MECHANICAL ENGINEERING | NEWS

University of Idaho
College of Engineering

OUTREACH

Vandal Engineering At 2017 TECH DAY

(Steve Beyerlein and Joel Perry)

Vandal Mechanical Engineers won first and second place during the hands-on CAD modeling competition at TECH DAY 2017, taking home two SpaceMouse Kits. Conference Organizer Chantel Wilkes complimented U of I students for their leadership in supporting multiple TECH DAY venues on June 5-6 in Spokane, WA. TECH DAY is a regional manufacturing event that brings professionals and students together to show local companies the capabilities of local students who are ready to contribute to the regional design/manufacturing economy. TECH DAY 2017 attracted over 300 people, including 9 U of I students and 3 U of I faculty members.

This year marked the first annual Education Day as part of TECH DAY. The inaugural Education Day was well-represented by University of Idaho, where U of I students hosted five booths that generated lively audience interest.

U of I student Autumn Pratt generates a CAD model of Quest Integration's Chantel Wilkes (U of I alumna) using a hand-held laser scanner.

LEGACY ENGINE MODELING IN INTRODUCTORY CAD COURSES

The culminating project in our sophomore CAD course involves examination of a different set of engineering drawings for a classic machine from the previous century (typically an engine). Students work in teams to discern design intent, create part as well as assembly models, and generate a shop-ready drawing package.

TEACHING DESIGN FOR MANUFACTURING

As part of our introduction to design for manufacturing, we have developed a challenging 'block project' that combines the use of engineering drawings with coordinate dimension callouts as well as true position callouts.

SOLID MODEL OF THE STUDLEY TOOL CHEST

Students in an advanced CAD elective modeled the Studley Tool Chest using SolidWorks. The original tool chest belonged to Henry Studley, a piano and organ maker in the late 1800's. Studley made the chest to house his 245 + tool collection.

REHABILITATION ENGINEERING

The Mechanical Engineering Department is home to a growing Rehab Robotics group with a focus on developing new technologies for assessment, rehabilitation, and assistance of arm impairment through various wearable robotic technologies.

USE OF CAD AND LASER SCANNING IN COSTUME MAKING

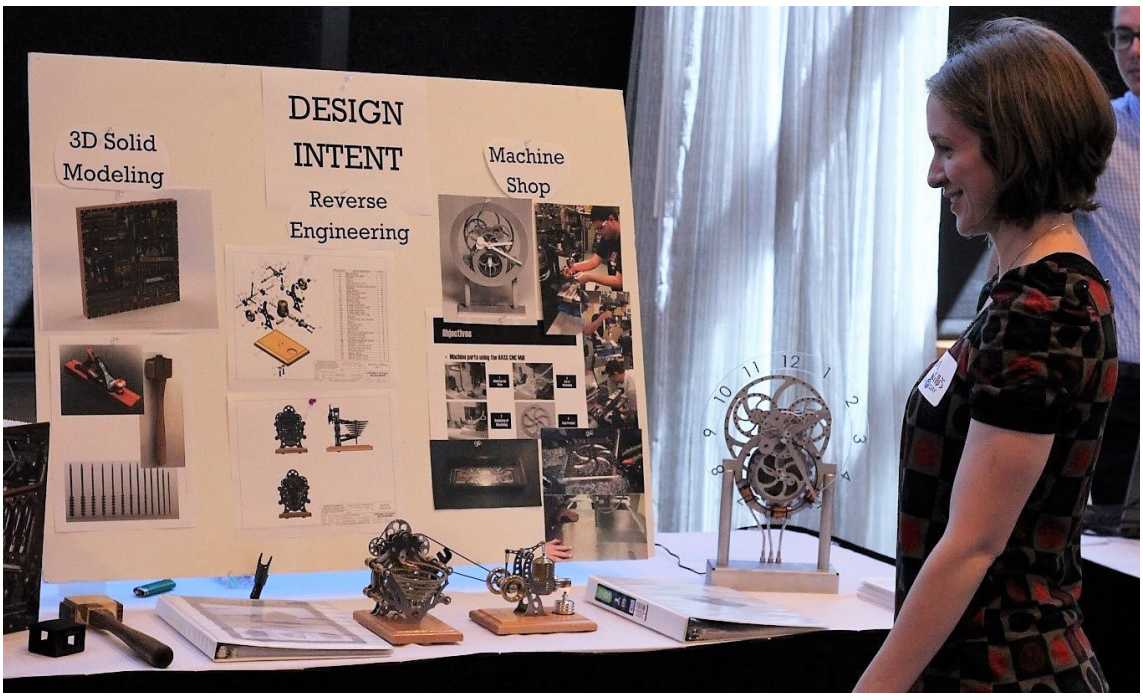
Coupling CAD tools with laser scanning unlocks many opportunities for interdisciplinary undergraduate research. This project features collaboration between mechanical engineering students, fashion design students, and a theater arts student. The outcome was a personalized dress design that was used in a spring 2017 theater production.

TECH DAY

Day 1 of TECH DAY concluded with an evening of networking over a skyline view, hors d'oeuvres, beverages, and an impressive variety of indoor games and friendly competitions.

Day 2 was filled with insightful workshops sharing modeling tips, tricks, and the latest releases in new SolidWorks software features. Workshop topics included sessions on Mechanical Engineering, Electrical Engineering, Marketing and Sales, Management, Information Technology, and Manufacturing. Also interspersed in the day were two timed competitions for accurate part modeling and part assembling.

TECH DAY modeling craze featured a part modeling contest. Sammy Stuhlman (left) and Tony Branz (right) working magic with SolidWorks.



Sarah Willis at her TECH DAY booth. U of I student booths included a poster and models from a U of I Technical Elective on Design Intent.

American Society of Mechanical Engineers (ASME) Annual Field Trip

(Brandon Hilliard)

A record number of students and faculty participated in the spring 2017 ASME student industry field trip. Thirty-six students and two faculty members (Steve Beyerlein and Michael Maughan) traveled to the Puget Sound area for a tour of six companies: Blue Origin, Exotic Metals Forming Company, Janicki Industries, Janicki Bioenergy, PACCAR, and The Boeing Company.

Blue Origin

The tour included the recently retired New Shepard rocket, components that will be in the New Glenn rocket, a passenger capsule with its passenger safety features, and the rockets in various stages of assembly. (Special thanks to Brandon Butsick and Brandt Pedrow for the tour.)

Exotic Metals Forming Company

Multiple Boeing Company Excellence Award winning components were on display at the Exotic Metals Kent campus. Students viewed milling machines, hydraulic presses, exhaust nozzles for military jets, and ducting that runs through all Boeing 737 airliners. (Special thanks to Rob Reeves and Brent Yaeggy for the tour.)

Janicki Bioenergy and Janicki Industries

At Janicki Bioenergy, students viewed the recently completed Omni Processor, funded by the Bill and Melinda Gates Foundation, which converts waste products into electricity and potable water. The tour of Janicki Industries included multiple 5-axis mills specifically designed to handle complex, large-scale high-precision projects. (Special thanks to Lucas Reid, Caitlin Owsley and Matt Soden for the tours.)

PACCAR

Tour participants observed engineering, design, and extreme testing of Peterbilt, Kenworth, and DAF trucks. Tests included the simulation of more than one million miles of driving, extreme weather conditions, and severe impacts on the cabin of the trucks. (Special thanks to Andrew Upson for the tours.)

The Boeing Company

Students witnessed how the leanest airplane factory in the world assembles some of the safest and most popular commercial airplanes–the 737 NG and 737 Max. The logistics of the process were amazing - with hundreds of suppliers from around the world and more than 300,000 parts producing 50 airplanes per month. (Special thanks to Todd Gray and Paul Huber for the tours.)

In addition to the tours, ASME members attended a mixer with U of I alumni from the Seattle area and engaged in conversations about employer expectations and post-graduation tips. Students also explored Seattle, making lasting memories with old and new friends.

