewis - Boise VA Medical Center
Jim Linford - Eagle Creek Consulting
Richard Maguire - Avista
Ken Mays - KMays Technical Services
Daniel Micheletti - Marvell Semiconductor Inc.
Tom Moore - Consultant
Nadine Morasci - Esterline Interface Technologies
Nicholai Olson - Tamarack Aerospace Group
Doug Overholtzer - Wagstaff, Inc.
Caitlin Owsley - Janicki Industries
Lyle Parks - Retired
Marc Patterson - Idaho Power
Tom Pfeiffer - Idaho National Laboratory
Behanz Rezaie - University of Idaho
Jonathan Richards - Schweitzer Engineering Laboratories
Kurt Ririe - Idaho National Laboratory

Burch Roark - Retired
Pete Robichaud - Rocky Mountain Research Station
Tracy Rolstad - Avista
Michael Schleich - Itron
Daniel Schneider - Schweitzer Engineering Laboratories
Anne Seifert - Idaho National Laboratory
Steve Silkworth - Avista
Charles Simon - The Boeing Company
Mark Sipe - Coffman Engineers, Inc.
Jamison Slippy - Quest Aircraft Company
Alistair Smith - University of Idaho
Eric Stubbs - Micron Technology
Todd Swanstrom - Western Trailer Co.
Mike Thompson - Wagstaff, Inc.
Dillon Turnbull - Schweitzer Engineering Laboratories
Trung Van - The Boeing Company
Ed Whitehead - Retired USN
Jeff Williams - Vista Outdoor
Cal Williams - The Boeing Company
Steven Yoon - The Boeing Company
Thomas Zysk - The Boeing Company

College of Engineering Advisory Board

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Herrera Environmental
Engineer
Director of Engineering



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KMays Technical
Services
Owner



TERRY PRECHT
Vergent Products, Inc.
President & CEO



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Schweitzer
Engineering
Laboratories
*Vice President, National
Operations*



TRACY ROLSTAD
Avista
*Senior Power System
Consultant*



PAUL HUBER
Boeing Commercial
Airplanes
*737 Strategy Program
Engineering Leader*



JOHN MURPHY
Glanbia Foods, Inc.
Director of Engineering



MICHAEL SCHLEICH
Itron
*Vice President Product
Management*



DAVE JOERGER
Idaho Power
General Manager



DAVID NELSON
Soteica Visual MESA,
LLC
Chief Technology Officer



MIKE SIMON
Creation Logic LLC
Chief Technical Scientist



BRENT KEETH
Micron Technology, Inc.
*Senior Fellow-Advanced
DRAM Architectures*



REMY NEWCOMBE
Rainier Patents
Patent Agent



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PE-GeoTek, Inc.
Board Chair



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Business Unit Director



JEFF OSTERMAN
CH2M HILL
*Business Development
Manager*



ROD LINJA
Keller Associates, Inc.
President



TOM M. PFEIFFER
Idaho National
Laboratory
*Engineering Manager,
Materials and Fuels
Complex Research
Division*



About the College of Engineering Senior Capstone Program

The University of Idaho's College of Engineering interdisciplinary senior capstone program is the foundation of our annual Engineering Design EXPO event. The program has evolved over its long history to become a catalyst for local and regional engineering design development. Our capstone program evolution 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. As a result Engineering Design EXPO has become the Pacific Northwest's longest running engineering showcase and a signature event for the University of Idaho. Engineering Design EXPO is a unique opportunity for senior students to share the results of their team projects with the public, elementary and high school students, alumni, and industry partners.

THE SIX CORE VALUES 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.

2017 EXPO Project Advisers

BIOLOGICAL ENGINEERING

- Dev Shrestha

CHEMICAL AND MATERIALS ENGINEERING

- Matthew Bernards
- David Drown
- Dean Edwards
- James Moberly
- Mark Roll

CIVIL ENGINEERING

- Erik Coats
- Patricia Colberg
- Fritz Fiedler
- Ahmed Ibrahim
- Jim Liou
- Emad Kassem
- J.J. Petersen

COMPUTER SCIENCE

- Greg Donohoe
- Bruce Bolden

ELECTRICAL AND COMPUTER ENGINEERING

- Herbert Hess
- Brian Johnson
- Feng Li
- Ata Zadehghol

MECHANICAL ENGINEERING

- Steve Beyerlein
- John Crepeau
- Ankit Gupta
- Gautam Kumar
- Dan Cordon
- Michael Maughan
- Edwin Odom
- Joel Perry
- Behnaz Rezaie
- Tao Xing

PHYSICS

- Christine Berven
- Jacob Turner

CONGRATULATIONS TO ALL OF OUR UI ENGINEERING SENIOR DESIGN EXPO STUDENTS!

We congratulate you on a job well done and wish you the best as you engineer your future.

Freda Agbecha - Civil Engineering
Alexa Aguilar - Electrical & Computer Engineering
Nayef Alazemi - Chemical & Materials Engineering
Fawaz Alharbi - Mechanical Engineering
Muhannad Alhasan - Civil Engineering
Mazen Aljawi - Biological Engineering
Kyle Allen - Civil Engineering
Mohammed Almonseef - Electrical & Computer Engineering
Waleed Almotairi - Electrical & Computer Engineering
Suliman Alrashidi - Electrical & Computer Engineering
Austin Amrein - Electrical & Computer Engineering
Sierra Anderson - Civil Engineering
Marcelino Arteaga - Mechanical Engineering
Cooper Atkinson - Mechanical Engineering
Tessa Aus - Electrical & Computer Engineering
Nicholas Bachus - Mechanical Engineering
Lucio Barajas - Mechanical Engineering
Bryan Barret - Biological Engineering
Zachary Beaman - Chemical & Materials Engineering
Jacob Bechler - Electrical & Computer Engineering
Joshua Begay - Biological Engineering
Kevin Benzing - Computer Science
Adonay Berhe - Electrical & Computer Engineering
Jonathan Bessler - Chemical & Materials Engineering
Zachary Bjorklund - Electrical & Computer Engineering
Ben Bjornson - Chemical & Materials Engineering
Jeffrey Blankinship - Civil Engineering
Nathan Bliesner - Electrical & Computer Engineering
Marshall Bolen - Mechanical Engineering
Evan Bonar - Mechanical Engineering
Jacob Bonwell - Chemical & Materials Engineering
Richard Boss - Computer Science
Michael Botterbusch - Mechanical Engineering
Byron Bowles - Mechanical Engineering
David Brands - Civil Engineering
Anthony Branz - Mechanical Engineering
Michael Braun - Electrical & Computer Engineering
Robert Breckenridge - Computer Science
Brandon Brewster - Computer Science
Sheila Briggs - Chemical & Materials Engineering
Casey Bryant - Civil Engineering
Matthew Buchanan - Mechanical Engineering
Devin Burgess - Civil Engineering
Ry Butler - Civil Engineering
Chris Campbell - Computer Science
Brian Cartwright - Computer Science
Rick Castleton - Civil Engineering
Connor Chapek - Chemical & Materials Engineering
Kevin Christopher - Chemical & Materials Engineering
Jace Courtright - Mechanical Engineering
Daniel Cox - Mechanical Engineering
Daniel Craig - Electrical & Computer Engineering
Alexandre Crozes - Civil Engineering
Mattie Cupps - Chemical & Materials Engineering
Matt Daniel - Computer Science
James Daschel - Chemical & Materials Engineering
Andrew Davies - Electrical & Computer Engineering
Taylor Davis - Chemical & Materials Engineering
Jesus De La Cruz - Electrical & Computer Engineering
Brooke Deans - Mechanical Engineering
Ashley DeBie - Chemical & Materials Engineering
Scott Dennis - Computer Science
Ajay Dillon - Civil Engineering
Jacob Dolan - Electrical & Computer Engineering
Shane Doll - Mechanical Engineering
Austin Doutré - Mechanical Engineering
Carter Drake - Mechanical Engineering
Carter Drake - Mechanical Engineering
Jacquelyn Duffau England - Electrical & Computer Engineering
Bill Duncan - Mechanical Engineering
Chad Dunkel - Biological Engineering
Kade Dustin - Civil Engineering
Ian Ehram - Chemical & Materials Engineering
Aaron Eliason - Mechanical Engineering
Maxwell Emerson - Mechanical Engineering
Alyssa Ertel - Chemical & Materials Engineering
Karina Eyre - Civil Engineering
Mason Fabel - Computer Science
Nick Ferguson - Mechanical Engineering
Scout Ferguson - Mechanical Engineering
Margaret Fitzgerald - Chemical & Materials Engineering
Kyle Flack - Mechanical Engineering
Nicole Fletcher - Biological Engineering
Jesse Frantzich - Computer Science
Selso Gallegos - Mechanical Engineering
Daniel Gentile - Electrical & Computer Engineering
Blake Gerling - Civil Engineering
Christina Gibbs - Biological Engineering
Max Gilmore - Computer Science
Gretchen Gingerich - Biological Engineering
Alex Gomez - Mechanical Engineering
Kelie Gonzalez - Biological Engineering
Nathan Groggett - Electrical & Computer Engineering
Zach Hacker - Mechanical Engineering
Peter Haley - Mechanical Engineering
Tala Hamadah - Chemical & Materials Engineering
Peter Handel - Mechanical Engineering
David Handy - Electrical & Computer Engineering
David Handy - Electrical & Computer Engineering
John Hansen - Mechanical Engineering
Brian Hanson - Biological Engineering
Jonathan Hanson - Electrical & Computer Engineering
Mathew Harlow - Mechanical Engineering
Taylor Hart - Civil Engineering
Konrad Hausmann - Chemical & Materials Engineering
Quenton Heath - Chemical & Materials Engineering
Anne Heiner - Civil Engineering
Elizabeth Hernandez - Computer Science
Meghann Hester - Mechanical Engineering
Eric Hill - Mechanical Engineering
Parker Hill - Mechanical Engineering
Jesse Hinshaw - Chemical & Materials Engineering
Jacob Hopkins - Civil Engineering
Andrew Hoth - Electrical & Computer Engineering
Joshua Howard - Mechanical Engineering
Kyle Hubbell - Chemical & Materials Engineering
Jennifer Hunt - Electrical & Computer Engineering
Alex Inskip - Electrical & Computer Engineering
Sean M. Instasi - Chemical & Materials Engineering
Brandon Jank - Computer Science
Justin Jeter - Electrical & Computer Engineering
Caleb Jo - Mechanical Engineering
Dylan Johann - Mechanical Engineering
Erin Johnson - Chemical & Materials Engineering
Nic Johnson - Chemical & Materials Engineering
Andrew Jones - Electrical & Computer Engineering
Phil Kearns - Electrical & Computer Engineering
Matthew Kirkland - Computer Science
Nick Krenowicz - Electrical & Computer Engineering
Kyle Krieg - Electrical & Computer Engineering
Charles Krueger - Mechanical Engineering
Tyler Larson - Electrical & Computer Engineering
Trevor Livingston - Mechanical Engineering
Colin Lunstrum - Chemical & Materials Engineering
Jordan Lynn - Computer Science
David Lytle - Chemical & Materials Engineering
Kat MacDonald - Civil Engineering
Jared Mahoney - Electrical & Computer Engineering
Patrick Mahoney - Chemical & Materials Engineering
Eric Marsh - Computer Science
Dakota McDaniel - Mechanical Engineering
Brett McKinnon - Chemical & Materials Engineering
Scott McMurdie - Electrical & Computer Engineering
Skyler Means - Civil Engineering
Forrest Garret Miller - Chemical & Materials Engineering
Brandon Morford - Computer Science
Joe Morris - Mechanical Engineering
Shea Morrison - Electrical & Computer Engineering
Tanner Mort - Electrical & Computer Engineering
David Mortin - Electrical & Computer Engineering
Lorraine Mottishaw - Chemical & Materials Engineering
Kyro Murray-Gann - Mechanical Engineering
Nathan Myers - Chemical & Materials Engineering
Brandon Nafsigner - Electrical & Computer Engineering
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Zachary Nepute - Civil Engineering
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Nick Pica - Chemical & Materials Engineering
David Pick - Mechanical Engineering
Ben Plaster - Chemical & Materials Engineering
Erin Poor - Civil Engineering
Austin Porter - Chemical & Materials Engineering
Autumn Pratt - Mechanical Engineering
Hue Purkett - Computer Science
Justin Puryear - Mechanical Engineering
Austin Quinn - Civil Engineering
Kevin Ramirez - Civil Engineering
Cristobal Ramos Salazar - Civil Engineering
Brandon Ratcliff - Computer Science
Brian Remsen - Mechanical Engineering
James Rockwell - Mechanical Engineering
Daniel Schlittler - Mechanical Engineering
Chad Schluter - Civil Engineering
Adam Sedgewick - Mechanical Engineering
Will Seegmiller - Mechanical Engineering
Courtney Sell - Civil Engineering
Adam Seubert - Electrical & Computer Engineering
Geordan Skyles - Civil Engineering
Cody Smisek - Mechanical Engineering
Caleb Smith - Mechanical Engineering
David Smith - Mechanical Engineering
John Snevily - Computer Science
Tyler Songstad - Computer Science
Brendan Souvenir - Electrical & Computer Engineering
Ken Speers - Mechanical Engineering
Zachary Spence - Computer Science
Brenden Staab - Biological Engineering
Robert Stewart - Computer Science
James Sutton - Mechanical Engineering
Ian Tanimoto - Computer Science
Craig Tedmon - Mechanical Engineering
Emily Tesnohlidek - Chemical & Materials Engineering
Drew Thompson - Mechanical Engineering
Elli Tindall - Chemical & Materials Engineering
Juvy Jane Tongco - Mechanical Engineering
Kadeem Torgeson - Civil Engineering
Taylor Tosaya - Mechanical Engineering
Nathan Totorica - Electrical & Computer Engineering
Jordan Trapp - Civil Engineering
Connor Trulock - Mechanical Engineering
Lexi Turkenburg - Electrical & Computer Engineering
Jay Van Gerpen - Electrical & Computer Engineering
Jordan Vilcapoma - Electrical & Computer Engineering
Geoffrey VonBargen - Electrical & Computer Engineering
Amanda Vu - Chemical & Materials Engineering
Grant Wade - Computer Science
Nathan Wagner - Mechanical Engineering
Jessica Waller - Civil Engineering
Stephen Walters - Mechanical Engineering
Shane Warmbrodt - Civil Engineering
Blake Warner - Mechanical Engineering
Kristen Wells - Electrical & Computer Engineering
Donn Werner - Computer Science
Tygh Weyand - Mechanical Engineering
Jack Williams - Chemical & Materials Engineering
Sarah Willis - Mechanical Engineering
Joel Wilson - Biological Engineering
Andrew Wisniewski - Chemical & Materials Engineering
Sam Wolfe - Chemical & Materials Engineering
Mark Woodland - Mechanical Engineering
Trevor Woodland - Chemical & Materials Engineering
Dominic Zaccardi - Civil Engineering
Atticus Zborowski - Mechanical Engineering

