2016 ENGINEERING DESIGN EXPO AWARD WINNERS

People's Choice Award Winner	
Boeing Workstation to Hold Various Rib Sizes for Assembly Operations*	Create a modular workstation that can be scaled to grip and manipulate ribs ranging from 5'-17' in length for light assembly work. A complete workstation includes lighting and tool balancers, as well as design considerations for ease of use and ergonomics. **Sponsor**: Kyle Griner **Sponsor Organization**: Boeing Frederickson Skin and Spar **Team Members**: Austin Chmelik - Mechanical Engineering Kyle Cleveland - Mechanical Engineering Diego Juarez - Mechanical Engineering Lucas Sass - Biological Engineering **Faculty Adviser(s)**: Matthew Riley **Mentor(s)**: Theron White
*Also winners of booth and technical presentation awards	
Booth Award Winners	
University of Idaho Clean Snowmobile Challenge Team	The technologies that the CSC team develops are to improve fuel efficiency, emissions, make a quieter snowmobile, while creating over 100 horsepower. **Sponsor**: UI College of Engineering **Sponsor Organization**: SAE International Clean Snowmobile Challenge Team Members: Daniel Aguilera - Mechanical Engineering Jeffery Black - Mechanical Engineering Jeffery Craig - Electrical & Computer Engineering Ben DeRuwe - Mechanical Engineering Aaron Eliason - Mechanical Engineering Megh Hester - Mechanical Engineering Bryce Jensen - Mechanical Engineering Emily Kliewer - Mechanical Engineering Zack Lipple - Mechanical Engineering Jason Maas - Mechanical Engineering Leland Maris - Mechanical Engineering Justin Ruehl - Mechanical Engineering Dillon Savage - Mechanical Engineering Stephen Schoomen - Mechanical Engineering Adam Sedgwick - Mechanical Engineering Cade Smith - Mechanical Engineering Chase Smith - Mechanical Engineering Ian Sullivan - Mechanical Engineering Mark Woodland - Mechanical Engineering Alex Wright - Mechanical Engineering Makynzie Zimmer - Mechanical Engineering **Faculty Adviser(s)**: Dan Cordon

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A.P.E.S. (Automated Plant Environment Shield)	The A.P.E.S. team has created a modular, automated, consistent, plant covering shield that blocks all light from reaching the poinsettias at night. The design uses a hemispherical method combined with a spring loaded arm to cover each side of the poinsettias completely. **Sponsor**: Bob Tripepi **Sponsor Organization**: College of Agricultural and Life Sciences **Team Members**: Andrew Brackebusch - Mechanical Engineering Daniel Flick - Agricultural Engineering Tyler Hutten - Mechanical Engineering Jackson Stipe - Agricultural Engineering **Faculty Adviser(s)**: Dev Shrestha
Arm and hand mobility assistance, monitoring, and rehabilitation	Three projects were developed during a new ME Technical Elective on Assistive Technologies for Physical Impairment: 1) improved hand-opening assistance via modification of a commercially available SaeboFlex, 2) development of a wearable sensing device for arm use monitoring, and 3) finger and thumb rehabilitation training module for use with UI's PARTNER robot. **Sponsor**: Joel Perry **Sponsor Organization**: UI Department of Mechanical Engineering **Team Members**: Nik Butler - Mechanical Engineering Stephen Goodwin - Mechanical Engineering Bridger Hopkins - Mechanical Engineering Kyle Petersen - Mechanical Engineering Jeremiah Schroeder - Mechanical Engineering Shawn Trimble - Mechanical Engineering **Faculty Adviser(s)**: Joel Perry
Battery Ultracharger	The goal is to create a battery pack which can charge within 2 minutes and then use that power to recharge a phone. It will be compact and easy to move around, making it a great fit for people on the go with not a lot of time to spare. **Sponsor**: Herbert Hess **Sponsor Organization**: UI Department of Electrical and Computer Engineering **Team Members**: Keith Leitner - Electrical & Computer Engineering Robert Prew - Electrical & Computer Engineering **Faculty Adviser(s):** Herbert Hess