The spring 2018 ASME Industry Tour will be to the Portland area. If you work for a company that would welcome U of I students for a tour, please contact the Mechanical Engineering Department.

ASME Tour Participants at Exotic Metals

Visiting the Seattle Space Needle

SAE World Congress Experience 2017

(Patrick Paulus)

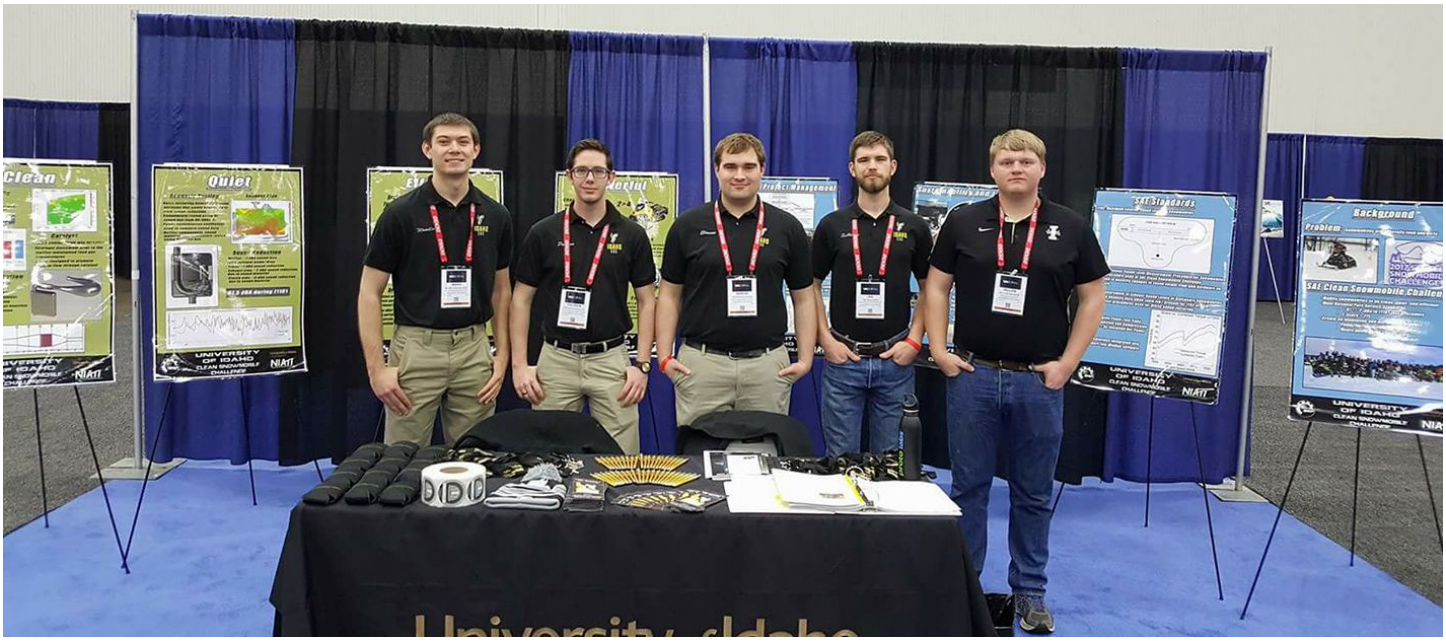
Five members of the UICSC team traveled to Detroit, Michigan, on April 4th to participate in SAE's World Congress Experience, an annual expo highlighting research and development in the automotive industry. Team members networked with industry professionals, presented a published paper on project management habits, toured companies, and explored Motor City.

On Tuesday, the team toured AVL, Ford, and Mahle facilities. These tours provided perspectives on the challenges, operation, and various roles companies play in the automotive industry. Team members also met and connected with alumni at each of the companies who shared stories about their college experiences.

On Wednesday, the team won a SAE student section showcase competition in the main exhibit hall, earning a small prize and bragging rights. The rest of this day was spent networking with guests, exhibitors, and sponsor companies, and receiving advice and praise on previous projects on the snowmobile.

On Thursday, Mark Woodland and Patrick Paulus presented the team's SAE Technical Paper entitled 'Implementation of Project Management and Knowledge Management Practices in Activities of a Clean Snowmobile Competition Team'. (http://papers.sae.org/2017-01-1261/) Since last April, this paper inspired organizers of SAE Collegiate Design Series Competitions to include a required section about project management practices in team design reports. That evening, the team socialized with the other universities at the event and caught up with colleagues from Michigan Tech's snowmobile team.

With an extra day in Detroit, the team visited the Henry Ford Museum and explored the city, meeting with alumni in the area in the evening. Inclement weather made for an interesting return trip, but everyone came back in high spirits after an excellent and rewarding week.



UICSC (left to right) team Mark Woodland, Patrick Paulus, Aaron Eliason, Ian Sullivan, Dillon Savage.

Clean Snowmobile Challenge 2017

(Jason Maas)

On the Friday of March 3, eleven students, from freshman to graduate student, packed into an SUV and diesel truck to make the 30+ hour journey to Houghton, Michigan for the Clean Snowmobile Challenge. The team's entry this year was a 2013 Ski-doo model lovingly nicknamed Voodoo for its last year of eligibility for the competition. A new 2017 model was intended for use this year, but electrical issues arose that could not be fixed before the competition date, forcing a change of focus to the old chassis.

This year's competition was quite a challenge for the organizers. The weather at the beginning of the week was near 50 degrees Fahrenheit with thunder and lightning, causing the usual 100-mile endurance run to be shortened to 30 miles around a track. As the week progressed, temperatures dropped as low as 0 degrees with wind-chill down to -30, causing the snow that had previously melted to become solid ice. This not only presented issues of safety, but limited a snowmobile's ability to cool its engine, causing problems for many of the teams.

Perhaps the most exciting mishap of the week came during the in-service emissions event. In this event, the snowmobile pulls a sleigh of emissions-analyzing and fuel-delivery equipment to measure emissions output and fuel consumption. A weld on the tongue of the first team's sleigh failed causing the cart to fall during operation and vault over itself, landing upside-down on the equipment and destroying it in the process. Many of the team members were worried that the event would be cancelled because of this mishap. However, the great people who run this competition worked through the night to bring an old model up and running the following day.

As was true in the last few years, our team performed very well at the competition. However, an issue with the in-lab emissions event cost us significant points. Despite these problems, we achieved a fourth-place finish and awards for best acceleration and best value. We performed very well in almost all events, notably achieving very high scores in the technical paper and presentation. Our snowmobile also had one of the highest fuel economy scores, getting edged out only by a well-calibrated four-stroke engine.

The team arrived back in Moscow very tired from the long drive home, but with many fresh ideas and a renewed enthusiasm for future projects. In the weeks following competition we have been busy transferring knowledge from our graduating members so this success may continue long into the future.

Cade Smith on Voodoo.

CSC Team members (left to right) Ben deRuwe, Aaron Elisaon, Leland Maris, Jason Maas, Cade Smith, Ian Sullivan, Brian Gift, Alex Kiss.

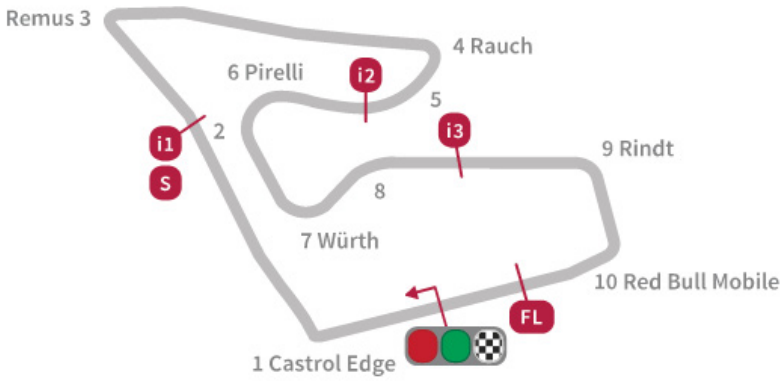
Students Earn 5th Place in ESTECO Aprilia Race Engine Design Competition

(Edwin Odom and Steve Beyerlein)

During the 2016-017 year, four U of I students entered the ESTECO Academy Design Competition that featured realization of a track-customized motorcycle engine. Details about the competition and access to high-end industry software tools were provided just four months before the final design report and PowerPoint presentation were due. Before the team could get started, they needed to figure out how to exchange data between four different software packages, and research relevant engine design parameters. The team created a simulated race track comparable to the Austrian Grand Prix to validate their optimized solution. Performance of different 250 cc engine designs were simulated in GT-POWER and modeFRONTIER was used to specify various intake, exhaust, and cam design parameters to optimize lab time. The team's approach incorporated realistic, vehicle dynamics in the design of race engines. For their efforts, the team was recognized in a short list of competition winners.

