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CREATING Tomorrow



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CREATING Tomorrow

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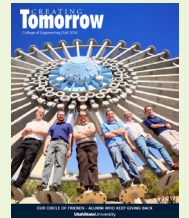
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ON THE COVER:

A group of USU Engineering alumni who work at Sandia National Labs in Albuquerque, N.M., have created a scholarship fund. The members' generous contributions have helped multiple students across several departments. Learn more on page 16.



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A Note of Thanks to Our Circle of Friends

It's not every day we get the opportunity to reach out to our alumni and friends of the college to say thank you. With this year's Creating Tomorrow magazine, we look to our former students and generous donors to express our sincerest gratitude. Your thoughtful contributions continue to make the College of Engineering one of the most innovative, forward-thinking academic research institutions in the region.

With charitable donations from our alumni, we continue to develop leading-edge academic programs, recruit world-class faculty and equip our laboratories with tools that prepare students to be tomorrow's engineering and computer science leaders. And perhaps most importantly, your contributions generate scholarship funding that provides the best possible university experience for a deserving future engineer.

Your gifts and the continued support of our industry friends enable students to compete in national design challenges and take part in meaningful outreach programs with organizations like Society of Women Engineers and Engineers Without Borders. Thanks to you, our students are involved both in and outside of the classroom, performing service projects around the globe and landing internships and jobs with top names in manufacturing, aerospace, communications, defense, space science and more.

With our continued success, we're forging ahead with new opportunities and partnerships here in Utah and around world. We are continuing to break new ground in fundamental research in areas of nano-scale materials and nuclear energy materials research.

With all this exciting development, we must recognize those who make it possible. This year's alumni magazine is about you: the donors and benefactors who left this institution with an inspiring experience and the motivation to give something back. You are our support network, our pathway to new opportunities, our circle of friends. Thank you.

Jagath Kaluarachchi,
PhD, PE, D.WRE, F.ASCE, F.EWRI
Interim Dean, College of Engineering

