IN 1981-82 a team of seven engineering students got together with George Wilson, the University’s Physical Plant Manager, and ended up with an electric van which was first used for the delivery of packages on campus and then in the Kibbie Dome for about 12 years. With a dozen 6-volt golf cart batteries, the van had a range of 25 miles between recharges, plenty for the seven-mile delivery route on campus. The project leader, who became known by other team members as John (forget-about-your-Friday-nights) Crockett said, “the project team pretty much lived the electric van for a year and a half.” The van was essentially built from the ground up and the team quickly learned there is a lot to building a vehicle—a sliding cargo door, for example—and an appreciation for the engineers of vehicle manufacturers. Weighing in at 2,800 pounds and costing about $6,500, the van could hit a speed of 55 mph, much higher than needed for its intended purpose.

Bill Barnes, advisor to the group, said that, although the project is being done with free student labor, the students have benefitted “from getting a wonderful design experience.” Dr. Barnes also added, “It’s the kind of thing I’d have like to have done when I was a student.” Crockett and Dr. Barnes also got an expense-paid trip to Washington, DC, to describe the project at the ASME National Conference.

John Crockett, who sent the information for this newsletter, had this to say, “Dr. Barnes changed my life! He believed in me and gave me an opportunity—I am so grateful for having him in my life.”

Team members included John Crockett, Doug Staker, Paul Erickson, Dwayne Sudweeks, Ron Leidle, Jayson Claar, Brad Burge, and Dr. Bill Barnes, advisor.

It was an amazingly-successful project the size of which had not been attempted by undergraduates ever before.
WE TAKE CLEAN WATER FOR GRANTED; FOR SOME IT’S A HARD-WON NECESSITY.

Orphans to Ambassadors were aided in successfully installing a solar-powered water filter system in Uganda by members of a U of I capstone team made up of two BAE and two ME students. Here is a report from Amy Cox, BSBAE S14:

“We successfully installed the solar-powered water filtration system at an orphanage in a village outside of Kampala, Uganda. I’m glad I felt well-versed in the system because there were plenty of kinks throughout the installation process. However, our water tests show that the system is working and successfully filters out coliform and e.coli from the water that they were drinking. The team leaders of O2A sounded very interested in partnering up with UI again to do work on another cornerstone project for a developing country.”

“Traveling to Africa with Orphans to Ambassadors was such an amazing trip! I was the only student out of our group from U of I that was able to go install the system. The additional four students involved with designing and building the system were BAE students Kyle Rainer, Sharon Strom (now Sharon Burnett) and I, and ME students Tyler Marines, and Nick Stroud. “The Orphans to Ambassadors motto is “Where the forgotten become the unforgettable.”

OUT TO INNOVATE™ 2014/2015

Leslie Kerby

Leslie Kerby, Ph.D. candidate in Nuclear Engineering is the winner of the Out to Innovate Graduate Scholarship. After completing a BS in Physics in 1998, Kerby paused her education to focus on raising her children. After more than a decade and divorce (and coming out), she began her research in applied nuclear physics, partnering with Los Alamos National Laboratory to upgrade parts of the spallation reaction models used within the transport code, MDNP6.

She is the recipient of many awards and honors: the American Physical Society M. Hildred Blewett Fellowship in 2013-2014, one of only three female physicists across the US to be so recognized; chosen by the American Nuclear Society as a John and Muriel Landis Scholar (2014); a Roy G. Post Foundation Scholarship recipient in 2013; a member of the US Delegation for the 2014 International Conference on Women in Physics.

“I am deeply honored to be selected as the NOGLSTP Out To Innovate™ graduate scholar. I recognize the many applicants who were also deserving and I am grateful to be acknowledged with this prestigious award. I promise to represent LGBTQ scientists well and to continue my efforts to promote awareness and acceptance in both the workplace and society. I am also extremely grateful for the financial aspect of this award. As a student supporting five children, this scholarship is very welcome.”