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Environmental Engineering Research Laboratory Demonstration/Exhibition	Graduate and undergraduate students from the Environmental Engineering Laboratory in the Civil Engineering Department will showcase and discuss UI research activities related to resource recovery from wastewater. **Sponsor**: Erik Coats **Sponsor Organization**: UI Department of Civil Engineering **Team Members**: Ben Carleton - Chemical & Materials Engineering Karina Eyre - Civil Engineering Eric Hughes - Civil Engineering Derek Probst - Civil Engineering Taylor Romenesko - Civil Engineering **Faculty Adviser(s)**: Erik Coats
Heat Exchanger Tube Removal Technology	Develop an extraction process for heat exchanger tubes that have failed during production and are detected by performing a leak test. The end goal is to reduce the waste of the whole heat exchanger when the tube has split and it is unable to be removed. **Sponsor Organization**: Colmac Coil Manufacturing Inc. **Team Members**: Alan Edwards - Mechanical Engineering Tony Keys - Mechanical Engineering Andy Roybal - Mechanical Engineering **Faculty Adviser(s)**: Michael Maughan **Mentor(s)**: Jake Gilles
Improvement of Lead-Acid Battery Performance with Conductive Ceramic Fibers Using a Recycled Tire Feedstock	Tires were used as a feedstock to deposit a highly conductive carbon matrix onto ceramic fibers. Those fibers were incorporated into lead acid battery positive plates, increasing the overall performance of the battery through increased positive-plate active material utilization. **Sponsor**: IEE/WERC **Sponsor Organization**: New Mexico State University **Team Members**: Seth Dustin - Chemical & Materials Engineering Jesse Hinshaw - Chemical & Materials Engineering Jieun Lee - Chemical & Materials Engineering Jeff Porter - Chemical & Materials Engineering Josh Roper - Chemical & Materials Engineering **Faculty Adviser(s)**: David Drown, Dean Edwards, John Canning **Mentor(s)**: David MacPherson, Charles Cornwall

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Robotic Burrow Exploration	We have designed a robot to explore and map the burrows of pygmy rabbits and burrowing owls. The robot is controlled from a PC and sends video back to the operator. A suite of sensors allows the robot to measure the burrow as it explores. **Sponsor**: Courtney Conway and Janet Rachlow **Sponsor Organization**: UI College of Natural Resources **Team Members**: Xihua "Jake" Chen - Electrical & Computer Engineering Stephen Hanes - Electrical & Computer Engineering Brett Menzies - Computer Science Lance Wells - Computer Science **Faculty Adviser(s)**: Bruce Bolden, Joel Perry
Snowmobile Traction Control	Design a control system and electro-mechanical interface to implement drive-by-wire, launch control, and traction control on the UI Clean Snowmobile Challenge vehicle. **Sponsor**: Dillon Savage **Sponsor Organization**: UI Clean Snowmobile Challenge Team **Team Members**: Scott Damiani Dillon Downing Chase Smith **Faculty Adviser(s)**: Michael Santora, Dan Cordon **Mentor(s)**: Dillon Savage
Technical Presentation Award Winners	
Automated Synchronous Generator Black Start System	When power goes out, generator field current must be supplied by batteries to re-start before reverting to using the generator itself to power field excitation; this is a black-start. We designed and implemented a black-start system for the generator in GJ Lab and modeled it in Real Time Digital Simulation. **Sponsor**: Nikhil Pai Sponsor Organization: Schweitzer Engineering Laboratories, Inc. **Team Members**: Khalid Alotaibi - Electrical & Computer Engineering Bruno Loza - Electrical & Computer Engineering William Parker - Electrical & Computer Engineering **Faculty Adviser(s)**: Brian Johnson, Feng Li