2016 EXPO TECHNICAL PRESENTATIONS

Technical presentations are approximately 15 minutes and will take place in multiple locations in the Bruce M. Pitman Center between 9 a.m. and 12 noon. (Chief's Room, Vandal Ballroom, Silver Room, Gold Room and Cataldo Room). Exact times will be posted.

Biological Engineering

SILVER ROOM

11:20 a.m. – 12:20 p.m.

- Aquatic Weed Removal
- Seed Storage Tube
- Tendon Strain Apparatus

Computer Science

GOLD ROOM

11:20 a.m. – 12:20 p.m.

- Interactive Kiosk for College of Engineering
- Snare Drum Notator
- Technology Readiness Tracker

Chemical and Materials Engineering

GOLD ROOM

9:20 a.m. – 11:20 a.m.

- Waste Heat Harvesting with Liquid Gallium
- Passive Solar Distillation of Acid Rock Drainage Water
- IMC-based Humidification Control for Vapor Sorption Analyzers
- Optimization of Silicon Rubber Mold Production
- Degradable Concrete to Cap Mine Tailings

Electrical and Computer Engineering

CATALDO ROOM

10:40 a.m. – 12:20 p.m.

- High Speed Stator Design for Flywheel Energy Storage System
- Inter-Turn Fault Detection for Air Core Reactors
- Ridium 9523 Satellite Modem Development Platform
- Lunar Flywheel Controls
- RF Energy Harvesting

Chemical and Materials Engineering

SILVER ROOM

9:40 a.m. – 11:20 a.m.

- The Internet of Things: Watering the Future
- The Coffee Roasters
- Hoofbath Copper Recovery
- Kuzco Hoof Bath
- Hot to Pot: Geothermal Water Sources for Drinking Water
- Porous Wall Hollow Glass Microspheres

Mechanical Engineering

CHIEF'S ROOM

9:20 a.m. – 12:20 p.m.

- 3D Metal Printer
- Clean Snowmobile Challenge Team
- Clean Snowmobile Muffler Team
- H2Only
- Single Cylinder Engine Design and Optimization
- Titanium Fitting Sorting
- Waste Heat Management

Civil Engineering

VANDAL BALLROOM

9:20 a.m. – 12:20 p.m.

- Coeur d'Alene Outdoor Classroom and BMP Design Project
- Downtown Boise Transportation Project
- Lees Ferry Water Treatment Plant
- Mill Creek Channel Stabilizer Modification for Low-Flow Fish Passage
- Page Wastewater Treatment Plant Upgrade
- Paradise Pathway US 95 Underpass
- Pullman-Moscow Regional Airport Runway Realignment
- Sunset Swim Center Previous Concrete Parking Lot
- The Pointe at Post Falls

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OF CIVIL ENGINEERS



BORAH THEATER - EXPO SHOWTIMES:

9:45 a.m. | 10:30 a.m. | 11:45 a.m. | 12:30 p.m. | 2:00 p.m.

Engineering Design EXPO Student Projects

3D METAL PRINTER

We are creating a prototype 3D metal printer using MIG welding technology in order to bring the cost of 3D printing metal down and deliver access to academia and the home user.

Sponsor: Mike Maughan

Sponsor Organization: Department of Mechanical Engineering

Team Members:

Matthew Buchanan - Mechanical Engineering

Maxwell Emerson - Mechanical Engineering

Peter Haley - Mechanical Engineering

Kyle Krieg - Electrical & Computer Engineering

Jay Van Gerpen - Electrical & Computer Engineering

Nathan Wagner - Mechanical Engineering

Faculty Adviser(s): Mike Maughan

AQUATIC WEED REMOVAL

Team Nemo is seeking a solution to the excessive weed growth in the University of Idaho Arboretum ponds. The ideal solution will both address the immediate problem and improve the long-term health of the pond. Based on the needs of the arboretum caretakers, we are focusing on creating a scaled-down remote control version of larger weed harvesting boats. This will provide caretakers the ability to cut back growth immediately, and by removing biomass it will reduce the nutrient overload which is causing the problem.

Sponsor: Paul Warnick

Sponsor Organization: Arboretum Associates

Team Members:

Bryan Barret - Biological Engineering

Nicole Fletcher - Biological Engineering

Autumn Pratt - Mechanical Engineering

Stephen Walters - Mechanical Engineering

Sarah Willis - Mechanical Engineering

Faculty Adviser(s): Dev Shrestha

Mentor(s): James Founds

AMERICAN SOCIETY OF CIVIL ENGINEERS (ASCE) CONCRETE CANOE AND STEEL BRIDGE TEAMS

Civil engineering ASCE students will display the concrete canoe and the steel bridge they built recently for the annual ASCE student competitions.

Sponsor Organization: Department of Civil Engineering

Team Members:

ASCE civil engineering students

Faculty Adviser(s): Ahmed Ibrahim, S. J. Jung

AUTOMATED BURNISHING MACHINE

Our goal is to design and prototype an automated burnishing stand for Night-Force Optics that is adjustable to different turret models, this stand must be simple to operate and capable of burnishing to a specified torque and backlash. This machine will automate a process that is currently a manually completed by employees.

Sponsor: Pietro Boyd

Sponsor Organization: Night-Force Optics

Team Members:

Fawaz Alharbi - Mechanical Engineering

Kyle Flack - Mechanical Engineering

Selso Gallegos - Mechanical Engineering

Blake Warner - Mechanical Engineering

Faculty Adviser(s): Daniel Cordon, Steven Beyerlien

Mentor(s): Jacob Giles

CLEAN SNOWMOBILE CHALLENGE TEAM

The University of Idaho Clean Snowmobile Team is comprised of both undergraduate and graduate students. We design, build, and test a snowmobile then compete with it at the SAE Clean Snowmobile Challenge. The object of the challenge is to reduce emissions and quiet the snowmobile while maintaining reliability and performance.