TRANLIVE STUDENT OF THE YEAR

Rory Lilley

The College of Engineering and Mechanical Engineering Department congratulate Rory Lilley, 2014 TranLIVE student of the year. Transportation for Livability by Integrating Vehicles and the Environment TransLIVE is a university research consortium led by the University of Idaho focused on developing technologies to reduce the environmental impact of the transportation system. Rory has been an instrumental leader, organizer and technical consultant to our championship Vandal Racing Formula Hybrid SAE race car team. Find out more: http://tranliveutc.org/engr/niatt/tranlive/2014-student-of-the-year
Those of you who have taken the summer Lean Manufacturing technical elective know what a valuable course it is. Packed into three weeks at the beginning of summer session, the course can often be squeezed in by students unable to spend the entire summer in school. If we took a vote, it would be right up there with best course we offer.

1. This beautiful University of Idaho Seal rendered in aluminum, anodized aluminum, and brass was on display at summer 2014 Snapshot. Actually a part of Advanced Computer-Aided Design under Dr. Edwin Odom, some careful and painstaking work was needed for the various parts of the seal. For example, the letters, stars and numerals around the perimeter were carefully machined out of the base material, then replaced with individual aluminum letters and numbers. This would have been especially tricky for letters such as O, R and A, and the numbers 8 and 9. In all the seal took about 60 hours of combined machine time. The main center piece took just over 25 hours of time on the CNC mill to complete from beginning to end. Many hours were spent buffing the piece to bring it to its final brilliance and luster. Team members on the project: Stephen Goodwin, Rory Lilley, David Eld, Jeff Reznicek, Luke Nelson, Philip Petersen and Matt Kologi. (Thanks to Matt Kologi for additional information and photos.)

2. An outgrowth of Dr. Edwin Odom’s BandBeesten and Txalaparta capstone projects is a stop-action video created with Legos depicting the Vandal Marching Band - the Sound of Idaho. The video is apparently still in production but to see both the BandBeesten and Txalaparta in action visit these links: https://www.youtube.com/watch?v=02csuwVwjk0&feature=youtu.be. http://www.uidaho.edu/class/music/news/basque-txalaparta https://www.youtube.com/watch?v=Fjn9oDb7bKE&feature=youtu.be.

3. These figurines were part of the final project in our lean manufacturing course that took place in the 3rd/final week of this popular short course. This is intended to be a more open-ended manufacturing exercise where students can apply design/machining knowledge developed through the ‘block project’ and their shop-based ‘kaizen project.’ In 2014 we structured this culminating lab assignment as an outreach activity with the local ice rink. Teams of 3-4 students were charged to develop and manufacture articles that could be used for ‘sponsor recognition’ in ice rink fund-raising. Student teams were asked to maximize use of locally available materials, develop manufacturing plans, and create small production runs using local equipment based on their designs/manufacturing plans. (Information from Dr. Steve Beyerlein)

4. Dr. Eric Wolbrecht discusses a project with Theron White, MSME student. An important component of snapshot is feedback from professors, peers, and non-engineers interested in the projects. Team members have to be on their toes to provide clear and concise information to a variety of listeners.
FALL 2014 SNAPSHOT CAPSTONE PROJECTS: A BRIEF OVERVIEW

And that is what we got when ME office staff toured the wide variety of senior capstone projects at snapshot in December. However, when talking to students about their specific projects, we got much more than a brief overview. It is fascinating to hear descriptions of the projects, what has been accomplished and the goals for next semester culminating with the display of projects at Engineering EXPO May 1, 2015. The range and depth of knowledge these students display is impressive, to say the least.

We came back to our desks with our brains full of engineering, some that we understood and a good deal that was over our heads. The forty projects range from Fish Pond Cleaning Equipment to Next Generation Kickshot Game; Robot Communication to Remote Rain Gauge Data Collector. Sponsors include University of Idaho entities and individual professors, NASA, USDA, INL, SEL, Tecnalia, Rumble Orchards, Microsoft, Colmac Coil and many more. It's a busy and exciting time—the end of the semester.

ELEMENT ROBOT LLC

Element Robot was founded to make additive manufacturing more accessible. With the assistance of the Mechanical Engineering Department, we began testing our Skyforge 3D print-vending machine on the University of Idaho campus in early 2014. The trial program showed that students were happy to order 3D prints over the web, and we realized there was a great opportunity to bring our cloud 3D printing software to a wider audience. We started testing potential markets with a Kickstarter aimed at helping hobbyists control their 3D printers over the internet. While this fundraising project didn’t succeed, it did help us focus our efforts on the correct market.