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Blackcloud Creek Culvert Replacement	The purpose of this project is to replace a problematic culvert on Blackcloud Creek with a new crossing structure. The intent is to improve hydraulic capacity in order to mitigate flooding of adjacent properties and resolve the perched outlet to allow upstream fish passage for spawning. **Sponsor**: Ben Davis Sponsor Organization: TerraGraphics Environmental Engineering **Team Members**: Regan Hansen - Civil Engineering Meagan Larrea - Civil Engineering Chris Steinmetz - Civil Engineering **Faculty Adviser(s)**: Fritz Fiedler **Mentor(s)**: Amed Ibrahim
CLEAN Ideas: Removal of Pharmaceuticals from Wastewater for Human Consumption.	Reuse of wastewater is becoming a necessity in regions with limited access to water. A two column filtration and Activated Carbon-Ozone reactor system has been designed to clean wastewater effluent and remove unregulated pharmaceuticals from solution. This makes wastewater effluent potable for potential reuse in the drinking supply. **Sponsor**: IEE/WERC **Sponsor Organization**: New Mexico State University **Team Members**: Kyle Knapp - Chemical & Materials Engineering Adam Spencer - Chemical & Materials Engineering Sydney Tracy - Chemical & Materials Engineering Morgan Wood - Chemical & Materials Engineering **Faculty Adviser(s)**: David Drown, James Moberly **Mentor(s)**: David MacPherson, Charles Cornwall, Greg Moller
Cryogenic Recycling of Haul Truck Tires	Open-pit mines generate thousands of waste tires each year that are mostly buried on-site, posing various environmental hazards. Although recycling possibilities exist, most are infeasible due to isolated mining locations. A mobile system paired with cryogenics to make recycling opportunities feasible for mine sites was developed. **Sponsor**: IEE/WERC **Sponsor Organization**: New Mexico State University **Team Members**: Allie Brown - Chemical & Materials Engineering Adriana Carbon - Chemical & Materials Engineering Isaac Curtis - Chemical & Materials Engineering Emily Mariner - Chemical & Materials Engineering **Faculty Adviser(s)**: David Drown **Mentor(s)**: Charles Cornwall, Dave MacPherson

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Cushman Pump Station and Pipeline Design	We are designing a pump station and a pipeline for a fish hatchery. **Sponsor**: Bryant Charlo **Sponsor Organization**: Deere and Ault Consultants, Inc. **Team Members**: Bret Grote - Civil Engineering Robert Hale - Civil Engineering Sean Hollenbeck - Civil Engineering Paul Loska - Civil Engineering **Faculty Adviser(s)**: Fritz Fiedler
***DeVlieg Innovation Project* - Electrolyzer & Compressor/Tank: Personalized Hydrogen Cell Refueling Station**	This project is an electrolysis chamber for a personalized hydrogen cell refueling station. It uses a membrane reactor to convert water into hydrogen gas through electrolysis. It produces half a mole per second of hydrogen which would theoretically be input into a compressor to be liquefied. The second component of this project is a compressor and tank design for a personalized hydrogen cell refueling station. The compressor and tank prototypes are run using nitrogen gas for proof of concept. The compressor pressurizes from 15 psi to 500 psi. The tank then cools the gas to a liquid. **Sponsor**: DeVlieg Innovation Fellowship **Sponsor Organization**: Engineering Scholars **Team Members**: Cooper Atkinson - Mechanical Engineering Avery Brock - Electrical & Computer Engineering Aaron Burton - Electrical & Computer Engineering Ned Caisley - Electrical & Computer Engineering Taylor Davis - Chemical & Materials Engineering Alyssa Ertel - Chemical & Materials Engineering Stafford Morse - Mechanical Engineering Cameron Murdock - Electrical & Computer Engineering Kasey Peach - Chemical & Materials Engineering Paden Putnam - Mechanical Engineering Sam Schaffer - Electrical & Computer Engineering Nick Shaber - Mechanical Engineering Kathryn Simpson - Chemical & Materials Engineering JT Sutton - Mechanical Engineering **Faculty Adviser(s)**: Robert Stephens

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Integrated Rocket Ramjet	Design and model an integrated rocket ramjet. The engine transitions without sacrificial parts from the rocket to the ramjet stage upon reaching the design speed. Key features include a sealing inlet and a liquid fuel ignition source that doubles as a barrier to shield components from the solid rocket propellant. **Sponsor**: John Crepeau **Sponsor Organization**: UI Department of Mechanical Engineering **Team Members**: Jesse Caudle - Mechanical Engineering Marc Compton - Mechanical Engineering Christopher Fraser - Mechanical Engineering Alexx Jensen - Mechanical Engineering **Faculty Adviser(s)**: Michael Maughan **Mentor(s)**: Jacob Gilles