In the words of Dylan Johann: *"This capstone project was unique because of its competition structure. This meant that we had a very different relationship to the client compared to a traditional capstone project. The design requirements, while open ended, did not develop over the course of the project. Instead, we needed to focus our efforts on time management, thorough research, and validation of performance because the client would only see (and evaluate) our final product. This unique opportunity cultivated a set of skills more suited to entrepreneurial engineering. Instead of providing a service to a client, we developed an idea to pitch to a group of engine specialists, software experts, and race bike investors. I'm glad I was able to be part of this alternative capstone experience and hope we left a legacy for others who might want to pursue modeling and simulation focused projects."*

Team Members (left to right) Bill Duncan, Brian Remsen, David Pick, & Dylan Johann at 2017 Design Expo.



Austrian Grand Prix simulated racetrack.

Race bike.

Grand Challenge Scholars Program

(Miyako Nakayama)

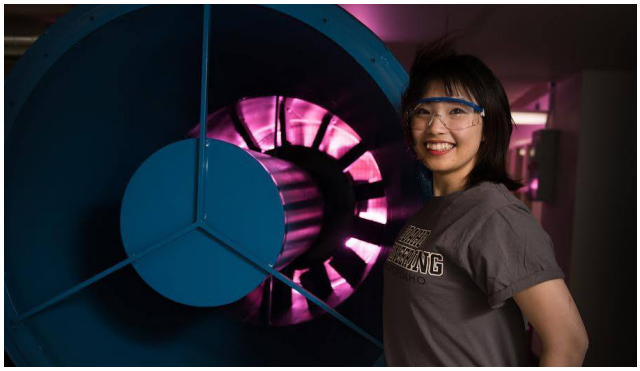
Ever since the Fukushima nuclear disaster in 2011, I have been interested in safer renewable energy sources. I selected wind energy as my Grand Challenge Scholars Program research topic during my sophomore year because of discussions with other engineering students about the potential for wind energy in Japan and also in the western U.S.

I began my project with an extensive literature review. This was especially important because I had not yet taken fluid mechanics and mechanics of materials. What I produced by the end of this past summer was a research paper that covered (1) history of wind turbines, (2) market growth and opportunities, (3) common configurations and components, (4) wind turbine reliability, (5) cost/benefit analysis for installing wind farm in Hokkaido, Japan, and (6) research challenges for next generation wind turbines (Anti-cyclone WTs, Recyclability, Cybersecurity, and Energy Storage Systems).

Along with my mentor, Assistant Professor Behnaz Rezaie, I am in the process of submitting a proposal to present my work at the American Wind Energy Association meeting in Chicago next May. Now that I am a junior I am looking forward to enriching my understanding of wind energy technology through technical electives in turbomachinery and computational fluid dynamics taught by Associate Professor Tao Xing.

The Grand Challenge Scholars Program has helped me develop many competencies that will be useful in my academic and professional careers. As English is not my first language, creating the literature review provided an opportunity to improve my English reading and writing skills. I also learned how to find relevant, quality articles in database searches and to focus on key sections of each article. Writing my research paper also taught me the format and style used in engineering writing.

Nuclear energy is the dominant form of energy used in Japan today. In the future, I plan to use what I have learned to help Japan develop and use more renewable forms of energy working for a technology/energy company.



Miyako Nakayama in wind tunnel lab.

An Interview with Mechanical Engineering Student Jack Gonzalez

Jack Gonzalez is a sophomore in mechanical engineering. He was recently interviewed as a scholarship recipient about his experiences at U of I.

Jack Gonzales outside ME 223 Lab

When did you realize that your field of study was your passion? *In high school, I was lucky enough to be able to participate in Project Lead The Way (PLTW) which is an advanced, four year engineering program that my high school had adopted. After taking the second year course, Principles of Engineering, I was hooked.*

What is the most fascinating aspect of your field of study? *I am personally a big fan of rapid prototyping which includes the ever growing field of 3D printing.*

How has the University of Idaho helped inspire you to succeed? *In the Making Innovating and Learning Laboratory (MILL) located in the library, there are lots of useful tools to help me tinker and prototype objects for my classes and personal projects. I love going in there and seeing what my calculations and hard work have created, and it's inspiring to have something that I designed in my hands.*

What obstacles did you overcome to attend the University of Idaho? *I didn't have to overcome too many obstacles, but one of the larger ones was dropping my much loved practicing of music. I was originally going to have a music minor in music performance on the bassoon, but plans fell through and I moved on.*

How have you helped pay for your college expenses? *I received scholarship money, a little help from my parents, and this year I had the opportunity to become an RA, which cut eight thousand dollars off my yearly costs.*

If you are a recipient of a scholarship, what is the name of the scholarship? *I am a recipient of the Walter B. Hayes scholarship for good grades in high school and the honors scholarship for being a member of the honors program.*

What impact has receiving scholarship support had on the quality of your education? *The scholarships that I have received have allowed me to come to the university without the additional stress of overwhelming loans.*

Name a place at the U of I that represents your passion academically and a second place that represents your passions personally and why. *The place that most represents my passion academically would be room EP 103 in the Engineering Physics building. I have my mechanical engineering labs there and I associate the room with awesome feelings of teamwork and success. A second place would be the Trout room in the LLCs because that's where RHA met last year and where I have my staff meetings as an RA now.*

If you could talk directly to the person who donates to your scholarship, what would you say? *Thank you for your wonderful contribution and I sincerely hope you get to use something that I make someday. Who knows, maybe you could be using signature Gonzalez technology!*

GRADUATE STUDENTS

Clandestine Summer Adventure

(Alex Olson, Coleton Bailey, Chris Bitikofer, Sally Mei)

Once upon a time, not too long ago, four graduate students were studying for their Continuum Mechanics exam and did what graduate students do best, procrastinate. Faced with confusion at the true meaning of Kronecker deltas, push forward and pull back transforms, and index notation, we felt as dumb as a box of rocks. This sparked our idea for a glorious revenge scheme. We would get back at our professors by confusing them with rocks – pet rocks to be precise.

With the power of the Internet, we procured a supply of googly eyes and rocks. We planted the rocks and their names (each related to the professor's field of research) in each professor's mailbox and watched quietly to see how they would react. Some professors clearly enjoyed their mysterious presents. To our great joy, Professor Crepeau soon posted pictures of all the adventures he took with his rock, Stefan Armstrong.

Professor Crepeau contemplates the meaning of his rock.

Sally T-Rex Mei, Professor Crepeau, Alex Olson, Chris Bitikofer (left to right)

We had more googly eyes and ordered a plethora of miniature dinosaurs to accompany any rocks who weren't able to have fascinating adventures. We delivered them with a new twist: a hint and the name of the rock they were looking for as a challenge for our professors to see who would reunite their dinosaurs and rocks. Of course we couldn't let our ruse go unexplained forever, so we confessed with a poem, Ode to Engineering and a survey, because who doesn't love some good old fashioned data analysis in their spare time.

For their outstanding efforts in reuniting their dinosaurs and participating in the summer adventure, we awarded Professor Beyerlein and Professor Crepeau laser cut, acrylic dinosaur trophies.