At institutions like companies, makerspaces, and universities, a networked 3D printing system is the best way to make 3D printing accessible for users, whether they are employees, customers, or students. By August we’d rewritten Skyforge to serve institutional needs and started installing it at libraries and companies. By the end of 2014, Skyforge has grown into a great cloud 3D printing platform with customers around the world. We look forward to growing the business while staying true to our original vision: building accessible manufacturing systems for the next generation of innovators. (Information from Chris Walker)

For more information find Skyforge at https://skyforge.co
HOW FAR IS IT FROM VIETNAM?

Hieu Truong is well on her way to a Ph.D. degree from the Dwight Look College of Engineering at Texas A & M University, after earning the BSME at the U of I in 2011, with a minor in Mathematics. Always a diligent and hard-working student, Hieu came to the United States from Vietnam at age 17 on cultural exchange, graduating from Bonneville High School in Idaho Falls. When asked why she stayed in Idaho and came to the University, Hieu gave this response: “During my exchange year, I was invited to the University of Idaho three times (Women in Engineering day, Vandals Friday and EXPO) and I really liked the campus, the town and especially the people in Moscow since I received very warm welcome when I visited. That was why I decided to come back for further education.”

At the University of Idaho, Hieu, though a quiet and self-effacing person, distinguished herself with her ambition and work ethic. She never carried fewer than 18 credits per semester, twice completing 21 credits, and graduated Magna cum laude in three years. Her sophomore year was unusual as she completed an internship and one class at the U of I while earning 31 credits at Texas A & M University, making contact with people with whom she is now working as a doctoral student. The attached link explains her research which is part of the Multi-University Research Initiative project funded by the Air Force Office of Scientific Research, and titled Synthesis, Characterization and Modeling of Functionally-Graded Multifunctional Hybrid Multiscale Composites for Extreme Environments.

Hieu has been sent to a variety of locations as part of her research at Texas A & M. Most recently she spent October through December in The Netherlands, and expects to be at Langley Research Center in Virginia as part of her NASA fellowship, starting in March. Hieu had this to say regarding her NASA fellowship: “More on what helped bring me where I am today. I was so fortunate to be selected for a senior design team [at U of I] working on a project funded by the NASA Idaho Space Grant Consortium. Five students, including Kysen Palmer, BSME & MEME, now pursuing a PhD at the University of Cambridge in England, worked on a two-semester-long project to create a sensor to determine precipitation and the size of precipitation that is space-qualified and can survive the atmosphere and environment of Titan, a moon of Saturn. We got a chance to spend a few days at NASA Jet Propulsion Lab in Pasadena, CA, in April 2011 to do testing on our final design. We also went to the International Planetary Probe workshop in Virginia in June that year to present our work, and there I got to visit the NASA Langley Research Center. I think all of the involvements with NASA from my undergraduate study have partially helped me win the fellowship.”

Now in a long-distance marriage to Dr. Linh Nguyen, Mathematics Professor at the U of I, Hieu is looking forward to the day her research is complete so that the two of them can be employed in closer proximity to each other. “I am still very grateful for the undergraduate education I got at the U of I and especially in our ME department. All of the skills and knowledge I gained with guidance and help from my experience at the UI are the main foundations of everything I’ve got today. If I were to do it all over again, mechanical engineering at the University of Idaho would definitely be my first choice.”

http://engineering.tamu.edu/news/2014/05/30/hieu-truong-awarded-nasa-nstrf-and-amelia-earhart-fellowships
POLYSYNC DRIVES CARS?

Josh Hartung, BSME 2011, has been involved in several innovative inventions. His latest project, Polysync, moves data from sensors in unmanned vehicles to the components that control the car’s movements.

IDAHOAN SEES A FUTURE WITH NO PRIVATE CARS

Moscow inventor Josh Hartung thinks traffic could become accident-free with his firm’s technology.