Sponsor Organization: Department of Mechanical Engineering & NIATT

Team Members:

Zac Avelar - Mechanical Engineering

Ben DeRuwe - Mechanical Engineering

Phoenix Duncan - Mechanical Engineering

Aaron Eliason - Mechanical Engineering

Brian Gift - Computer Engineering

Hayden Hulse - Mechanical Engineering

Alex Kiss - Mechanical Engineering

Zach Lipple - Mechanical Engineering

Jason Maas - Mechanical Engineering

Leland Maris - Agricultural Systems Management

Patrick Paulus - Mechanical Engineering

Adam Sedgwick - Mechanical Engineering

Cade Smith - Mechanical Engineering

Ian Sullivan - Mechanical Engineering

Joseph Tucker - Mechanical Engineering

Adam Thurgood - Mechanical Engineering

Mark Woodland - Mechanical Engineering

Faculty Adviser(s): Dan Cordon

Mentor(s): Dillon Savage

CLEAN SNOWMOBILE MUFFLER TEAM

Working as a sub-team on this year's competition sled, we designed, manufactured, and validated a muffler that is quieter than stock without imposing power losses.

Sponsor: Clean Snowmobile Challenge Team

Sponsor Organization: Society of Automotive Engineers

Team Members:

Marcelino Arteaga - Mechanical Engineering

Aaron Eliason - Mechanical Engineering

Adam Sedgwick - Mechanical Engineering

Mark Woodland - Mechanical Engineering

Faculty Adviser(s): Dan Cordon

Mentor(s): Dillon Savage

COEUR D'ALENE OUTDOOR CLASSROOM AND BMP DESIGN PROJECT

Team will present an original design for a combination outdoor classroom and stormwater best management practices demonstration site.

Sponsor: Jim Ekins

Sponsor Organization: City of Coeur d'Alene

Team Members:

Blake Gerling - Civil Engineering

Kat MacDonald - Civil Engineering

Kadeem Torgeson - Civil Engineering

Faculty Adviser(s): Fritz Fiedler, Ahmed Ibrahim, Emad Kassem

Mentor(s): Sandra Raskell, Kim Harrington

DEGRADABLE CONCRETE TO CAP MINE TAILINGS

Mine tailings (residual minerals from ores) are collected in large piles next to mining sites. However, mine tailings are hazardous to humans and crops. An agglomerated ½" to 1" cover will retain water away from the mine tailings, preventing heavy metal poisoning. A degradable cement cover infused with plant materials, diammonium phosphate, and magnesium chloride will agglomerate the mine tailings and prevent water leakage until the space is naturally reclaimed. The abundant source of plant nutrition allows plants to grow through the cement, providing natural, green containment years after the cement has degraded.

Sponsor Organization: NMSU Institute for Energy and the Environment

Team Members:

Forrest Garret Miller - Chemical & Materials Engineering

Lorraine Mottishaw - Chemical & Materials Engineering

Amanda Vu - Chemical & Materials Engineering

Faculty Adviser(s): David Drown, Matthew Bernards

ENGINEERING A FUTURE



That Models Critical Human Systems

Gabryel Conley Natividad is a Grand Challenge Scholar in his first year double-majoring in biological engineering with a biomedical focus and electrical engineering. Gabryel works in the UI Neurophysiological Imaging and Modeling Laboratory where he plans to complete a model of the Cerebrospinal Fluid System of the spine and brain. He recently published a paper on his research. Gabryel's ambition is to apply his engineering education and experience to help those in need.

BIOLOGICAL ENGINEERING

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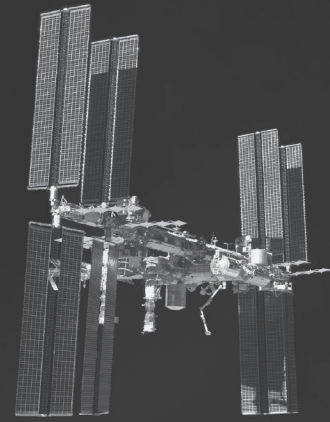
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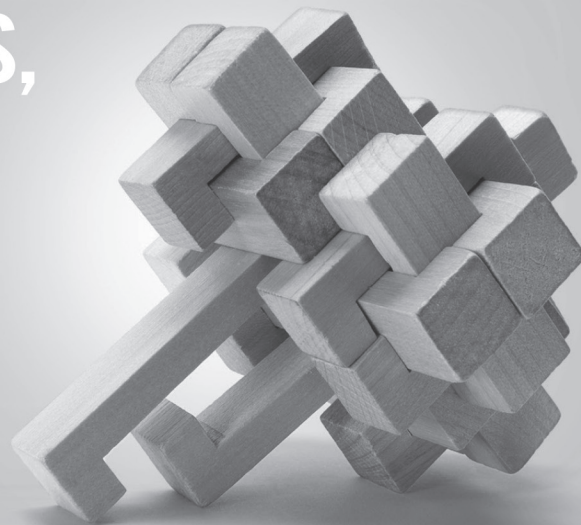


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Engineering Design EXPO Student Projects

DESIGN INTENT

This project is an exploration of the essence of design, where we focus on the why as well as the how of design. Areas of inquiry include woodworking, dress forms, kinematics, mobility, and manufacturing.

Sponsor Organization: Department of Mechanical Engineering

Team Members:

Shane Doll - Mechanical Engineering
Carter Drake - Mechanical Engineering
Meghann Hester - Mechanical Engineering
Eric Hill - Mechanical Engineering
Dakota McDaniel - Mechanical Engineering
Autumn Pratt - Mechanical Engineering
James Rockwell - Mechanical Engineering
Connor Trulock - Mechanical Engineering
Blake Warner - Mechanical Engineering
Sarah Willis - Mechanical Engineering

Faculty Adviser(s): Edwin Odom

Mentor(s): Coleton Bailey, Alex Olson

DEVICE FINDER

The goal of this project is to develop a hardware/software product to enable large organizations to locate "lost" printers. A large organization may have hundreds of printers, scattered around many acres of facilities, connected to a local area network or the Internet. Occasionally these printers go missing: they break down, are physically moved, or become disconnected from the network, and are very difficult to track down. A product is required that operates outside the company network to contact these printers and have them report their status and location.

Sponsor: Shawn Pratt

Sponsor Organization: Hewlett Packard

Team Members:

Michael Braun - Electrical & Computer Engineering
Jesse Frantzich - Computer Science
Grant Wade - Computer Science

Faculty Adviser(s): Greg Donohoe

DEVLIEG EMG ELECTROMYOGRAPHY CONTROLLED FLIGHT

Our goal was to control the flight of a quadcopter through basic movements rather than a controller. This started with the idea to use muscle signals for control but expanded to an accelerometer and potentially surface brain signals.

Sponsor Organization: The Devlieg Foundation

Team Members:

Phil Kearns - Electrical & Computer Engineering
David Mortin - Electrical & Computer Engineering
Cameron Murdock - Electrical & Computer Engineering
Kiana Pitman - Electrical & Computer Engineering
Jared Reichle - Electrical & Computer Engineering
Kierra Ryan - Mechanical Engineering
Sam Schaffer - Electrical & Computer Engineering
Nick Shaber - Mechanical Engineering
Marshall Townsend - Mechanical Engineering

Faculty Adviser(s): Jonathan Petersen

DEVLIEG RAMJET ROCKET PROTOTYPE

Rockets and rocket models will be displayed.

Sponsor Organization: The Devlieg Foundation

Team Members:

Kevin Brewer - Mechanical Engineering
Phillip Hagen - Electrical & Computer Engineering
Jacob Frost - Mechanical Engineering
Daniel Furman - Mathematics
Shelby Linafelter - Electrical & Computer Engineering
Bailey Lind-Trefts - Mechanical Engineering
Patrick Paulus - Mechanical Engineering

Faculty Adviser(s): Rick Fletcher, John Crepeau

DEVLIEG ROCKET PROPULSION RESEARCH

Project focusing on computational fluid dynamics and design verification for an integrated ramjet rocket and a solid fuel rocket booster.

Sponsor Organization: The DeVlieg Foundation

Team Members:

Chase Anderson - Mechanical Engineering
Brian Guiana - Electrical & Computer Engineering
Shelby Linafelter - Electrical & Computer Engineering
Sam Malinowski - Mechanical Engineering
Patrick Paulus - Mechanical Engineering
Paden Putnam - Mechanical Engineering
Courtney Wanke - Mechanical Engineering

Faculty Adviser(s): John Crepeau

DOWNTOWN BOISE TRANSPORTATION PROJECT

Based on the preliminary analysis of the impacts of converting 5th Street and 6th Street to two-way operation, the 5th Street/Fort Street/Hays Street intersection is anticipated to require additional capacity to accommodate the projected traffic conditions. Therefore, this project will evaluate up to three alternatives for improvements.

Sponsor: John Ringert

Sponsor Organization: Kittelson & Associates, Inc.

Team Members:

Freda Agbecha - Civil Engineering
Muhannad Alhasan - Civil Engineering
Devin Burgess - Civil Engineering
Courtney Sell - Civil Engineering
Dominic Zaccardi - Civil Engineering

Faculty Adviser(s): Fritz Fiedler

DRAIN PAN WELDING JIG

Our team has created an ergonomic clamping jig that allows the welders at Colmac Coil to safely and efficiently weld drain pans. This jig must accommodate various forms of welding while keeping drain pans orientated correctly while minimizing the amount of time required to clamp a drain pan for welding.

Sponsor: Trever Pope

Sponsor Organization: Colmac Coil

Team Members:

Michael Botterbusch - Mechanical Engineering
Scout Ferguson - Mechanical Engineering
Dakota McDaniel - Mechanical Engineering
Taylor Tosaya - Mechanical Engineering

Faculty Adviser(s): Dan Cordon

Mentor(s): Jacob Gilles

ELECTRIC GENERATOR MODELING AND AUTOMATIC GENERATION CONTROLLER

To model two of the electric generators and their distribution networks and loads for the microgrid in downtown Spokane, as well as to create an appropriate control system to provide a stable frequency control and effective load management.

Sponsor Organization: Avista Utilities

Team Members:

Mohanned Almoneef - Electrical & Computer Engineering
Waleed Almotairi - Electrical & Computer Engineering
Suliman Alrashidi - Electrical & Computer Engineering
Nathan Bliesner - Electrical & Computer Engineering
Geoffrey VonBargen - Electrical & Computer Engineering

Faculty Adviser(s): Herbert Hess, Feng Li

Mentor(s): Jordan Scott

ENGINEERING A FUTURE



That Delivers Medicines More Effectively

Jackie Martinez is a Grand Challenge Scholar studying chemical and materials engineering. Jackie is a first-generation college student interested in the limitless impacts chemical engineering has on all areas in society from pharmaceuticals to food, cosmetics and textiles to energy and even practicing medicine. Jackie has focused her Grand Challenge research on developing a non-fouling material used in the delivery of medicine through the blood-brain barrier an innovation with life-saving potential.