Read **Ode to Engineering** poem at: http://www.uidaho.edu/~/media/UIdaho-Responsive/Files/engr/academic-programs/me/newsletters/ode-to-engineering.pdf

Chris Bitikofer

I'm a Master's student working under Associate Professor Eric Wolbrecht and Assistant Professor Joel Perry on the BLUE SABINO project. BLUE SABINO (BiLateral Upper-limb Exoskeleton for Simultaneous Assessment of Biomechanical and Neuromuscular Output) will be a bi-lateral (two armed) wall- or

Chris Bitikofer at his TECH DAY booth.

floor-mounted exoskeleton which will act as a measurement system. We hope to use the system to unify and improve current metrics occupational and physical therapists employ in the assessment and quantification of upper arm mobility. As a member of the BLUE SABINO project, my research revolves around modeling the kinematics and dynamics of the system. I have produced models using the methods I learned in Associate Professor Wolbrecht's Robotics course to reproduce the kinematic motion of the system and to calculate manipulator Jacobians that we will use to implement force/torque control loops. More recently, I have been developing range-of-motion and motor torque requirements for the shoulder mechanism

using motion capture data from an earlier study of the upper arm during common activities of daily living (or ADLs). My next goal is to develop a spring gravity-balance mechanism for the shoulder joint of BLUE SABINO, which would allow us to reduce the size of motors needed to actuate the shoulder joint. Spring balancing can also allow us to produce a safer robot that would be self-supporting with or without access to external power. Working on this project has been a great opportunity. I am excited to see this robot come to life, and I can't wait to use the skills I've been developing at the University of Idaho to help people recovering from strokes and other disabilities.

Rick Leathers

I grew up in a small town in southeast Idaho, working in my family's automotive electrical shop and enjoying hobbies like RC airplanes and riding dirt bikes. These experiences gave me an overwhelming curiosity of why machines are designed the way they are and the science behind them. I chose engineering knowing that I wouldn't be satisfied studying anything else. I started my engineering education at Idaho State University in 2011, but after hearing good things about the University of Idaho's mechanical engineering program, I decided to transfer and attended U of I the spring semester of 2012.

While in the undergraduate program, I was undecided as to what facet of mechanical engineering I wanted to focus on and what type of job I wanted. After taking thermodynamics and applied thermodynamics classes I gained a deep love and appreciation for the thermo/fluids aspect of mechanical engineering. The goal of systematically understanding detailed combustion processes for alternative fuels seemed both challenging and rewarding to me. I applied to graduate school at the University of Idaho and joined Assistant Professor Kamal Kumar's research group the spring semester of 2016.

My thesis research is on autoignition studies focusing on renewable fuels and is a collaborative effort with the University of Connecticut. The apparatus used for this research is called a Fuel Ignition Tester (FIT). The FIT is basically a constant volume combustion chamber. Pressurized air fills the chamber and is heated; fuel is injected though a single hole nozzle (much like a diesel combustion system), and an autoignition event occurs. The response is recorded via in chamber pressure sensors. This provides valuable data on the ignition delay times for different fuels and blends.

I presented some of my work at the 10th US national combustion meeting in Maryland this past spring and I am currently working on publishing it as a journal article. Presenting at the conference in Maryland was gratifying and enlightening. I met leading researchers in the field and made some good friends. I look forward to presenting additional work at the western states section conference of the combustion institute this fall in Wyoming.

Nick Shaber

As a senior in Mechanical Engineering, I have been given the opportunity to begin my graduate studies as I finish my final year as an undergraduate. Currently, I am part of a research team that works on a project funded by the Department of Energy (DOE). In this project, we are investigating the mechanical properties of Alloy 709, a more recent generation of stainless steel alloy that appears to have suitable properties for structural applications in nuclear power plants. Due to the mechanical properties of this steel and the nature of the experiments to be performed, the tests take many hours to many weeks to complete. To answer the need for increased testing, a second testing frame was needed. To accommodate the need for another test frame I was awarded a Nuclear Engineering University Programs Scholarship by the DOE to focus on this work. Over the course of the past summer I have been fixing, calibrating and getting a second servo-hydraulic test frame operating for fatigue testing. We will be working with our two servo-hydraulic frames to conduct multiple experiments on Alloy 709. The experiments are currently being conducted at temperatures ranging from 600° to 800° in independently self-regulated furnaces. To accommodate our specimen geometry, one of the existing furnaces required modification for viewing and testing.

Moving forward with the experimental test matrix, we will be investigating moderate hold times creep for Creep-Fatigue Crack Growth conditions. Currently one of these moderate hold time tests is under way at both 600°C and 700°C with a hold time of 10 minutes. I look forward to working on this research project as I begin my Master's program. I was originally introduced to the possibility of this research by one of my Mechanical Engineering professors, Professor Robert Stephens, who presented me with an opportunity to work in his lab. The main aspect of the research that I was drawn to was the hands-on aspect. The research has offered me a better understanding of fatigue principles and the real-world applications of fatigue.

STUDENT AWARDS

Frank Wesley Childs IV Memorial Scholarship

Child's Recipients - Morgan Kerby (left) and Jacob Miller (right)

The Frank Wesley Childs IV Memorial Scholarship, established in December 1984, honors Frank Childs, a Mechanical Engineering graduate of the University of Idaho, class of 1984. This scholarship is open to University of Idaho students majoring in Mechanical Engineering who have junior or senior standing in the ME program and who have achieved a minimum U of I grade point average of 3.0. Applicants must write a brief statement explaining why they chose to study engineering and what beneficial service they might perform through the field of engineering. In their own words, here are this year's winners of the Childs Scholarship.

Morgan Kerby

I grew up on a farm and experienced first-hand several design flaws in the equipment we used. Some flaws were merely annoying, while others posed real safety issues. My goal as an engineer is to be a go-between for consumers to industry to get real input in order to make the best product possible. I would like to work in the agricultural field where I can help farmers and ranchers have equipment that they enjoy using and that does not contain any flaws. Making the most efficient, effective, and user-friendly equipment is my goal.

Jacob Miller

Growing up, I always had a fascination with how things worked. It wasn't until I lived with a relative who suffered from a physical disability that I knew I wanted to learn how I could make a difference in the world. Mechanical Engineering is the most diverse and challenging, yet applicable major, to peak my interest. Taking my knowledge gained through the outstanding staff and faculty at the University of Idaho, I fully intend on impacting the prosthetics world by creating solutions to everyday problems experiences by those less fortunate. I plan on taking my skills and applying them in order to personally change the lives of people that suffer from physical impairment.

Outstanding Senior

Autumn Pratt

I grew up in Sanders, Idaho living in a wall-tent, homeschooling, and raising goats, which was a very pleasant way to be a kid. In ninth grade I moved to Moscow to attend high school at Logos, where I became very interested in math and physics. I stayed in Moscow for college because I like the area, the engineering school at U of I is good, and Maria Pregitzer was really nice at the info meeting. I've been very pleased with my choice. The ME department is organized and friendly, and everyone knows each other. The students around me work hard and encourage me, and I've learned a lot. I am now attending graduate school at Cornell with a particular interest in biologically inspired engineering.

Read more at: http://www.uidaho.edu/autumn

Outstanding Senior

Selso Gallegos

I grew up with my nine siblings in Parma Idaho, a small town near Boise, Idaho. Every summer from age 11 to 18, I worked alongside my family as a farm laborer in Idaho's Treasure Valley picking cherries, apples, detasseling corn and weeding onions. During those years I noticed that much of the equipment used was inefficient, and that most of what we did could be done in better ways. My parent's hard work and my siblings' support and accomplishments inspired me to pursue a bachelor's degree in Mechanical Engineering at the University of Idaho. As a first generation college student, my experience at the University of Idaho has been challenging and rewarding, from my course work in the ME Department to my involvement on campus, in the Moscow community, and beyond. I spent an Alternative Service Break in Ecuador working to improve the quality of life in impoverished communities. After graduation I am excited to initiate my professional career as a Supply Chain Engineer at Intel in Chandler, Arizona.