MOSCOW — Josh Hartung is not humble. He’s quietly inventing what could be a critical piece of a new transportation utopia where the family car is obsolete, replaced by an accident-free public transit system using a fleet of vehicles driven by computers, not people.

Entire industries, such as car insurance and body repair, could be decimated.

His company’s invention, Polysync, moves data from sensors in unmanned vehicles to the components that control the car’s movements.

“Our technology has the potential to really disrupt the automotive industry,” Hartung said. “This is really exciting.”

His vision is likely years away — and that’s only if he and other researchers can overcome some of the weaknesses in the systems they are developing and get major carmakers on board.

For now, he and his team of seven work in an unassuming, converted plant nursery in a Moscow residential neighborhood.

Q: Could you explain what Polysync is?

A: Autonomous cars use devices such as radar, lasers and cameras to detect objects. Software takes that data and completes a bunch of calculations to figure out what it means, much like what the human brain does.

For example, say a car is travelling 60 mph and the sensors see a pedestrian 70 meters away, just on the edge of our stopping distance. All the systems need to know about it right now. That’s what Polysync does. It provides everybody the ability to talk to each other very quickly and efficiently.

We estimate about 80 percent of the work on autonomous vehicle goes into the infrastructure. Those nuts and bolts aren’t very sexy, but without them everything falls apart. What our system does is cut out 80 percent of the work to build and deploy the systems. That’s an insane number.

That’s how we accelerate the industry. Polysync is a platform like Android is for cellphones. If you think about the explosion of phones, a lot of it has been the ability to use one piece of software for many, many different telephones.

Q: What has happened with technology in the past decade that has made the possibility of a fully autonomous vehicle closer to reality?

A: Cars are all about cabin space and comfort. The original autonomous cars were filled with racks of computers, that cost hundreds of thousands or millions of dollars. Computers have gotten smaller. The measuring devices have higher accuracy and everything has gotten much cheaper. It’s the same thing that has happened with cellphones. There has been a lot more focus in academia on algorithms for doing this.

Q: What are the big-picture implications of this technology?

A: These systems can have a profound affect on human mobility. Humans driving cars are always a liability. We fall asleep. We get in the car drunk. We speed. We get road rage. It’s these things that cause accidents, traffic and a lot of pollution. This is due to great engineering on part of automotive companies. Very, very few accidents are due to mechanical or system failures.

Insurance providers are seeing double-digit reductions in accidents with early versions of this technology — innovations such as automatic lane keeping and brakes that stop for pedestrians when drivers don’t see them. At a 25 percent adoption rate, we’ll have a 75 percent reduction in accidents.

We’re moving really quickly toward no accidents. If we have a world where we have no accidents, we completely change what vehicles look like. You drive a 3,000- or 4,000-pound vehicle simply because you’re carrying around a ton of metal literally that’s meant to protect you in a collision. This paves the way for dramatically lighter cars. We may not need any sort of auto-body industry. Individual car insurance may not be needed at all or nearly as much.

We could have autonomous cars roaming every urban and rural community. Why would you own a car if you could call one and it would get you wherever you wanted to go for a very low cost? That applies even here in rural Idaho. You could call a pickup truck to take you camping or to your cabin. It would be there in 2 minutes because these can operate 24 hours a day.

Q: Right now the new safety technologies like lane keeping are backups. The computer is supposed to help prevent human mistakes. Do we really see accident reduction when the computer is doing all the work?

A: That’s the first problem everybody has with these systems. They don’t want some computer running them into a brick wall. The question is how do you handle that in a full autonomy when a human can’t resume control of the car?

That’s our biggest challenge. In the industry, it’s called functional safety. We have people’s lives in our hands. We can’t afford to crash the computers even once. If we do crash, we need to fail in a safe way.

When your check engine light comes on it’s because something broke, but the car doesn’t shut down on the freeway. The car doesn’t suddenly swoop off the road. This is an example of functional safety. Your car fails into a safe state.

Q: How did you choose this field?