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ENGINEERING A FUTURE



THAT LEAVES A LASTING IMPACT

For nineteen years chemical and materials engineering professor, David Drown (pictured above with students), has mentored and traveled with UI teams that compete at the WERC International Environmental Design Contest. This year is Drown's final year, he is retiring. Over the years Drown's teams have been very successful bringing home over fifty awards for developing solutions that address real-world environmental problems. This year's teams won three 1st place awards and two 2nd place awards. Congratulations to David Drown for his success, commitment to his students and his lasting impact on their lives.

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Engineering Design EXPO Student Projects

FLUE GAS ENERGY RECOVERY

Our teams mission is to capture the waste heat at the steam plant by utilizing thermoelectric generators to produce power. The power generated will be used to charge radio batteries at the steam plant.

Sponsor: Scott Smith

Sponsor Organization: University of Idaho Steam Plant

Team Members:

Scott McMurdie - Electrical & Computer Engineering
Brandon Nafsigner - Electrical & Computer Engineering
Garrett Oman - Mechanical Engineering
Bryan Perkins - Electrical & Computer Engineering
Faculty Adviser(s): Behnaz Rezaie, Herbert Hess
Mentor(s): Richard Leathers

H2ONLY

The University of Idaho is looking for a solution to clean sediment that collects at the bottom of the water tank just next to the Kibbie Dome. Our solution is efficient and effective so cost of cleaning is reduced as well as work while the water tank is in operation.

Sponsor: Scott Smith

Sponsor Organization: University of Idaho Steam Plant

Team Members:

Lucio Barajas - Mechanical Engineering
Marshall Bolen - Mechanical Engineering
Eric Hill - Mechanical Engineering
James Rockwell - Mechanical Engineering
Faculty Adviser(s): Tao Xing

HIGH SPEED STATOR DESIGN FOR FLYWHEEL ENERGY STORAGE SYSTEM

UI-FESS research team is designing and modelling flywheel energy storage systems to evaluate their associated science and technologies. FESSs enable the storage of energy from renewable, intermittent sources such as wind, solar, and nuclear. The high speed model is being developed to be able to store 30,000 RPMs.

Sponsor Organization: NASA

Team Members:

Cooper Atkinson - Mechanical Engineering
Nicholas Bachus - Mechanical Engineering
Shea Morrison - Electrical & Computer Engineering
Kyle Peterson - Mechanical Engineering
Matt Phillips - Electrical & Computer Engineering
Faculty Adviser(s): Herbert Hess, Christine Berven
Mentor(s): David Arnett, Justin Pettingill

HOOFBATH COPPER RECOVERY

(5-10%) copper sulfate solutions are implemented to prevent their cattle from infectious hoof diseases. After every 150-200 cattle, the solution becomes inactivate due to biosolids, urine, and soil particles. Currently waste solutions are sent to the wastewater lagoons, reducing soil fertility. Recovering copper from used copper-sulfate hoof baths can be recycled to restore the capital loss on copper. This process is not only economically sound, but environmentally friendly. Our team has been tasked to create an economical process of separating copper from the inactivated copper sulfate solution while doing a biological treatment process of the biosolids.

Sponsor Organization: NMSU Institute for Energy and the Environment

Team Members:

Zachary Beaman - Chemical & Materials Engineering
Jacob Bonwell - Chemical & Materials Engineering
Emily Tesnohlidek - Chemical & Materials Engineering
Elli Tindall - Chemical & Materials Engineering
Sam Wolfe - Chemical & Materials Engineering
Faculty Adviser(s): James Moberly, David Drown, Matthew Bernards
Mentor(s): David MacPherson, Charles Cornwall

HOT TO POT: GEOTHERMAL WATER SOURCES FOR DRINKING WATER

Geothermal water springs have not been widely used to produce clean drinking water because of their high temperature, salt, and bacteria content. Reverse osmosis (RO) membranes are commonly used in preparing drinking water. Our group prepared RO membranes for this application, by coating them with a zwitterionic polymer.

Sponsor Organization: NMSU Institute for Energy and the Environment

Team Members:

Jonathan Bessler - Chemical & Materials Engineering
Quenton Heath - Chemical & Materials Engineering
Faculty Adviser(s): Matthew Bernards, David Drown
Mentor(s): Charles Cornwall

IMC-BASED HUMIDIFICATION CONTROL FOR VAPOR SORPTION ANALYZERS

Decagon Devices has developed a Vapor Sorption Analyzer (VSA) instrument to characterize the water holding capacity of various materials. During operation, a microcontroller unit regulates a combination of both wet and dry feeds of air to achieve a desired target relative humidity to within 0.1% error of a set point. Internal Model Control (IMC) based control theory is applied to yield improved system performance and better reject system disturbances.

Sponsor: Martin Buehler

Sponsor Organization: Decagon Devices

Team Members:

Connor Chapek - Chemical & Materials Engineering
David Lytle - Chemical & Materials Engineering
Joe Pengilly - Chemical & Materials Engineering
Ben Plaster - Chemical & Materials Engineering
Jack Williams - Chemical & Materials Engineering
Faculty Adviser(s): David Drown, Matthew Bernards, Gautam Kumar
Mentor(s): David McPherson

INCREASING BATTERY EFFICIENCY: POROUS WALL-HOLLOW GLASS MICROSPHERES IN LEAD-ACID BATTERIES

Porous Wall-Hollow Glass Microspheres (PW-HGMs) have been shown to increase electrolyte storage when used in Pb-acid battery plates. This increase in electrolyte storage is responsible for an increase in the energy that can be extracted from the battery, particularly at high rates of discharge. To avoid undesirable voltage drop due to the lack of conductivity of the PW-HGMs, the microspheres are GUITAR coated (carbon thin film) which provides the needed conductivity for these additives.

Sponsor Organization: NMSU Institute for Energy and the Environment

Team Members:

Nayef Alazemi - Chemical & Materials Engineering
Ivan Pettit - Chemical & Materials Engineering
Nick Pica - Chemical & Materials Engineering
Andrew Wisniewski - Chemical & Materials Engineering
Faculty Adviser(s): Dean Edwards, Dave Drown
Mentor(s): Matt Bernards, John Canning

INDUSTRIAL ASSESSMENT CENTER

DOE sponsored students at UI perform free energy industrial audits around the northwest. This year they are researching new ways to quantify energy savings. This year's booth features demonstrations of advanced boiler control, vacuum system energy savings, and compressed air leak quantification.

Sponsor Organization: U.S. Department. of Energy

Team Members:

Daniel Cox - Mechanical Engineering
Brian Hanson - Biological Engineering
Austin Doutre - Mechanical Engineering
Chad Dunkel - Biological Engineering
Brandon Morford - Computer Science
Adam O'Keeffe - Biological Engineering
Will Seegmiller - Mechanical Engineering
Brenden Staab - Biological Engineering
Atticus Zborowski - Mechanical Engineering
Faculty Adviser(s): Dev Shrestha, Steven Beyerlein

ENGINEERING A FUTURE



That Restores and Improves Urban Infrastructure

Holly Terrill is a Grand Challenge Scholar studying civil engineering. As a senior in high school Holly worked on a project studying Washington State's transportation infrastructure. That experience lead Holly to pursue an education where she had an opportunity to apply her love of math and science to build and design. Holly recognizes the critical importance of modernizing the structures that support our economy and way of life and she is dedicating herself towards accepting the challenge.

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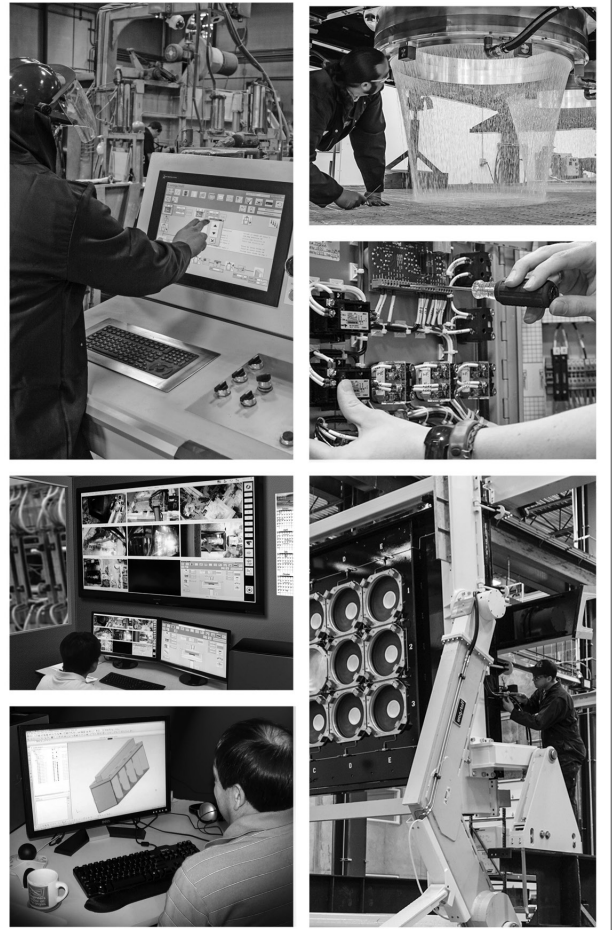
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ENGINEERING A FUTURE



THAT ENSURES ALL PEOPLE HAVE ACCESS TO CLEAN WATER

The University of Idaho Humanitarian Engineering Corps (UI-HEC) is a student-led non-profit humanitarian organization established to partner with communities worldwide to facilitate community driven design that improves access to basic human needs.

UI-HEC's current project is a five year commitment to design and construct a sustainable water supply system for the community of Carani, Bolivia.

UI-HEC can use your help to ensure the people of Carani and other communities they partner with have access to basic needs like clean water.

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Engineering Design EXPO Student Projects

INTERACTIVE KIOSK FOR COLLEGE OF ENGINEERING

The goal of this project is to create an interactive touchscreen kiosk in Janssen Engineering Building (JEB) for the College of Engineering. It will serve as an information portal to all of engineering, and the primary point of navigation for JEB, with information on services available, upcoming events, and maps to offices and labs.

Sponsor: Rob Patton
Sponsor Organization: University of Idaho College of Engineering
Team Members:
Kevin Benzing - Computer Science
Adonay Berhe - Electrical & Computer Engineering
Richard Boss - Computer Science
Faculty Adviser(s): Greg Donohoe

INTERNET OF THINGS FOR SUSTAINABILITY

A five day workshop aimed at teaching high school students and college freshmen the basics of micro controllers, with a focus on sustainability.