Read more at: http://www.uidaho.edu/selso

Outstanding Senior

Adam Sedgwick

I was born in northern Utah on a wheat farm near the small town of Grouse Creek. Growing up on a farm taught me to appreciate and even enjoy the ability to work hard and to get a job done right. My interest in mechanical systems and how they work began with my exposure to farm equipment. By age 12 our family had moved to Post Falls, Idaho. I am very grateful for the education I received in High School. A number of teachers were key in helping me grow in my desire to learn and do well in school. I really began to enjoy learning and felt like I was gaining knowledge and skills that would help me solve problems and make a positive impact on others.

Having an aptitude for math and science and a desire to create and build tools or products to help others, I decided to go into Mechanical Engineering. It was a great choice. The decision to go to the University of Idaho was an easy one; it has a great Engineering program with very helpful and involved faculty, is affordable, and is a great area. Since being here at the U of I, I have been involved in the Engineering Scholars program, the American Society of Mechanical Engineers (ASME), and the Clean Snowmobile Challenge team. Each as given me opportunities to participate in project work, go on site tours, and develop as a Mechanical Engineer. Last summer I interned at the Naval Reactors Facility (NRF) in the Facilities department. I have accepted a full time position as a Facilities Engineer with NRF and will start in June.

Society of Manufacturing Engineers Presentation Awards

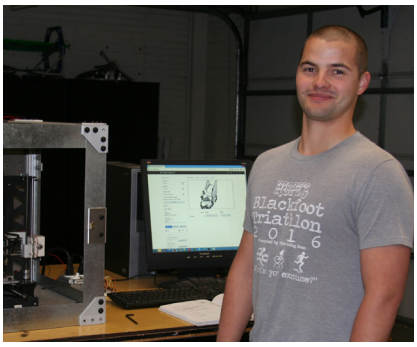
Tommy Moore

In the spring of 2017, Thomas Moore, now a senior in Mechanical Engineering, took first place in the local Society of Manufacturing Engineers student presentation competition to highlight his work tuning the mechanical properties of 3D printing material. Tommy was proving the concept of adding metal filings to the printer filament and aligning them with a magnetic field to create and control anisotropic material. Of the experience, Tommy had this to say: *"At this competition I competed against other students who were also presenting on manufacturing related topics. Before this instance I had never presented research to a group of people, so to do well in this competition I knew that I would have to put in the work to effectively present my research. I was fortunate enough to have the expertise of Assistant Professor Michael Maughan, to help coach me on how to accurately present research to a technical audience."*

Tommy impressed the judges with his Vandal mechanical engineering knowledge and took home a $500 prize.

Matthew Buchanan

Mechanical Engineering senior Matthew Buchanan, presenting on behalf of the 3D metal AM team, won second place in the Society of Manufacturing Engineers (SME) student presentation competition on April 25th. An interdisciplinary capstone team, led by Assistant Professor Michael Maughan, has been developing additive manufacturing capabilities at the University of Idaho. Buchanan and the team designed the first generation of their "printer" to be much less costly than current metal additive manufacturing equipment. The machine is currently capable of producing parts from steel with walls as thin as 4 mm. Build size is comparable to existing printers that create plastic parts. The printer uses wire-feed welding technology and common but strong steel feedstock material to keeps costs down. The goal is to eventually commercialize the printer to the maker and prototyping markets.



Matthew Buchanan with the 3D printer he helped to build. The printer uses welding technology to form metal parts.

Agile and expedited manufacturing have the opportunity to revolutionize the way manufacturing is thought of. 3D additive manufacturing (AM) is one approach that could not only expedite manufacturing, but produce parts with enhanced materials properties.

We asked Matt some questions...

What's most exciting about working on the printer?
What's most exciting is that this is a real-world solution. 3D metal printing does exist currently, but the price keeps the technology out of reach to almost everyone. Our printer changes that. Our printer was developed for an incredibly low price, bringing 3D metal printing to the home user, small-businesses, and academia.

What are your future goals?
My future goals are to attend graduate school to earn my M.S. in Mechanical Engineering, then later work in the robotics engineering field.

Solid Modeling Across the Curriculum

(Edwin Odom)

Solid modeling is integral to the way we teach project management, teamwork, critical thinking about design intent, solving problems in mechanics as well as machine design, manufacturing, and capstone design. Solid modeling is especially helpful in teaching of the process and craft of design.

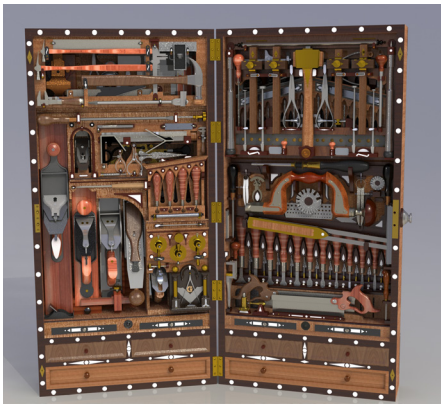
We begin with a sophomore introductory course in solid modeling that culminates in a team project involving part modeling, assembly modeling, and drawing package realization from a set of 50-100 year-old legacy drawings. In deciphering these drawings, students make decisions involving sub-assemblies, check dimensions, and mating of parts. Sophomore work products were featured in one of the TECH DAY booths and a decade of these products are archived at www.webpages.uidaho.edu/mindworks/Solidworks/past_projects.htm

During the junior year, solid modeling is used to supplement instruction in the intermediate mechanics of materials course. Initially, it is used for graphical statics and the visualization of the stress state in combined stressed members. Solid modeling is then used to calculate cross section properties to include moments and product of inertia as well as principal moments of inertia. The smart dimensioning tool is deployed to determine distances from the principal moments of inertia axes to points and interest. Using these values, stress calculations are made and solid modeling is used to visualize the final stress distribution in the cross section. In our machine component design course, solid modeling is used to make mechanical drawings of the bolt and material geometry affected by a high performance fastener connection. Teaching/learning practices associated with the junior course were recently recognized by the ASEE Engineering Design Graphics Division in a paper entitled 'Using Solid Modeling to Enhance Learning in Mechanics of Materials and Machine Component Design' which one the 2016 Outstanding Technical Paper award. The paper was authored by Professor Edwin Odom and Professor Steven Beyerlein.

Read the paper: http://www.uidaho.edu/~/media/UIdaho-Responsive/Files/engr/academic-programs/me/newsletters/solid-modeling-beyerlein-odom.pdf

In our lean manufacturing course, solid modeling is used to introduce GD&T with true positioning drawings for the infamous 'block project' that is featured in a companion article by Alex Olson. Our advanced solid modeling course focuses on preparation of certification exams, manufacturing, and built-in simulation capabilities of SolidWorks.

This past year, we began a research effort to study design intent associated with legacy artifacts. We begin with who, what, when and where of a design artifact but to get at the craft of the design, we look at the how and why of the design. A recent example is a study of the Studley Tool Chest displayed in the Smithsonian Institute. Last spring, we modeled the 245 plus tools in the chest and created animations to demonstrate how they efficiently and artistically fit within the tool chest. A particularly compelling tool in this chest is the custom hammer. We used solid modeling to recreate this tool and to study various manufacturing technologies, i.e. machining, sand casting, and investment casting. The more we research this topic, the more we wonder whether design is a process or a craft. We would welcome your thoughts.



Studley Tool Chest Render

Replica of the Studley Infill Hammer. Also shown is the cope used to cast the bombe brass housing, the 3D printed pattern for the casting, and 3D mock-up of the housing.

Innovative learning spaces support design pedagogy. New Samsung 32" monitors and Dell T5810 computers (mounted underneath glass tabletops) in GJ 115.