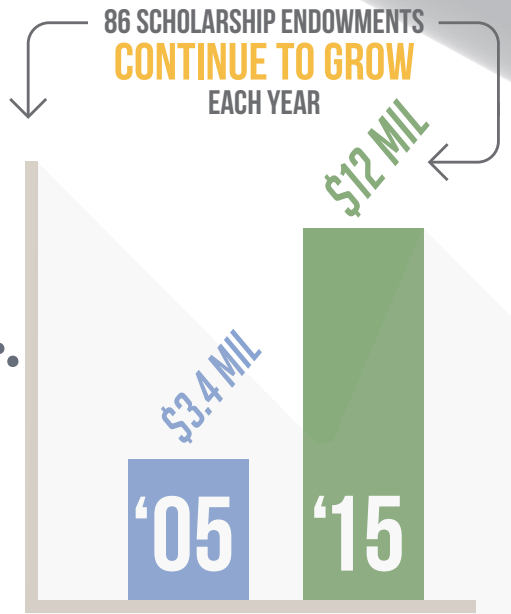


THANKS TO
ALUMNI
GIVING BACK



1,452
PEOPLE CONTRIBUTED TO THE
COLLEGE OF ENGINEERING
IN THE PAST FIVE YEARS

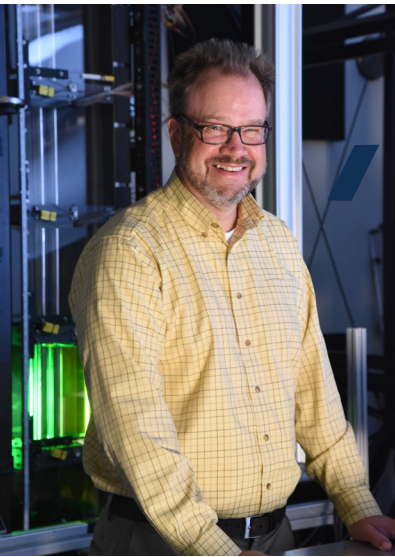
322
SCHOLARSHIPS
AWARDED IN '15



\$3.6
MILLION
IN TOTAL DEVELOPMENT
GROWTH IN 2015



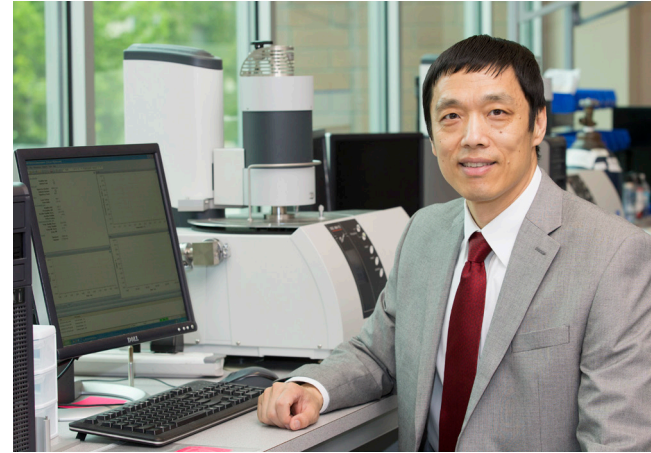
INNOVATIONS FROM ALUMNI,
PART IN EXCITING
→ **OUTREACH, DESIGN AND ACADEMIC PROGRAMS**



Two MAE Faculty get \$5.8 Million in Nuclear Energy Research Grants

Mechanical and Aerospace Engineering Professor Dr. Heng Ban received a \$5 million grant from the U.S. Department of Energy's Nuclear Energy University Program (NEUP) to lead an international team of collaborators on new research into accident-tolerant nuclear fuels.

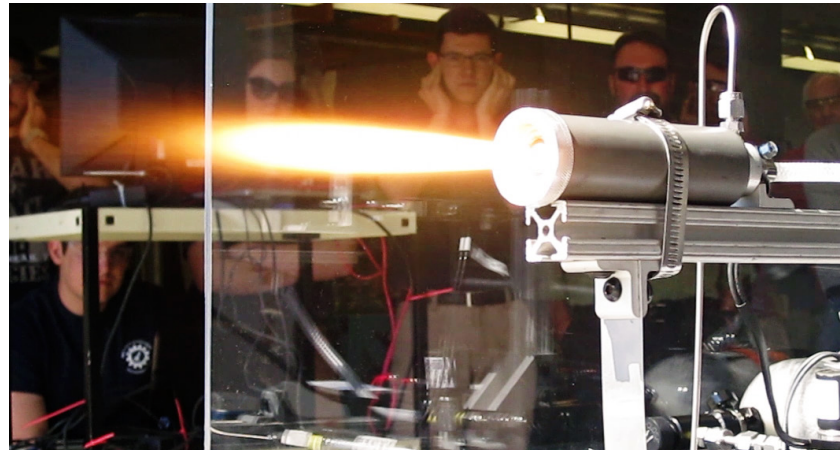
MAE Professor Dr. Barton Smith also received a NEUP grant for \$800,000. The goal of his work is to improve computer models that predict how reactor cooling systems function during an accident scenario.



NASA Selects USU Aerospace Team for Small Rocket Motor Research

USU aerospace engineering students are leading exciting new research into the future of small rocket motors. The team of undergraduate students, led by Professor Tony Whitmore, will get a \$200,000 NASA grant to develop a new generation of "green" rocket motors that could revolutionize the space industry. The small motors are made of multiple layers of printed ABS plastic.

The layering process creates a meshwork of voids in the material. When electrodes are added and voltage is applied, electrical charges accumulate in the spaces and allow an electrical arc to build up inside the motor. By simultaneously introducing oxygen, the evaporated fuel material burns and a rocket motor is born.



How to Charge a Moving Vehicle

Electrical engineering researchers at Utah State University unveiled to the world a brand new technology for electric vehicles earlier this year. Led by Dr. Regan Zane, the team showcased the first-ever demonstration of in-motion charging of an electric bus. The wireless power transfer demo took place at the 2016 Conference



on Electric Roads & Vehicles (CERV) at USU's Electric Vehicle and Roadway, or EVR, research facility and test track.

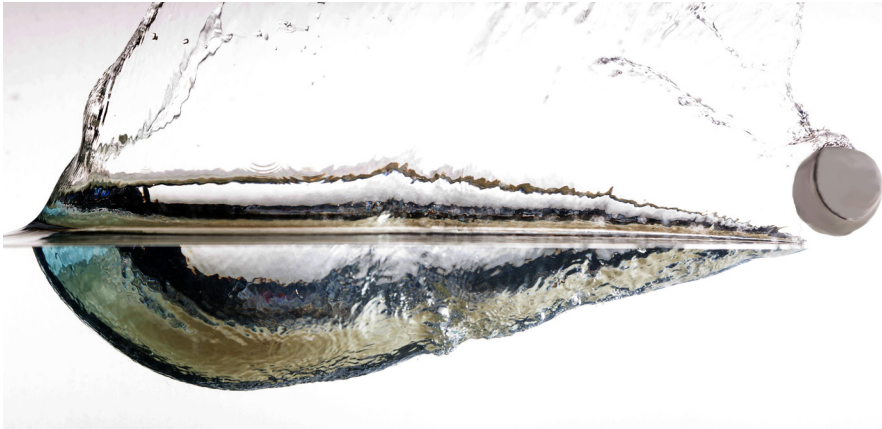
Engineering PhD Student Wins AWRA Competition