Sponsor: Vishal Saxena
Sponsor Organization: Department of Electrical Engineering
Team Members:
Daniel Gentile - Electrical & Computer Engineering
David Mortin - Electrical & Computer Engineering
Matthew Kirkland - Computer Science
Max Gilmore - Computer Science
Faculty Adviser(s): Feng Li
Mentor(s): Greg Donohoe

INTER-TURN FAULT DETECTION FOR AIR CORE REACTORS

The research team will design a three-phase small scale model of an air core reactor to simulate and test inter-turn faults. An RTDS model will be developed to simulate more in-depth scenarios and verify the data collected from the small scale model.

Sponsors: Kevin Damron and Normann Fischer
Sponsor Organizations: Avista Utilities and Schweitzer Engineering Laboratories, Inc.
Team Members:
Jacquelyn Duffau England - Electrical & Computer Engineering
Andrew Hoth - Electrical & Computer Engineering
Justin Jeter - Electrical & Computer Engineering
Tanner Mort - Electrical & Computer Engineering
Faculty Adviser(s): Brian Johnson
Mentor(s): Asad Mohammad

IRIDIUM 9523 SATELLITE MODEM DEVELOPMENT PLATFORM

The goal of this project is to develop a hardware/software platform for using the Iridium 9523 satellite modem on nano-satellites at NASA Ames Research Center.

Sponsor: Marc Murbach
Sponsor Organization: NASA Ames Research Center
Team Members:
Tessa Aus - Electrical & Computer Engineering
David Handy - Electrical & Computer Engineering
Jonathan Hanson - Electrical & Computer Engineering
Jordan Lynn - Computer Science
Chris Ocker - Computer Science
Faculty Adviser(s): Feng Li, Ata Zadehgol

KUZCO HOOF BATH

Design of a reactor to dissolve copper into sulfuric acid to form copper sulfate crystals. CuSO₄ is widely used in hoof bath solutions for cows in the dairy industry. Combined with WERC Team 1's project, dairy farms in Southern Idaho will be able to have a sustainable recycling system for a more economical and environmentally friendly process.

Sponsor: James Moberly
Sponsor Organization: Department of Chemical & Materials Engineering
Team Members:
Sheila Briggs - Chemical & Materials Engineering
Mattie Cupps - Chemical & Materials Engineering
Ashley DeBie - Chemical & Materials Engineering
Ian Ehram - Chemical & Materials Engineering
Trevor Woodland - Chemical & Materials Engineering

Faculty Adviser(s): James Moberly, Matthew Bernards, David Drown
Mentor(s): David MacPherson, Charles Cornwall

LEES FERRY WATER TREATMENT PLANT

This project is a redesign of the Lees Ferry Water Treatment Plant. The project includes comparison of different treatment methods, treatment system design, as well as structures to cover the treatment system.

Sponsor: Olivia Weick
Sponsor Organization: McMillen Jacobs Associates
Team Members:
Alexandre Crozes - Civil Engineering
Joshua Neath - Civil Engineering
Zachary Nepute - Civil Engineering
Kevin Ramirez - Civil Engineering
Chad Schluter - Civil Engineering
Faculty Adviser(s): Fritz Fiedler

LSV-2 AUTONOMOUS SUBMARINE EMI MEASUREMENT AND MITIGATION

The US Navy Acoustic Research Detachment, at Lake Pend Oreille, is experiencing electromagnetic interference (EMI) with their acoustic data collection. We are determining the primary sources of EMI in the LSV-2, the world's largest autonomous submarine, and designing an EMI mitigation scheme to assist the development of submarine stealth technology.

Sponsor: Alan Griffiths and James Klein
Sponsor Organization: US Navy Acoustic Research Detachment
Team Members:
Jacob Bechler - Electrical & Computer Engineering
Jared Mahoney - Electrical & Computer Engineering
Kristen Wells - Electrical & Computer Engineering
Faculty Adviser(s): Herb Hess, Ata Zadehgol

LUNAR FLYWHEEL CONTROLS

Develop code and hardware configuration for the safe acceleration and stabilization of the Low Speed Lunar Flywheel Energy Storage System.

Sponsor Organization: NASA
Team Members:
Brian Cartwright - Computer Science
Andrew Jones - Electrical & Computer Engineering
Ian Tanimoto - Computer Science
Faculty Adviser(s): Herb Hess, Christine Berven
Mentor(s): David Arnett

ME 421 / ME 301 FINAL PROJECTS

Student teams in computer aided design classes will demonstrate their final projects.

Sponsor Organization: Department of Mechanical Engineering
Team Members:
ME 421 students
ME 301 students
Faculty Adviser(s): Michael Maughan, Joel Perry, Ankit Gupta

MICRO CAPACITIVE SENSOR

The goal of this project is to develop a printed circuit board (PCB) that utilizes capacitive sensors and an off-the-shelf capacitance-to-digital-converter (CDC) to detect and monitor micro entities. The monitoring process is an autonomous process that displays a plot of real-time capacitance values.

Sponsor: Suat Ay
Sponsor Organization: UI VLSI Sensor Research Group
Team Members:
Jennifer Hunt - Electrical & Computer Engineering
Nathan Totorica - Electrical & Computer Engineering
Jordan Vilcapoma - Electrical & Computer Engineering
Faculty Adviser(s): Feng Li
Mentor(s): Bingxing Wu, Ezekiel Adekanmbi

ENGINEERING A FUTURE



That Finds Solutions To Secure Cyberspace

One of the 14 Grand Challenges established by the National Academy of Engineering for the 21st Century is securing cyberspace. The UI Cyber Defense Team recently won 2nd place at the annual Pacific Rim Collegiate Cyber Defense Competition (PRCCDC).

The PRCCDC is one of the most well respected college-level cyber defense competitions in the Northwest and is part of the National Collegiate Cyber Defense Competition, the top college-level cyber defense competition in the nation.

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Engineering Design EXPO Student Projects

MILL CREEK CHANNEL STABILIZER MODIFICATION FOR LOW-FLOW FISH PASSAGE

Mill Creek is designed for flood control in Walla Walla, Washington. The Army Corps of Engineers evaluated the channel and determined that fish cannot pass at low flows. The task is to modify stabilizers 53-55 to create sufficient fish passage while maintaining structural and conveyance integrity for flood events.

Sponsor: Sean Milligan
Sponsor Organization: U.S. Army Corps of Engineers
Team Members:
Karina Eyre - Civil Engineering
Anne Heiner - Civil Engineering
Cristobal Ramos Salazar - Civil Engineering
Jessica Waller - Civil Engineering
Faculty Adviser(s): Fritz Fiedler, Jim Liou, Ahmed Ibrahim
Mentor(s): Jon Renholds

NEUROTOUCH

The NeuroTouch is a hand-held device that measures the elastic modulus of biological tissues with the slightest touch to the tissue surface. It is designed to be used as a diagnostic tool for surgeons; giving real time feedback to aid in determining the severity of different health ailments.

Sponsor: Bryn Martin & Mike Maughan
Sponsor Organization: University of Idaho
Team Members:
Mazen Aljawi - Biological Engineering
Brooke Deans - Mechanical Engineering
Christina Gibbs - Biological Engineering
Mathew Harlow - Mechanical Engineering
Brendan Souvenir - Electrical & Computer Engineering
Faculty Adviser(s): Dev Shrestha
Mentor(s): Richard Leathers

OPTIMIZATION OF SILICON RUBBER MOLD PRODUCTION

Design and improve ATC Manufacturing's silicon polymer compound mixing process for the creation of molds. Standardize the mixing process during creation of the molds such that the lifetime of the mold is maximized. A revised mixing procedure was developed to ensure mold uniformity.

Sponsor: Jodi Lizotte
Sponsor Organization: ATC Manufacturing
Team Members:
James Daschel - Chemical & Materials Engineering
Konrad Hausmann - Chemical & Materials Engineering
Patrick Mahoney - Chemical & Materials Engineering
Faculty Adviser(s): David Drown, Matthew Bernards
Mentor(s): Jacob Bonwell, Jodi Lizotte

PAGE WASTEWATER TREATMENT PLANT UPGRADE

The Page wastewater treatment plant is located in Smeltonville, ID. It currently is unable to meet its NPDES effluent requirements for ammonia. Additionally, it is likely that the EPA will impose stricter effluent ammonia requirements in the future along with nitrate and phosphorus. The purpose of the project is to design a biological treatment and solids separation system to maximize the use of existing infrastructure.

Sponsor: Sharon Strom
Sponsor Organization: J-U-B Engineers
Team Members:
Casey Bryant - Civil Engineering
Kade Dustin - Civil Engineering
Erin Poor - Civil Engineering
Austin Quinn - Civil Engineering
Faculty Adviser(s): Fritz Fiedler, Erik Coats

PARADISE PATHWAY US 95 UNDERPASS

The design for a bike underpass for the South Main Street bridge highway in Moscow, Idaho.

Sponsor: Robert Heckendorn
Sponsor Organization: University of Idaho
Team Members:

Sierra Anderson - Civil Engineering
David Brands - Civil Engineering
Jacob Hopkins - Civil Engineering
Faculty Adviser(s): Fritz Fiedler
Mentor(s): Nate Suhr

PASSIVE SOLAR DISTILLATION OF ACID ROCK DRAINAGE WATER

Acid rock drainage (ARD) waters impact local waterways due to their heavy metal content and acidity. Many affected sites are remote and effective treatment requires low-maintenance and self-sustaining processes. Our team has developed a passive solar distillation system to treat ARD waters, operating solely on gravity and solar power.

Sponsor Organization: NMSU Institute for Energy and the Environment
Team Members:
Alyssa Ertel - Chemical & Materials Engineering
Talal Hamadah - Chemical & Materials Engineering
Jesse Hinshaw - Chemical & Materials Engineering
Erin Johnson - Chemical & Materials Engineering
Nathan Myers - Chemical & Materials Engineering
Faculty Adviser(s): David Drown, Matthew Bernards
Mentor(s): Charles Cornwall, John Failla

POINSETTIA MANAGEMENT SYSTEM

The goal of this project is to provide remote monitoring and control for the commercial production of poinsettias and other greenhouse plants using mobile devices. The system controls strategically timed covering and uncovering of plants to control exposure to light, and monitoring of soil moisture and other ambient properties.

Sponsor: Dev Shrestha
Sponsor Organization: Department of Biological Engineering
Team Members:
Robert Breckenridge - Computer Science
Brandon Jank - Computer Science
Nick Krenowicz - Electrical & Computer Engineering
Faculty Adviser(s): Greg Donohoe

PULLMAN-MOSCOW REGIONAL AIRPORT RUNWAY REALIGNMENT

The Pullman-Moscow Regional Airport located in Pullman, WA, plans to construct a larger runway to replace the existing runway. The proposed project area will require substantial site grading and drainage improvements. Our project is to provide a geotechnical evaluation, settlement analysis, and realignment of airport creek.