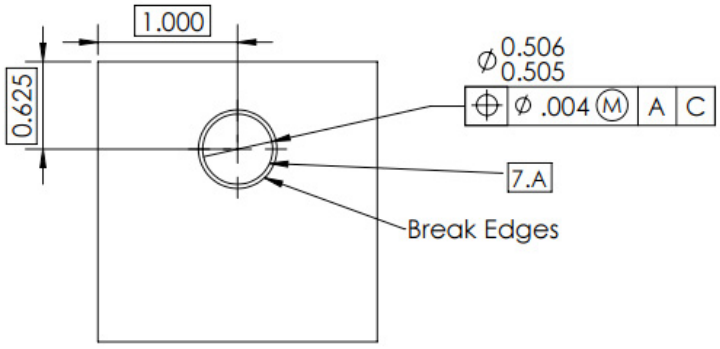
Teaching Geometric Dimensioning and Tolerancing (GD&T)

(Alex Olson)

The University of Idaho ME410 (Lean Manufacturing) class exposes students to principles of lean, manufacturability, and machining processes. The class is divided into both lecture and lab sessions. While the lecture focuses on teaching lean manufacturing concepts, the lab uses hands-on work to teach manufacturability and machining in the ME machine shop. Based on alumni feedback, the department is seeking to improve student's understanding of GD&T and its application in design, manufacturing, and inspection. This summer we experimented with a GD&T lab exercise in ME 410. The curriculum materials used in this study can be found online at www.webpages.uidaho.edu/mindworks/lean.htm

Due to the breadth and depth of GD&T it was decided that, for initial exposure, only true-position and run-out should be taught. A true position basics sheet and a worksheet exercise was produced by Jacob Gilles during his MS thesis work. The basics sheet is a one-page primer explaining how to identify, translate, and calculate true-position callouts. The worksheet exercise has a half-dozen critical thinking questions that reinforce principles explained on the basics sheet. Both were provided in the first ME 410 lab session (following a shop orientation tour) and completed before the end of class with guidance by graduate student mentors.

The infamous ME 410 block project drawings were converted from bi-lateral dimensions (Figure 3) to true position (Figure 4). This forced students to read/consider GD&T tolerances in making their manufacturing and in inspecting during fabrication. Since the block project has both mill and lathe parts, students typically switch machines at the midpoint. This spring we took advantage of this transition point and performed in-process

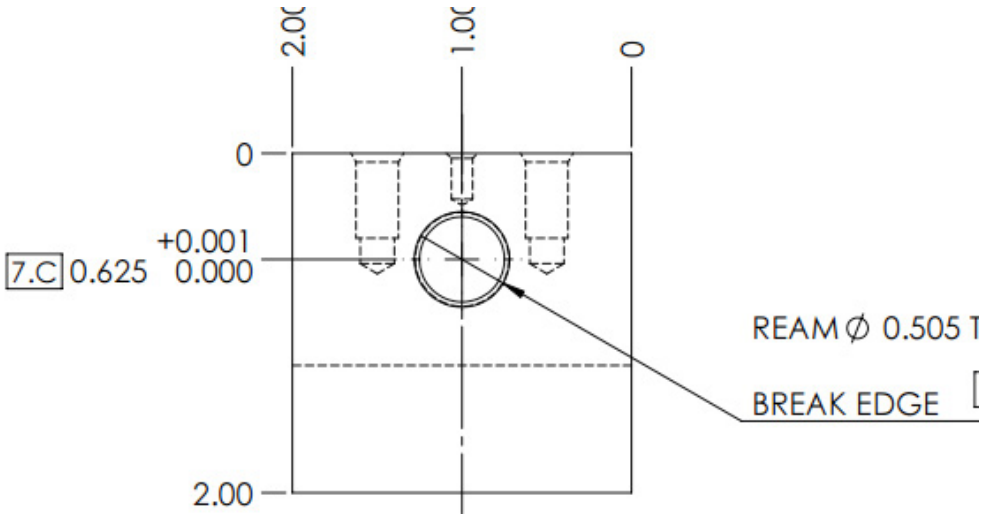


Sample of "New" GD&T True-Position Drawing

inspections using GD&T. Tools such as telescoping probes, pin gauges, and our coordinate measuring machine were deployed in this exercise.

ME 410 has a single in-class exam that tests the material taught during the lecture and lab. This semester we provided students with a few practice problems (with solutions) for GD&T and included a true-position question on the exam. Since the first GD&T activity and the block manufacturing project were done in small groups, exam preparation and performance provided an opportunity to individually assess GD&T learning.

As a result of this experiment, we concluded that introducing GD&T should be done gradually. It is important to frame GD&T ideas within physical examples that students can touch and measure along with properly dimensioned drawings that reflect design intent. By completely abandoning the old drawing package and only supplying the GD&T package, students were forced to think about interfaces between parts rather than individual parts meeting dimensional specifications. Students were better able to answer questions such as will my top block fit in your bottom block, making the parts interchangeable. When we asked this question in the past using bi-lateral dimensions students had much more difficulty making this prediction.



Sample of "Old" Plus-Minus Drawing

FACULTY AND STAFF

Elaine Queener Retires

(Molly Steiner)

Elaine with her husband, Gerry

Elaine retired in May after 14 years of service in Mechanical Engineering and a total of 22 years at the University of Idaho. She and Gerry kicked off her retirement by traveling abroad to Portugal and Germany to spend the summer with their children and grandchildren. They are back at home in Troy establishing new routines as a retired couple, getting the "farm" back in shape, and Elaine is teaching piano a few afternoons a week.

Thinking back on her years at the U of I: *"When taking typing long years ago in high school I vowed, 'I'll never be a secretary.' Turns out that my 9 years in the music department (1972-81), and then 14 years in ME (2003-17) were the best jobs I ever had. This, I believe, is due to the people I was privileged to work with; co-workers, professors, department chairs, and students—all with problems to be solved. It really keeps a person's brain working! I am thankful and grateful to all who made it a pleasure instead of a chore to come to work each day."*

ME faculty and staff gather to wish Elaine well in her retirement

New Faculty

Daniel Robertson

Daniel Robertson is a multidisciplinary scientist with expertise in biomechanics, plant science and interdisciplinary design. He received a Doctorate in Mechanical Engineering from Brigham Young University in 2013. After completing his doctorate, Daniel spent 4 years in Abu Dhabi in the United Arab Emirates as a Senior Research Scientist and a US Department of Agriculture NIFA-AFRI Fellow. Daniel's past research projects include characterizing the material responses of biological tissues, spinal biomechanics, orthopedic device design, plant biomechanics and stochastic modeling. Daniel is excited to begin teaching, working and collaborating with students at the University of Idaho. He is the newly appointed academic director of the Grand Challenge Scholars Program in the College of Engineering and will be mentoring senior design teams along with other ME faculty. He also plans to begin working with local agronomists to address the long standing problem of stalk lodging (i.e., corn, wheat, barley, and canola plants breaking in wind and rain storms).

New Faculty

Matt Swenson

After graduating from Oregon State University with a B.S. in Mechanical Engineering in 1999, Matt Swenson immediately pursued a career in industry, quickly excelling and continuously accepting roles of increasing responsibility. The first five years, he worked at GK Machine, Inc., a small company south of Portland, designing customized agricultural equipment. Next, he worked at Hyster-Yale Material Handling, most recently as the Director of Product Development for the Counterbalanced Electric Truck product line while introducing 8 new products into production between 2009 and 2013. Although each new role was challenging and rewarding, they progressively drew Matt further away from science and engineering, and more towards business administration. With this gradual shift, each position demanded more focus on company profits, and allowed less opportunity for him to mentor younger employees in the science and engineering involved in product development. As a result, Matt decided to relinquish his industry career to pursue a Ph.D. with the specific goal to fulfill his passion for teaching and mentoring young engineers as a university professor.

College of Engineering Outstanding Faculty Award

Edwin Odom

Edwin Odom received his bachelor's degree in mechanical engineering from the University of Wyoming in 1974. After serving four years in the U.S. Army, with tours at Aberdeen proving Grounds and the Arctic Test Center, he returned to the University of Wyoming for graduate studies. After completing a master's degree in 1982, Odom worked as a staff research engineer and then as a composite materials manufacturing engineer at General Electric before returning to the University of Wyoming to earn his doctorate degree in 1991.