Civil and environmental engineering and Water Lab PhD student Ayman Alafifi won first place in the American Water Resources Association Utah Chapter student paper competition on April 13. Alafifi developed an optimization model that shows the implications of management decisions on the quality of a river's ecological habitat. The research will help

improve habitat quality for priority species while also meeting human demands.



Walking on Water: Splash Lab Team Unravels Science of Skipping Spheres



Engineers at the Splash Lab have unraveled the physics of why elastic spheres bounce on water more easily than rigid ones. Lead author Dr. Tadd Truscott and his collaborators published their findings in *Nature Communications* – a top interdisciplinary journal. The findings will offer new insight into water impact physics – an important area of study in naval applications and ocean engineering.

Rethinking Stormwater: USU Researchers Receive Major Grant to Study Aquifer Recharge

Researchers at Utah State University are taking a fresh look at stormwater management as part of a federally-funded study to improve water reuse in the western U.S. The team of engineers, scientists and sociologists are among a growing group of water quality experts who say it's time for new ideas in stormwater management. Their research proposal was chosen among five nationwide to receive part of an Environmental Protection Agency grant totaling \$3.3 mil-

lion. USU will receive \$774,283. Chief researcher Dr. Ryan Dupont, a professor of civil and environmental engineering, says the goal of the study is to determine the feasibility of recharging underground aquifers with stormwater. Instead of discharging the water into irrigation canals or natural waterways, it's possible to harvest stormwater at multiple locations and use it to recharge aquifers.

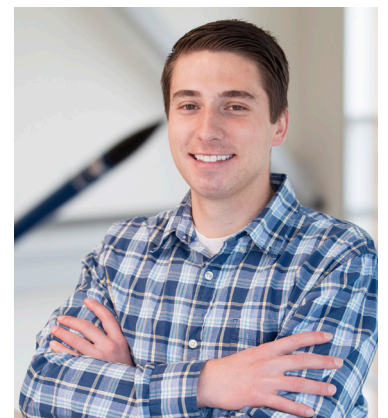


Aggies Win NSF Graduate Research Fellowships



Two Engineering Alumni received Graduate Research Fellowships from the National Science Foundation to help cover the costs of graduate school. Nathan Stacey ('16) and Sean Bedingfield ('15) were awarded Fellowships along with 2,000

other students across the country. The opportunity will open new doors for the future engineers as they continue their education. Stacey plans to attend graduate school at Stanford this fall. Bedingfield is currently at Vanderbilt University.

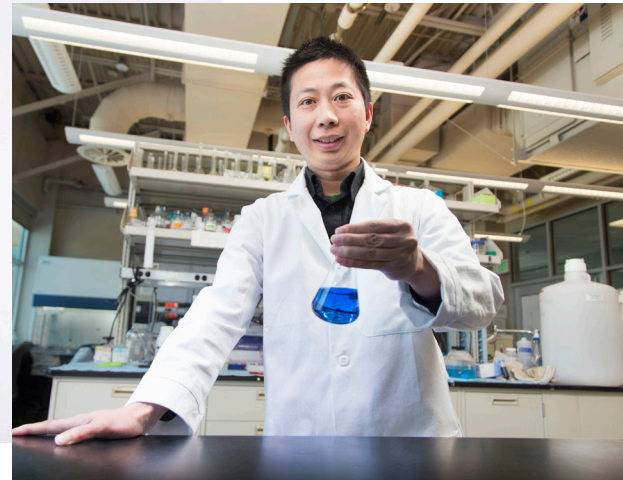




Biological Engineering Faculty Patents Method to Make Natural Blue Dye

Dr. Jixun Zhan, an associate professor of biological engineering at USU, has secured a patent for an innovative method to produce the deep blue dye known as indigoidine. The natural tint is a promising alternative to the synthetic

dyes used to color textiles, food and paper. Zhan says today's consumers are increasingly aware of the synthetic ingredients found in everyday products and are looking for natural substitutes wherever possible.