Sponsor: Andy Abrams
Sponsor Organization: Strata
Team Members:
Rick Castleton - Civil Engineering
Ajay Dillon - Civil Engineering
Geordan Skyles - Civil Engineering
Faculty Adviser(s): Fritz Fiedler
Mentor(s): Sunil Sharma

REVERSE ENGINEERING LEGACY HYDROELECTRIC EQUIPMENT

Our team has converted old drawings of legacy era hydro-power turbine equipment into solid models which are being used to create a functional desktop prototype as well as inform industry replacement of full-size components.

Sponsor: Jeff Smutney
Sponsor Organization: Wagstaff
Team Members:
Alex Gomez - Mechanical Engineering
Charles Krueger - Mechanical Engineering
Ken Speers - Mechanical Engineering
Drew Thompson - Mechanical Engineering
Faculty Adviser(s): Edwin Odom
Mentor(s): Alex Olson, Coleton Bailey

ENGINEERING A FUTURE



THAT PREPARES IDAHO'S STUDENTS FOR HIGH TECH CAREERS

Take and or Teach a UI Dual Credit Course in Computational Thinking & Problem Solving

Computer Science (CS 112) is an introduction to computational thinking and problem solving, including elementary computing concepts such as variables, loops, functions, lists, conditionals, concurrency, data types, simple object oriented concepts, I/O, events, syntax, structured programming, basic concepts of computer organization, editing and the influence of computers in modern society.

HIGH SCHOOL STUDENTS who have completed Algebra 2 with at least a C average are eligible to participate to earn college credit and learn the foundational skills for a career in computer science.

HIGH SCHOOL TEACHERS interested in teaching CS 112 can receive a stipend and honorarium to attend a professional development workshop to become certified to teach CS 112.

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ENGINEERING A FUTURE



That Recreates the Electronics of the Brain

Allison Ellingson is a Grand Challenge Scholar studying electrical and computer engineering. She is motivated by making a real difference in the world and the independence of conducting her own research. Allison is working to design a neuron equivalent electrical circuit with the hope that it will lead to further understanding of the adaptive properties of neurons. Her work has the potential to treating anything from mental health issues to strokes and paralysis.

ELECTRICAL AND COMPUTER ENGINEERING

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University of Idaho
College of Engineering

The logo for Lochsa engineering features a stylized, dark grey icon on the left consisting of two overlapping, curved shapes. To the right of this icon, the word "Lochsa" is written in a large, bold, black sans-serif font. Below "Lochsa", the word "engineering" is written in a smaller, black, lowercase sans-serif font with wide letter spacing.

Lochsa

engineering

A 3D rendering of a steel I-beam is shown in a horizontal orientation. A chain hoist is attached to the top flange of the beam. The text "We Support YOU." is overlaid on the beam. "We" is on the left, "Support" is on the right, and "YOU." is centered below "Support" in a larger, bold font.

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YOU.

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Engineering Design EXPO Student Projects

RF ENERGY HARVESTING

Only a small amount of RF energy is captured by the intended receiver. The objective of this research is to make a device that captures the remaining ambient energy and converts it back into electricity for low power applications such as powering a sensor module.

Sponsor Organization: UI Sustainability Center

Team Members:

Alexa Aguilar - Electrical & Computer Engineering
Andrew Davies - Electrical & Computer Engineering
Tyler Larson - Electrical & Computer Engineering
Faculty Adviser(s): Herb Hess, Ata Zadehgo, Feng Li

SEED STORAGE TUBE

Our prototype is intended for usage in third world countries to help increase agricultural yield. Our solution is an airtight and watertight container inside which seeds collected during harvest can be stored for up to two years. The container is vacuum sealed to kill insects present in the seed.

Sponsor: Don Tolmie

Sponsor Organization: Idaho Bean Commission

Team Members:

Joshua Begay - Biological Engineering
Peter Handel - Mechanical Engineering
David Smith - Mechanical Engineering
Joel Wilson - Biological Engineering
Faculty Adviser(s): Dev Shrestha, Steven Beyerlein
Mentor(s): Alex Olson

SELECTIVE NOISE CANCELLATION WITH BONE CONDUCTION HEADPHONES

Improve and modify existing noise cancellation circuit design to selectively eliminate both ambient and particular sounds without impeding the ability to have a normal conversation using bone conduction headphones. In addition, an acoustic wave cancellation proof of concept demonstration will be provided.

Sponsor Organization: Department of Physics

Team Members:

Sarah Horvath - Physics
Ross Miller - Physics
Nathan Pabst - Mechanical Engineering
Eduardo Ramos-Arteaga - Physics

Faculty Adviser(s): Jacob Turner

SIGHT IMPAIRED MOBILITY ASSISTANCE

This product is designed to enable sight-impaired people to navigate by sound. A headset carrying video cameras produces a software model of the surroundings, and translates this description to sounds, allowing the user orient him/herself and perform tasks like navigating around a room and pick up objects. This phase of the project focuses on constructing a videogame-like "virtual world", and mapping a 3D scene into sound, serving as a testbed of techniques.

Sponsor: Daniel Schneider

Sponsor Organization: Schweitzer Engineering Laboratories, Inc.

Team Members:

Matt Daniel - Computer Science
Mason Fabel - Computer Science
Eric Marsh - Computer Science
Colin Pate - Electrical & Computer Engineering
John Snevily - Computer Science
Faculty Adviser(s): Greg Donohoe

SILICIDE COATING FOR AEROSPACE PARTS

We have designed, fabricated and tested an apparatus that applies a uniform silicide coating (R512E) to the inside surface of a niobium based alloy (C-103) that is shaped into a thrust chamber and rocket nozzle.

Sponsor: Nicholas Cunningham

Sponsor Organization: ATI Metals

Team Members:

Nick Ferguson - Mechanical Engineering
Trevor Livingston - Mechanical Engineering
Joe Morris - Mechanical Engineering
Tygh Weyand - Mechanical Engineering
Faculty Adviser(s): Steve Beyerlein
Mentor(s): Jacob Gilles

SINGLE CYLINDER ENGINE DESIGN AND OPTIMIZATION

ESTECO Academy has partnered with Aprilia Racing and Gamma Technologies to sponsor the design and optimization of a single-cylinder, four-stroke, 250cc engine. The aim of this project is to utilize modeFRONTIER and GT-Suite in numerically analyzing, simulating, and testing to create the ideal race engine.

Sponsor Organization: ESTECO Academy, Aprilia Racing and Gamma Technologies

Team Members:

Bill Duncan - Mechanical Engineering
Dylan Johann - Mechanical Engineering
David Pick - Mechanical Engineering
Brian Remsen - Mechanical Engineering
Faculty Adviser(s): Edwin Odom
Mentor(s): James Founds

SNARE DRUM NOTATOR

This project will take real-time measurements of a soloist playing on the snare drum, and convert them into music notation, which can be displayed using publicly available applications, or printed. The system will gather signals from accelerometers and gyroscopic sensors mounted to a wristband. The goal is to capture nuances of the performance not available in commercial notation software, such as type of stroke, and location, attack, and intensity of a hit.

Sponsor: Spencer Martin

Sponsor Organization: UI School of Music

Team Members:

Scott Dennis - Computer Science
Nathan Groggett - Electrical & Computer Engineering
Phil Kearns - Electrical & Computer Engineering
Hue Purkett - Computer Science
Domn Werner - Computer Science
Faculty Adviser(s): Greg Donohoe

SPOKANE MICROGRID DISTRIBUTED GENERATION AND STORAGE

Our team is one of three teams at the University of Idaho working with Avista Utilities to develop a micro-grid in downtown Spokane. Our team's mission is to investigate current options for distributed generators and energy storage, and examine the locations for and study the integration of these micro-grid components.

Sponsor Organization: Avista Utilities

Team Members:

Daniel Craig - Electrical & Computer Engineering
Jesus De La Cruz - Electrical & Computer Engineering
Jacob Dolan - Electrical & Computer Engineering
Faculty Adviser(s): Herber Hess, Brian Johnson, Feng Li
Mentor(s): Jordan Scott

Academy of Engineers

Every fall, the University of Idaho, College of Engineering recognizes a new class of inductees into its Academy of Engineers.

Members of the Academy of Engineers are individuals that have been selected for their personal contributions to engineering achievement, leadership, engineering education, and service to the profession and society.

We salute our Academy of Engineers leaders for their lifetime commitment to advancing the quality of life through achievement, high ethical standards, innovation and commitment.