Professor Odom began his academic career at the University of Idaho as an assistant professor in Mechanical Engineering in 1991. His areas of interest include experimental and analytical mechanics. A long time interest has been on energy methods and more recently the Engesser-Crotti theorem. Additionally, Odom has been deeply involved with mechanical engineering capstone design since 1992--as an instructor, as the faculty leader of the Idaho Engineering Works, and as a champion for design infrastructure. Odom is a registered Professional Engineer in the State of Idaho, a member of the American Gear Manufacturing Association, and the American Society for of Engineering Education.

Odom has published in various engineering, experimental mechanics and engineering education journals. He has been the PI and co-PI of projects sponsored by Conoco, the National Science Foundation, NASA, ONR and NIATT.

SWE Leadership Summit

(Behnaz Rezaie)

The Society of Women Engineers (SWE) held their 2017 University of Idaho/Washington State University Leadership Summit at WSU's PACCAR Environmental Technology Building in March. The focus of the summit was coaching young women on team-building, leadership, and communication. The panel members from academia and industry concluded with an informal question and answer session.

Panel members (left to right) Erin Jesup, Engineer at SEL; Behnaz Rezaie, U of I faculty; Renee Petersen, WSU faculty; Brianna LaBarge, Engineer at Nike.

ALUMNI

Advisory Board Report

(Todd Swanstrom)

Over the last year, in addition to providing feedback on departmental infrastructure needs, the ME Advisory board has worked closely with the ABET committee in vetting program educational objectives (PEOs). These describe the knowledge/skills of a University of Idaho Mechanical Engineering practitioner after 3-5 years on the job. These also map to six U of I institutional learning outcomes. We solicited your PEO input via the online survey highlighted in previous ME newsletters. Sixty alumni, with the profile shown in the charts below, weighed in with ratings and comments. Voting was near unanimous that U of I graduates with these capabilities meet or exceed modern workplace expectations. This past summer, a working group consisting of Jonathan Richards, Dan Schneider, Jamie Slippy, Gene Hamacher, Mike Maughan, and Steve Beyerlein carefully reflected on your comments, debated among themselves, and made the final edits shown below.

After 3-5 years on the job, a University of Idaho Mechanical Engineering practitioner is expected to …

PEO #1 - Learn and Integrate

Attain career advancement based on demonstrated knowledge and skill in engineering analysis, modeling/simulation, experimental methods, application of codes/standards, and design for manufacturing.

PEO #2 – Create and Innovate

Achieve client and stakeholder satisfaction of engineering solutions while maintaining a reputation for generating technically valuable early prototypes and wise use of available time, talent, and budgetary resources.

PEO #3 - Communicate

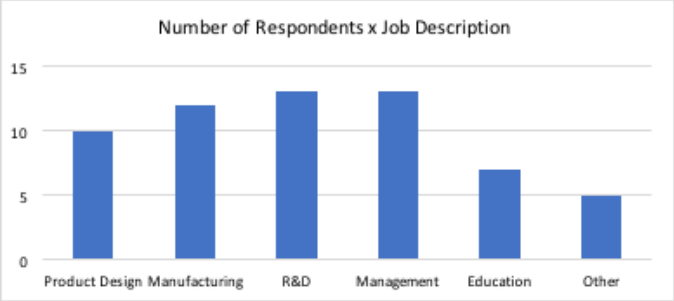
Establish recognition as a competent communicator within a field or industry through creation of clear problem definitions, generation of informative technical reports, participation in technical conferences/forums, and/or use of knowledge sharing technologies.

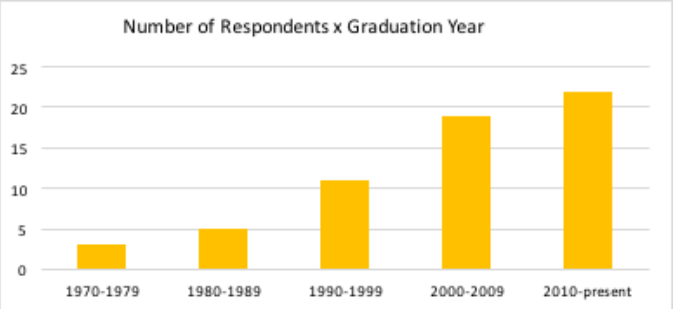
PEO #4 – Clarify Purpose and Perspective

Seek life-long advancement through continued professional development such as entrepreneurship, pursuit of graduate degrees, professional licenses, and/or certifications.

PEO #5 - Practice Citizenship

Assume expanded responsibilities for collaboration with others including public and worker safety, environmental protection, ethical and legal practices, formal project management, and involvement in professional communities or society at large.





Brittany Ballard-Nosov

In October 2016, Brittany Ballard-Nosov (BSME 2009, MSME 2011) was presented with the Boeing Innovation Award for Technical Replication "Multifunction End Effector- One-Sided Assembly." Brittany's contributions as an Equipment Engineer include a robotic application used to automate drilling, inspection, and fastener insertion for composite assemblies. She is continuing grow her expertise in robotics and automation in conjunction with acquisition, installation, and operation of large-scale machining centers at Boeing's Auburn facilities.

Bridger Hopkins

A road not taken by many…

Bridger Hopkins graduated from the University of Idaho in December 2016 after transferring to Moscow from northern Minnesota. Below you will find a number of interesting responses to questions about his academic career pathway and passion for project work that combines engineering and architecture.

What was the nature of your pre-engineering coursework?

I started my Mechanical Engineering degree in Grand Rapids, Minnesota at Itasca Community College. ICC is a unique community college that has a major emphasis in engineering where students get their first two years of engineering done before transferring over to four-year institutions. Small class sizes, hands-on experience, and an engineering building that houses all the math, science, and chemistry courses you take in your first two years sets their program apart from nearly any other.

How did you become interested in architecture?

In my senior year of high school I bought and remodeled a foreclosed home. I lived in the house during my first two years of college, renting out rooms and continuing the remodel before ultimately selling the house to pay for the rest of school. During that time friends and family would ask what I wanted to do with mechanical engineering. I would half-jokingly reply: "Real estate." Perhaps it's not too far off.

Why did you select the University of Idaho?

Although I am from Minnesota I wanted to go a different route than all of my friends for finishing my degree. I grew up visiting my family in the region and found University of Idaho by the suggestion of my grandma. The experience of being a transfer student is interesting, with most students already having found friends and study groups you really have to break the ice. As many can likely relate, Professor Odom's ME 341 was the crucible that I passed through which helped me make connections that lasted the remainder of my time at U of I.

How did you combine engineering and architecture at the University of Idaho?

One of the most impactful projects that I was a part of during my time at U of I was in my last semester of school. The project began in New Venture Creation (BUS 415) where we began looking for a solution to the shortage of quality housing in our community (Here is where my real estate joke became more of a reality). Ultimately, students became the focus of this project. With the cultural meme that "tiny houses" are today, we wanted to take a critical look at what they were, approaching them as an engineer, considering design, construction, sustainability, and cost efficiency.

How did you engage an inter-disciplinary community of collaborators?

We needed to look at what students really wanted and needed where they live. Instead of going with the so-called "tiny home" name, the idea was rebranded as "essentialist homes". The houses were going to be built smaller (not tiny), reducing wasted and unused space while remaining functional. I recruited a team of students from the College of Art & Architecture as well as the College of Business, city planners, and a real estate agent to design a community of essentialist homes. Next, I hosted a design charrette. A charrette is an architectural competition where design specifications are given and then teams work feverishly to present their proposals in as little as three days (a conceptualization process that engineers could also benefit from using).

What was the outcome of this venture?

While there were many great designs proposed, one stood out and was chosen to develop further with the help of the architects. See design at http://www.uidaho.edu/~/media/UIdaho-Responsive/Files/engr/academic-programs/me/newsletters/bridger-hopkins-design.pdf

At this time, the fully formed team took on the name The Kairos Project. Kairos being an ancient Greek word for time, meaning a propitious moment for decision or action; a perfect moment.