Student Team Takes Top 3 in Human-Powered Vehicle Race

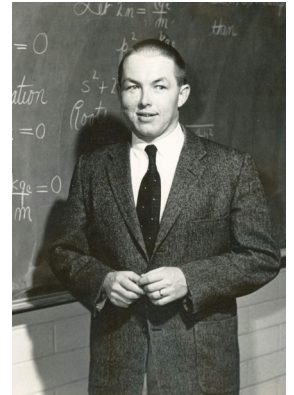
Mechanical engineering undergraduates from Utah State University landed several top-three awards at a human-powered vehicle competition in California. Two USU teams entered the Human Powered Vehicle Challenge (HPVC) with their custom designed three-wheeled cycles, going up against long-running champions including Cal-State, Northridge and University of California-Berkeley. The race was April 22-



24 in San Jose. The 11-member student team that built and raced the 'Deja Blue' trike placed third in overall ranking; second in innovation; and won first place in the endurance category.

Remembering Professor Emeritus Dr. Edward Vendell

Mechanical Engineering Professor Emeritus Dr. Edward Vendell died Saturday April 9 at the age of 83. Vendell came to Utah State University in 1960 after earning an M.S. degree from the University of Utah. He left in 1964 to complete a Ph.D. at Oklahoma State University and returned to teaching at USU in 1967.



Nearly \$1 Million in Scholarships Offered to E-State Campers

Close to \$1 million in scholarship funding was awarded to a group of high school students attending their last day of the weeklong 'Engineering State' summer camp. The event introduces young people to engineering and computer science. Eighty out of 240 students were offered scholarships ranging from \$2,000 to \$41,000.



CEE PhD Student Wins Major Award

Caleb Buahin won a best student paper award at the 8th International Congress on Environmental Modeling & Software held July 10-14 in Toulouse, France. Buahin specializes in water resources engineering, component-based modeling and hydro-informatics under major professor Dr. Jeff Horsburgh. His works involves solving complex environmental and natural resource problems using computer simulation models to examine potential effects of different management choices.



This Desert Moss Drinks from the Air

A team of scientists and engineers led by researchers at the Splash Lab have discovered how a desert moss native to Utah and other arid regions can extract moisture from the atmosphere using its leaves. The study was coauthored by MAE Assistant Professor Dr. Tadd Truscott and was the cover story for the July edition of Nature Plants.

Undergraduate Advisor Receives National Award



Katherine Grover, an advisor for students in the biological and mechanical & aerospace engineering departments, received a major award from the National Academic Advising Association, or NACADA. Grover was recognized for her positive impact on students. She began advising for the college in July 2013 and says seeing students succeed is the best part of her job.

Computer Science Faculty Gets Grant For Gender Study



Programming camps and other computer science recruiting programs for girls have surged in recent years, but little research has been done on how effective they are. Associate Professor of Computer Science Dr. Vicki Allan is studying the effects of gender in the classroom. Using a summertime coding camp for girls and National Science Foundation funding, she'll study the effects of single-gender versus balanced-gender camps and female-only and gender-balanced role models.

Becker Gets NSF Grant to Study Cognitive Behavior



Professor of Engineering Education Dr. Kurt Becker received a \$700,000 National Science Foundation grant for ongoing research to improve engineering curricula. The purpose of the study is to provide a cognitive foundation to inform and improve engineering education models while expanding our understanding of how students evolve to acquire expert-level design skills.



A Career in INNOVATION

Civil Engineering Alum Keeps Industry, University Connected

If you want to see Bruce Brothersen's portfolio, just look up. His life's work is built into the structures that make up our communities, spanning the schools, office buildings and aircraft hangars that keep the economy ticking. The Layton, Utah, native came to USU for an undergraduate degree in the 1980s and quickly decided that engineering was a good fit.

"I've always been fascinated by buildings and the construction process," said Brothersen. "After my first quarter I knew civil engineering was the right choice for me."

Brothersen earned a bachelor's degree in civil engineering in 1986 and has since kept close ties with USU and the Department of Civil and Environmental Engineering (CEE). Today, he's the Engineering Manager for Vulcraft in Brigham City, Utah. Vulcraft is the largest open-web steel joist and joist girder manufacturer in the country and a strong supporter of USU's College of

Engineering.

The company is a division of Nucor and operates seven Vulcraft plants from upstate New York to Box Elder County, Utah with hundreds of employees including seven USU engineering alumni at the Brigham City plant and interns in Nebraska and Indiana. Brothersen has been with the company for 29 years. His

"The faculty and staff at USU are good people who care about students and who want to help others. That's the reason I've stayed connected through the years."

innovative drive has led to several new products and given Vulcraft a competitive edge.