CLASS OF 2016



Richard W. Allen



Corby Anderson



William G. Eisinger



Lynn Davis



Marjorie M. Hatter



Jim W. Linford



David M. Kohli

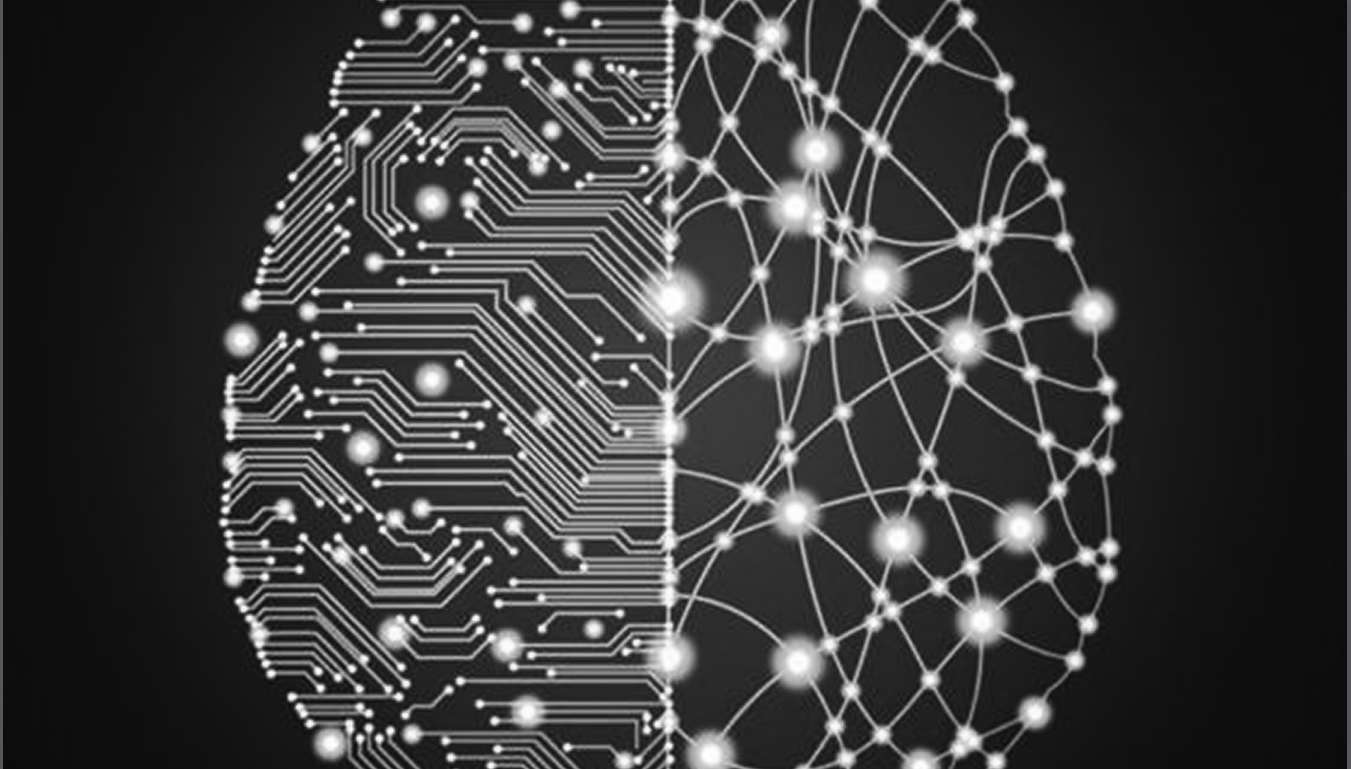


Arnfinn Rusten

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ENGINEERING A FUTURE



THAT DESIGNS COMPUTER CHIPS INSPIRED BY THE BRAIN

Imagining a world in which artificial intelligence rules the day isn't hard for Vishal Saxena — though he admits that such a sci-fi future is still 100 years away.

Before autonomous drones inundate low-altitude airspace, however — transporting people to and from their destinations, delivering goods, tracking reintroduced wildlife and endangered species, and monitoring disease in large-scale farming operations — certain problems with artificial intelligence and the memory chips that serve them need to be solved.

Machines need to become better at reasoning and perception — a subset of AI known as “deep learning,” learn lessons autonomously so they can reprogram

without human supervision, and operate on less power to reduce their dependence on cloud infrastructure, which has a significant carbon footprint.

Saxena, who became the Micron Endowed Professor in electrical and computer engineering in UI's College of Engineering in 2016, is working on solutions to these problems. In fact, the professor and award-winning researcher is playing a crucial role in developing some of the most innovative technology on today's semiconductor market.

Saxena is developing neural-inspired chips — hardware that could be used in machines with artificial intelligence — that emulates the brain in its energy efficiency and capabilities.

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Engineering Design EXPO Student Projects

SUNSET SWIM CENTER PERVIOUS CONCRETE PARKING LOT

Tualatin Hills Park & Recreation District (THPRD) in Beaverton, OR has contacted 3J Consulting to reconstruct the existing swim center parking lot due to a deteriorating asphalt surface and would like to utilize pervious concrete to further the district's sustainability goal, correct existing flooding, and repair the pavement. In this project, the client (THPRD) is requesting the consultant to replace the parking lot surface but maintain the western sidewalk and curbs. All existing parking lot lighting is to remain as there is not sufficient budget to replace the lighting for the project. THPRD would also like to maintain or increase the total number of parking spaces for the project and provide dedicated parking in the western two rows of stalls for pool patrons. The parking lot is shared with the high school to the north for after school program transportation services by buses which stage at the Sunset Swim Center's parking lot. The access onto the main roadway will need to be maintained and can't be relocated. Design elements include: a. Parking Lot layout b. Pervious pavement section design c. Hydrology report d. Stormwater drainage system design

Sponsor: John Howorth
Sponsor Organization: 3J Consulting, Inc.
Team Members:
Jeffrey Blankinship - Civil Engineering
Skyler Means - Civil Engineering
Jordan Trapp - Civil Engineering
Faculty Adviser(s): Fritz Fiedler

TAP IN! THE GLOBAL WATER CRISIS

The commercialization of bottled water has led to misinformation about the higher quality of most tap waters. Public water supplies all around the world are threatened by large corporations whose beverage portfolios are now driven by water, not soft drinks. After a visit with us, you will never look at bottled water the same again. Come and learn more about the global water crisis and how you are part of the solution.

Sponsor Organization: Department of Civil Engineering
Team Members:
Cody Barrick - Civil Engineering
Monica Erickson - Civil Engineering
Holly Terrill - Civil Engineering
Faculty Adviser(s): Patricia Colberg, Erik Coats
Mentor(s):

TECHNOLOGY READINESS TRACKER

The Technology Readiness Tracker is a software tool that assists the user in searching the web to gather and analyze trends in a specified technology. A picture of the state of maturity of a technology will aid companies decide whether or not to develop products in that technology area, and aid investors in deciding whether to invest.

Sponsor Organization: Oak Ridge National Laboratory
Team Members:
Chris Campbell - Computer Science
Brandon Ratcliff - Computer Science
Robert Stewart - Computer Science
Faculty Adviser(s): Greg Donohoe

TENDON STRAIN APPARATUS

Our client has designed and built a mechanical bioreactor controlled by Labview to test mechanical properties of soft tissues such as tendon. Currently the client is able to measure the force applied to the tissue and the displacement between the grips holding the tissue. Our objective is to develop and design a non-contacting video system to measure the strain within soft biologic tissues and improve the capability of the system already in place.

Sponsor: Nathan Schiele
Sponsor Organization: Department of Biological Engineering
Team Members:
Gretchen Gingerich - Biological Engineering
Kelie Gonzalez - Biological Engineering
Benjamin Perley - Mechanical Engineering
Craig Tedmon - Mechanical Engineering
Faculty Adviser(s): Dev Shrestha
Mentor(s): Richard Leathers

THE COFFEE ROASTERS

An inexpensive personal coffee roaster which uses hot air to roast green coffee beans to the user's preference has been designed. This roaster is an improvement on existing systems because it will also collect the skin of the coffee beans, filter carbon dioxide, and other harmful gases from the exhaust.

Sponsor: Eric Aston
Sponsor Organization: Department of Chemical & Materials Engineering
Team Members:
Kevin Christopher - Chemical & Materials Engineering
Margaret Fitzgerald - Chemical & Materials Engineering
Sean M. Instasi - Chemical & Materials Engineering
Nic Johnson - Chemical & Materials Engineering
Austin Porter - Chemical & Materials Engineering
Faculty Adviser(s): David Drown, Matthew Bernards
Mentor(s): Eric Aston, Mark Roll, Kris Waynant

THE GRID DEFENDER

Grid Defender is a power grid support system intended to protect power lines and utility poles from damage during adverse weather conditions. The system works by sensing stress on the lines and if it exceeds a dangerous level, the cross arms and power lines are safely lowered to the ground.

Sponsor: Dennis Bell
Sponsor Organization: The Grid Defender
Team Members:
Austin Amrein - Electrical & Computer Engineering
Shane Doll - Mechanical Engineering
Elizabeth Hernandez - Computer Science
Justin Puryear - Mechanical Engineering
Daniel Schlittler - Mechanical Engineering
Lexi Turkenburg - Electrical & Computer Engineering
Faculty Adviser(s): Joel Perry

THE INTERNET OF THINGS: WATERING THE FUTURE

In the US 355 BILLION gallons of water is used EVERY DAY, water conservation is essential for reducing such use. This design utilizes a user friendly application to instruct sensors to gather atmospheric and soil readings. This data is used to control irrigation in real-time to minimize overwatering, thereby conserving water.

Sponsor Organization: NMSU Institute for Energy and the Environment
Team Members:
Taylor Davis - Chemical & Materials Engineering
Kyle Hubbell - Chemical & Materials Engineering
Brett McKinnon - Chemical & Materials Engineering
Tyler Songstad - Computer Science
Faculty Adviser(s): David Drown, Matthew Bernards

THE POINTE AT POST FALLS

Land development in Post Falls, Idaho that includes roadway design, stormwater collection and treatment, and design of wastewater facilities.

Sponsor: Ben Weymouth
Sponsor Organization: T.O. Engineers
Team Members:
Kyle Allen - Civil Engineering
Ry Butler - Civil Engineering
Taylor Hart - Civil Engineering
Shane Warmbrodt - Civil Engineering
Faculty Adviser(s): Fritz Fiedler, Erik Coats, C.P. Liou

ENGINEERING A FUTURE



That Makes Sustainable Energy Viable

Mia Nakayama is a Grand Challenge Scholar studying mechanical engineering. Mia wants to have a global impact with her education. She has a business background and has always been curious about the process of making things. She is dedicated to helping design engineering solutions that will provide the world with sustainable and reliable sources of energy. Her Grand Challenge work investigates methods of harnessing the energy of large wind events, like hurricanes and typhoons.

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Engineering Design EXPO Student Projects

TITANIUM FITTING SORTING

We have created a material handling system to properly orient titanium fittings for a subsequent cleaning operation in accordance with needs of Boeing's Tube Duct and Reservoir Center.

Sponsor Organization: The Boeing Company

Team Members:

Evan Bonar - Mechanical Engineering
John Hansen - Mechanical Engineering
Joshua Howard - Mechanical Engineering
Cody Smisek - Mechanical Engineering
Juvy Jane Tongco - Mechanical Engineering

Faculty Adviser(s): Steven Beyerlein

Mentor(s): Alex Olson

TOWER OF LIGHTS EDITOR AND SYNTHESIS

The Tower of Lights placed bright, colored light-emitting-diode (LED) lights in the windows of the Theophilus Tower on the UI campus, and connects them to computers which cause the lights to pulse in a pattern consistent with music played through speakers. This is a multidisciplinary endeavor, combining engineering and the arts. The goal of this project is to develop an editor to enable musicians to compose aesthetically pleasing light patterns to augment the music.

Sponsor: Robert Rinker

Sponsor Organization: Department of Computer Science

Team Members:

Zachary Bjorklund - Electrical & Computer Engineering
Brandon Brewster - Computer Science
Zachary Spence - Computer Science

Faculty Adviser(s): Greg Donohoe

VANDAL ATMOSPHERIC SCIENCE TEAM

The Vandal Atmospheric Science Team (VAST) aims to design, build, test, fly, and recover aerospace technology and science instrumentation via High-Altitude Balloon launches, develop critical-thinking creators and leaders, and foster partnerships between the University of Idaho and the aerospace industry.