Kairos competed in several business pitch competitions where they won $1500 to put towards the development of our plan. My hope is that the vision for essentialist homes could serve University of Idaho students in the future, but ultimately that we could produce sustainable housing that really serves the needs of a consumer.

What's next?

My wife and I welcomed our first child, Clara Lu, to our family on August 1, 2017. A job hunt is under way and The Kairos Project is on hold. I look forward to whatever is next. Maybe it's real estate. Regardless, I feel well prepared for what lies ahead, barring parenthood. If you would like to know more about the Kairos Project, please contact me at bridgerhopkins@gmail.com

Jamison (Jamie) Slippy

Jamison (Jamie) Slippy is Principal Engineer at Quest Aircraft Company in Sandpoint, Idaho, where he has held a number of positions since joining the company in 2002. Jamie graduated from the University of Idaho with his BSME in 1991 and MSME in 1993. His graduate research was in numerical simulation of blood flow in abdominal aortic aneurysms, working under the guidance of Professor Donald Elger.

Jamie initially went to work for Hewlett-Packard in Boise, Idaho, where he helped develop and test laser printers for shared printer environments. In 2002, he was presented an opportunity to work for the start-up Quest Aircraft Company (formerly Packer Aircraft) designing mechanical systems and structures for a clean-sheet airplane design. Quest's purpose was to provide air support tools for missionary and humanitarian organizations worldwide, ultimately culminating in the FAA certification and production of the KODIAK 100 airplane. At Quest, Jamie has designed structures and systems, has led teams to support aircraft production and new product development. He has also been instrumental in developing and maintaining excellent relationships with the FAA, helping to make certification efforts more efficient. Jamie has served Quest Aircraft in a number of roles, including design engineer, structures manager, director of engineering, senior engineer, and principal engineer.

Jamie enjoys learning and building new things, whether wood furniture, automotive, welded structures, or even the fiberglass paddle board built using scrap Styrofoam as a foundation. He has participated as a judge at the Engineering Expo since 2009, and was invited to join the Mechanical Engineering Advisory Board in 2016. Jamie is dedicated to teaching and encouraging others (including students and peers) to be curious and to keep learning. Participation in the Advisory Board is one avenue in which he can do this.

LETTER FROM THE CHAIR

Left to right (Amy Shaw, Isaac Cox, Ryan Oliver, Steve Beyerlein, and Paulette House (our new college Director of Student Services) talking about signature Vandal Engineering learning experiences. Amy and Ryan now work in Alaska and were former interns in the U of I Industrial Assessment Center (IAC) that does energy audits for Pacific Northwest manufacturers. The group met in Anchorage surrounding the Fall 2017 College Recruiting Fair which was attended by Steve and Paulette.

At a recent campus retreat for department chairs and unit leaders we learned about results of a Gallup-Purdue University study http://news.gallup.com/poll/168848/lifecollege-matters-life-college.aspx that explored how life in college matters after college. Specifically the survey connected teaching/learning experiences while attending college to workplace success and personal (life vision, social relationships, financial security, community engagement, and physical health) after college. Interestingly, there is little correlation between the type of school, private or public, regardless of the selectivity in the entering freshman class. What makes a profound difference in the lives of individual graduates is the extent to which students are emotionally supported during college and the depth of experiential learning that characterizes their education. Researchers in the Gallup-Purdue University study compared student's answers to the 'big six' questions below with the odds of being engaged at work and the odds of thriving in all areas of well-being.

EMOTIONAL SUPPORT QUESTIONS

1. **I had at least one professor at [College] who made me excited about learning.**
2. **My professors at [College] cared about me as a person.**
3. **I had a mentor who encouraged me to pursue my goals and dreams.**

EXPERIENTIAL LEARNING QUESTIONS

4. **I worked on a project that took a semester or more to complete.**
5. **I had an internship or job that allowed me to apply what I was learning in the classroom.**
6. **I was extremely active in extracurricular activities and organizations while attending [College].**

Across more than 70,000 students surveyed in all 50 states, only 14 percent of college graduates reported all three types of emotional support. Only 6 percent of graduates reported all three types of experiential learning. Less than 3 percent reported that they could answer affirmatively to all six questions. Moreover, the Gallup data show increased odds of engagement at work and overall well-being connected to how well students are supported and prepared in college.

ODDS OF GRADUATES BEING ENGAGED AT WORK

- **2.6 x higher if prepared well for life outside of college**
- **2.4 x higher if college is passionate about the long-term success of its students**

ODDS OF GRADUATES THRIVING IN ALL AREAS OF WELL-BEING

- **4.6 x higher if engaged at work**
- **2.5 x higher if prepared well for life outside of college**
- **2.0 x higher if students remain emotionally attached to college**
- **1.9 x higher if college is passionate about the long-term success of its students**

My annual exit interviews with Mechanical Engineering graduates (BSME, MSME/MEME, and PhD) routinely surface comments and kudos about the emotional support they have received by our faculty/staff and appreciation for the hands-on projects as well as learning experiences that have been embedded in their education. The results affirm our recognition by the National Academy of Engineers as an exemplar of real-world engineering education. How we cultivate faculty/staff/student bonds inside and outside the classroom matters and this makes a difference in the lives of our students, at U of I and beyond. Our commitment to our ME students does not end with great lives and great jobs. We seek to work together with alumni to pay it forward to future generations of Vandal Engineers. There are many ways to do this and some of these have been featured in previous ME newsletters (www.uidaho.edu/engr/departments/me/news/newsletters). One way is to write back and share your own stories about emotional support, experiential education, or other aspects of your college years that have been especially meaningful and significant. We would like to spotlight these in future ME newsletters.

SPECIAL THANKS TO 2017-18 EXTERNAL CAPSTONE PROJECT SPONSORS

We appreciate generous contributions of time and financial resources by partners outside the College of Engineering in enriching our nationally acclaimed capstone design experience. Progress on these projects will be summarized along with those for the last 20 years on our capstone wiki site (www.mindworks.shoutwiki.com).

For more information about being a sponsor, see our capstone brochure (www.webpages.uidaho.edu/mindworks/Capstone%20Design/Sponsors/Brochure%20update%20S17_v4.pdf)or contact Matt Swenson (our new capstone design coordinator) at swenson@uidaho.edu

Avista	Instrumented Gel Wall Insulation System
Bastian Solutions	Transmission Design For Autonomous Commercial Robot Platform
Boeing Company	737 Interior Lighting Assembly Redesign
Boeing Company	Inconel Tubing Pre-Pullout
Diedrich Roasters	New Air Cleaning Solution for Coffee Roasters
Discovery Center of Idaho	Interactive Telerobotics Exhibit
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Hyster-Yale Group	Wireless Height Encoder
Idaho National Laboratory	Containment Box Grider/Polisher Water Circulation and Filtering System Upgrade
NIATT	CSC Exhaust System After Treatment
Schweitzer Engineering Laboratories	Thermally Conductive Card Guide
Tecnalia Research & Innovation	Elbow Rehabilitation
UI Facilities	Industrial Mass Flow Meter for UI Energy Plant
UI Facilities	Free Cooling System for Campus Data Centers
UI Music Department	Sousaphone Bleacher Storage & Next Generation Bandbeesten Grand Piano
Western Trailer	Drag Reduction Surfaces for Custom Trailers

SAVE THE DATE!

Mid-Year Snapshot Day
December 1, 2017 | 8:30am-1:30pm | GJ Design Suite

25th Annual Engineering Design EXPO 2018
April 27, 2018 | 8am-4pm | Pitman Center

Juvy Tongco at 2017 Engineering Design EXPO explaining his team's vibratory sorter for titanium aircraft fittings.

MECHANICAL ENGINEERING **NEWS**

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Any opinions expressed herein are those of the writers and do not necessarily represent the official position(s) of the university or its Board of Regents.

Editor: Debbie Edwards

KEEP IN TOUCH!
We want to hear from you!

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