A: I was living in New York. Consumer products weren’t agreeing with me. I wanted to change the world. I did an industry survey at an international trade show for drones. I was looking for a problem that the industry hadn’t solved. At a mixer on the first day, I was drinking a beer alone and this guy comes up and sits next to me. It turns out to be Robert Hambrick, the owner of one of the world’s largest distributors of sensing components for unmanned vehicles. We founded Harbrick after that.

Q: How does your company operate?

A: We’re completely revenue funded. Every dollar that we spend is a dollar that we earned. We are currently seeking investment.
We still do a little bit of custom engineering. Our customers do research for the auto industry and others. They pay us a fee in order to have access to the product. We’re working on getting the big automakers to adopt our technology.

Q: What does your company’s future look like?
A: Five years down the road, Polysync will be deployed on several million vehicles. We’ll probably be a company of at least 100 people. It’s likely we’ll open additional offices. We’ve looked at Detroit, Coeur d’Alene and the Silicon Valley. Much of that growth will be in engineering, and that will mostly be kept in Idaho.

I like to think about disrupting the industry and creating a lasting framework that makes the world a better place to live. We want to play the role in that which makes the most sense. It might be to sell to a bigger company. It might be to build this whole thing into a gargantuan company ourselves. Financial benefit will come out of creating lots of value.

(Thanks to Tara Roberts for the article above from the University of Idaho College of Graduate Studies October 2014 Newsletter.)

SMRs also have the potential to be placed underground. If terrorists want to crash an airplane into the reactor, there will be no reactor over the ground, Aydogan say.

Aydogan also is developing computational tools to analyze SMRs and other nuclear reactors to better understand how efficiently nuclear systems work during nuclear accidents and abnormal events as well as how components, especially new designed components, within a reactor interact with each other for various operating conditions and scenarios.

Before he came to the UI, Aydogan studied SMRs for Westinghouse-Toshiba. The company will soon use one of his designs, for which he recently published a patent, for its SMRs. Aydogan says his team at CAES will continue partnering with nuclear industry leaders to conduct research and transfer technology.

As the nuclear industry begins to shift toward small modular reactors as the best solution for low-carbon power for future generations, nuclear engineers at the Center for Advanced Energy Studies (CAES) in Idaho Falls are hard at work on new passive safety systems. These will have new ways of cooling and shutting down reactors in an emergency without certain actions from an operator or electronic system. In a passive safety system, the reactor can shut itself down by using the basic nature of physics, such as gravity, says Dr. Fatih Aydogan, assistant professor in the mechanical engineering department at the University of Idaho’s nuclear engineering program. Water-cooling systems could run by gravity rather than pumps, he explained. Read more: https://www.asme.org/engineering-topics/articles/nuclear/time-passive-safety-nuclear-plants
Dear Alumni and Friends of Mechanical Engineering,

As faculty members, we are trained in the intricacies of mechanical engineering, each of us doing research in a particular sub-field. We teach engineering courses with a goal of improving student learning and making sure that students understand engineering principles and apply them to solve engineering problems. We communicate experiences that we have had and talk about various case studies where we can figure what went wrong and what went right.

The longer I serve as department chair, the more I realize that we teach much more than engineering. We teach life skills, responsibility, professionalism and ethics. We teach students to work together and to communicate effectively. When students come in as freshmen, we see a broad range of talent, academic excellence and maturity. We teach students to attend class regularly, turn in assignments on time, and encourage them to develop time-management skills. Although difficult for many of our students to realize, these are the skills necessary for them to succeed when they join the workforce.

In 1944, W. J. King published the “Unwritten Laws of Engineering” as three articles in Mechanical Engineering magazine. The article is available on the web, and the book is available from online book sellers. Some wisdom that the articles include: “Demonstrate the ability to get things done,” “Develop a let’s-go-see attitude,” and “Strive for conciseness and clarity in oral or written report.” That advice is as good today as it was in 1944.

The ME faculty is committed to helping our students succeed in all aspects of their engineering studies, and I can report to you that they do so in an outstanding manner.

We would love to hear from you how your experiences at the UI helped develop your life skills.

Warmest Regards,

John Crepeau, Ph.D., P.E.
Professor and Chair
Department of Mechanical Engineering

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**KEEP IN TOUCH! We want to hear from you!**

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