Sponsor: Joe Law

Sponsor Organization: NASA Idaho Space Grant Consortium

Team Members:

Cooper Atkinson - Mechanical Engineering
Byron Bowles - Mechanical Engineering
Bill Duncan - Mechanical Engineering
Zach Hacker - Mechanical Engineering
David Handy - Electrical & Computer Engineering
Jonathan Hanson - Electrical & Computer Engineering
Kyle Petersen - Mechanical Engineering
Caleb Smith - Mechanical Engineering
Nathan Wagner - Mechanical Engineering

Faculty Adviser(s): Ata Zadehgol

VOCAL ISOLATING AND AMPLIFYING HEADPHONES

The project is to isolate vocals in a media stream and amplify them to create a more distinguishable and clear voice for the hard of hearing.

Sponsor: James Frenzel

Sponsor Organization: Department of Electrical & Computer Engineering

Team Members:

Alex Inskip - Electrical & Computer Engineering
Adam Seubert - Electrical & Computer Engineering

Faculty Adviser(s): Feng Li

WASTE HEAT HARVESTING WITH LIQUID GALLIUM

All electronic devices generate heat and lose efficiency. To combat this loss, we present a novel waste heat management system using liquid gallium to efficiently draw heat away from electronics. A thermoelectric generator then produces electricity from the waste heat to be used elsewhere.

Sponsor Organization: U.S. Office of Naval Research

Team Members:

Ben Bjornson - Chemical & Materials Engineering
Colin Lunstrum - Chemical & Materials Engineering

Faculty Adviser(s): David Drown, Matthew Bernards, Herbert Hess

Mentor(s): Amrit Dahal

WASTE HEAT MANAGEMENT

Thermal management is a key component in electronics design and a leading cause of electronic failure. Team Frigus has designed a thermal management system for a multi-kilowatt, multi-phase power converter based on a unified thermal core design using liquid and air cooling. Design, manufacturing and testing were conducted for validation.

Sponsor: Herbert Hess

Sponsor Organization: Department of Electrical & Computer Engineering

Team Members:

Caleb Jo - Mechanical Engineering
James Sutton - Mechanical Engineering
Connor Trulock - Mechanical Engineering

Faculty Adviser(s): Herbert Hess, Tao Xing, Mark Roll

Mentor(s): Rachel Peterson

WATER FOR FAMILIES "WHERE THERE IS NOTHING"

A water distribution system system designed for a community in Bolivia.

Sponsor Organization: UI Humanitarian Engineering Corps

Team Members:

Monica Erickson - Civil Engineering
Cat Feistner - Civil Engineering
Will Parker - Electrical & Computer Engineering
Simon Shindler - Chemical & Materials Engineering

Faculty Adviser(s): Fritz Fiedler

WEARABLE MOBILE ARM SUPPORT

To design a mobile, wearable, arm movement assistance device from the existing design that is effective at providing support to the shoulder and elbow and comfortable to the user.

Sponsor: Joel Perry

Sponsor Organization: Department of Mechanical Engineering

Team Members:

Anthony Branz - Mechanical Engineering
Jace Courtright - Mechanical Engineering
Carter Drake - Mechanical Engineering
Parker Hill - Mechanical Engineering
Kylo Murray-Gann - Mechanical Engineering

Faculty Adviser(s): Joel Perry

Mentor(s): James Found

WHAT IS CIVIL ENGINEERING?

Future job prospects and career options for civil engineers are spectacular! Yet many potential engineers (and others) have no idea what civil engineers do. Stop by and meet UI Civil Engineering majors and learn more about how civil engineers work to make our lives better every day and in every way.

Sponsor Organization: Department of Civil Engineering

Team Members: Civil Engineering Students

Faculty Adviser(s): Patricia Colberg

EXPO Welcomes Invent Idaho Student Finalists

Invent Idaho is a program conceived in 1989 for students in grades 1-12 to provide a forum for thousands of young inventors.

Invent Idaho is the only program of its kind in Idaho. Young inventors participate in progressive levels of competitions, including three regional events held across Idaho, culminating in an Invent Idaho State Finals event. This year's finals took place on the University of Idaho Moscow campus. For more information about Invent Idaho visit www.inventidaho.com.

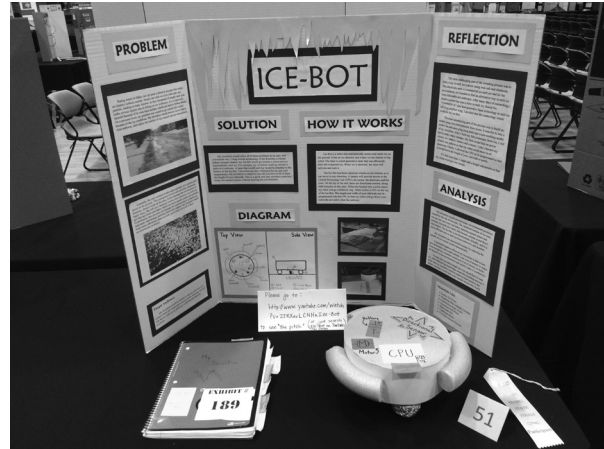
College of Engineering Dean Larry Stauffer has invited the 2016 Invent Idaho finalists to participate in this year's UI Engineering Design EXPO in recognition of their accomplishments.



Dewey.Drone

Amiah Van Hill

A drone that will re-file library books and also file misplaced books.



Ice-Bot

Kai Hatten

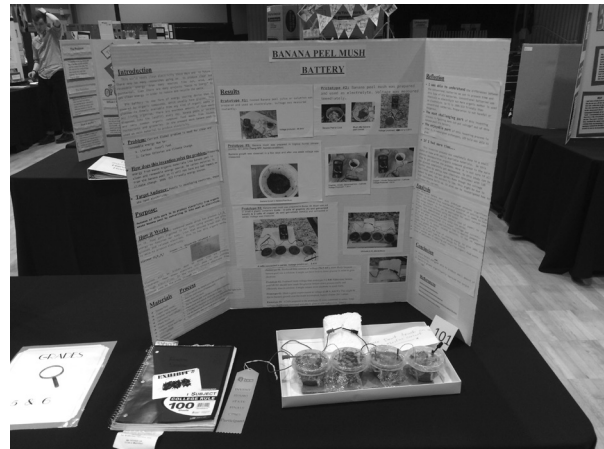
The Ice-Bot is a robot that automatically senses and melts ice on the ground. It uses a heat generative laser to melt and evaporate ice to safely clear sidewalks and porches.



Mare Sanum (Healthy Sea) Fishing Net

Taelyn Baiza

The Mare Sanum (Healthy Sea) Fishing Net is a futuristic smart net designed to address the hazards of ocean bycatching and ghostfishing. Bycatching is the accidental capture of marine wildlife in commercial fishing nets, and ghostfishing is the accidental capture of marine wildlife in nets that have become lost or abandoned. Through the use of nanobots, the Mare Sanum can selectively capture and release animals and make itself easily retrievable.



Banana Peel Mush Battery

Vishali Sutharsan

Banana peel mush battery was made as traditional cell by making banana peel mush as electrolyte. A cell produces considerable amount of voltage. Four cells connected in series produced 3.41V and made the LED bulb (1.7V, 20mA) to glow. It can be proposed as a clean and renewable energy source for future. It is 100% ECO friendly.

ENGINEERING A FUTURE



THAT COMBINES FUN WITH REDUCING EMISSIONS AND NOISE

The SAE International Clean Snowmobile Challenge provides students the opportunity to enhance their engineering design and project management skills by applying learned classroom theories in a challenging week-long competition testing their ability to reengineer an existing snowmobile to reduce emissions and noise.

This year 24 teams from university's across North America converged on Michigan Tech's Keweenaw Research Center in Houghton, Michigan to compete in events including emissions, noise, fuel economy/endurance, acceleration, handling, static display, cold start and design.

The UI Clean Snowmobile Challenge team has participated in the annual competition for the past 17 years. The UI team has placed in the top three positions 9 times. This year the team received awards for best acceleration and best value.

Members of the UI Team, Aaron Eliason, Patrick Paulus, Ian Sullivan and Mark Woodland recently traveled to the SAE International World Congress, in Detroit, where they participated in the undergraduate presentation competition and won GM's first place award for their work on project management and knowledge management best practices associated with UI's Clean Snowmobile Challenge team.

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2017 EXPO ORGANIZING AND DEVELOPMENT TEAM



LARRY STAUFFER
Dean



JOE LAW
Associate Dean for Undergraduates



ROB PATTON
Marketing Communications Manager



J.J. PETERSEN
Faculty Lecturer & Engineering Scholars Adviser



DAN CORDON
Mechanical Engineering Faculty & Capstone Adviser



BOBBI HUGHES
Assistant Dean for Development



SANDY SPEAR
Alumni and Donor Relations Coordinator



STACY RAUCH
Associate Director of Development



MARY LEE RYBA
Senior Director of Development



Planning Engineering Design EXPO is a yearlong activity. To explore future opportunities to support the University of Idaho's Engineering Design EXPO contact the College of Engineering Development team at 208-885-5201 or email us at expo@uidaho.edu. We look forward to talking with you about how you can help support EXPO and our current and future students.

Special thanks to University Communications and Marketing and the Creative Services unit for their invaluable assistance with creating Engineering Design EXPO promotional content and event materials.

ENGINEERING A FUTURE



THAT BREAKS STEREOTYPES

Alexa Aguilar and Shea Morrison don't look like engineers. Especially if you think that an engineer looks like a particular type of man. The University of Idaho seniors look like typical sorority sisters. And they are.

"Alexa and I met our freshman year because we pledged the same house (Tri-Delta)," Morrison said.

But the electrical engineering majors are also passionate about science and math, deeply involved in undergraduate research projects, and actively working to bust myths about and barriers for women in engineering.

"I think it's something within our society that we think 'smart' must mean old white dude," Morrison said. "Alexa and I are sorority sisters, we love going out with friends and hanging out. We love math and science too."

They want other women to follow in their footsteps, which is why they're involved in the College of Engineering's Electrical Engineering Ambassador Group. The group travels to middle and high schools to talk to students about engineering. It "humanizes" engineering for students who might otherwise find it intimidating, Aguilar said.

"I want girls especially to know that it's not out of reach. If you're good at math and science, and you like it, don't be afraid. Don't be intimidated. Just do it. Become an engineer," Aguilar said.

They also want other women to know that being an engineer doesn't mean giving up your femininity, either.

Note: Alexa and Shea will both be presenting their senior design projects at EXPO. Alexa's project is titled RF Energy Harvesting and Shea's is the High Speed Stator Design for Flywheel Energy Storage System.

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