"The thing I do best is develop new products," he said in a recent interview.

"It takes a number of people with various areas of expertise; it takes research and development, and it takes a customer willing to buy the finished product." Brothersen and his associates have

developed several variations of truss designs including a new truss system called TrussFrame that spanned 360 feet – wide enough to accommodate a football field. That system was installed at a new SkyWest Airlines maintenance hangar in Boise, Idaho, that opened last year. The impressive structure can accommodate several regional jets. Next, the Nucor companies have developed and sold a Truss-Frame system that spans an unimaginable 400 feet for a new indoor practice facility for Real Salt Lake currently under construction.

Brothersen also designed the scissor truss system in the Jim & Carol Laub Indoor Training Center. Vulcraft has supplied products in several USU buildings including the new Aggie Recreation Center, the Wayne Estes Center and more.

As part of his ongoing commitment to Utah State University, Brothersen also works with CEE researchers to develop new designs and products. He's currently working with CEE Assistant Professor



Left: Colton Kilmer, left, and Bruce Brothersen at the Vulcraft plant in Brigham City, Utah. Right: Brothersen works with CEE PhD student Taylor Sorensen; Vulcraft employee and USU alumnus Tysen Johnson and current intern Colton Kilmer.



Alumni Profile: Bruce Brothersen - BS '86, Civil Engineering
Current Position: Engineering Manager, Vulcraft - Brigham City, Utah

- Named Civil & Environmental Engineering 2016 Alumnus of the Year
- Serves on CEE Industrial Advisory Board
- Supports Engineering State summer camp & Engineers Week activities

Dr. Marc Maguire on a study that will help Vulcraft launch a new truss and decking system.

“We do the actual physical testing here at our plant, and Dr. Maguire and his students do the number crunching,” he explained. “It’s a great partnership for us and for the engineering students

who are part of the research.”

Vulcraft also employs several interns from the College of Engineering including Colton Kilmer who came to USU after attending Engineering State – an engineering-themed summer camp for high school students hosted by USU and sponsored by Nucor.

Brothersen says keeping in touch with his alma mater helps him inspire future engineers and creates new op-

portunities for his industry.

“It always comes down to people,” he said. “The faculty and staff at USU are good people who care about students and who want to help others. That’s the reason I’ve stayed connected through the years. And being involved with E-State and hiring interns has given us the opportunity to hire good people. Every company needs good people.” ■



Tysen Johnson, left, and CEE alumnus and Vulcraft Engineering Manager Bruce Brothersen. Johnson joined Nucor’s Vulcraft division after interning with the company as a USU Engineering student.



Giving Back: The Gift of Paying it Forward

As I travel around the country meeting with alumni and donors, I'm struck by how often people tell me that the reason they give back is because they want to return a favor. For decades, thousands of engineering students have enjoyed the benefits of an academic scholarship or internship opportunity, and each year many of those same recipients pay it forward to a new generation of engineering leaders.

Engineering alumni across a range of industries look back on their Aggie experience and tell us they want to give a little something back. Our office recently worked with two very generous donors who told us they wanted to pass on the same benefits they received in college.

Last year, Cache Valley resident and World War II veteran John "Burt" Millard and his wife, Alma, left a legacy that will impact future engineering students at Utah State University for many years

to come. The John and Alma Millard Scholarship Endowment Fund will provide annual scholarships for full-time students pursuing an undergraduate degree in the Mechanical and Aerospace Engineering department. Through their generosity, a fund was also established to pay the expenses for student projects and competitions.

Also last year, longtime USU supporters Richard and Moonyeen Anderson made a significant gift that will help more young people graduate with a degree in engineering. The Andersons' lifetime giving and most recent financial commitment will ensure the long-term success of the Richard and Moonyeen Anderson Scholarship fund.

These are just two examples of the many generous benefactors who have helped shape the College of Engineering and our students over the years. To our alumni and friends of the college, I thank

you for all you do and all you have done to help build this institution and encourage those who study and work here.

Working with our students is a privilege, and I'm happy to be involved in helping them become successful engineers. If you'd like to learn more about giving or other development opportunities, please don't hesitate to reach out. Even small contributions can change the life of an Aggie and give a wonderful return on your investment. Please contact me with questions about how you can leave a lasting impact on the College of Engineering and Utah State University.

Val Potter,
Executive Director of Development
435-797-8012 | val.potter@usu.edu

I'm Not What You Think I Am

Engineering Education Alumna Leads New Research into Stereotype Threat

Stacie Gregory was always a good student. Math and science came easy to the Indianapolis, Ind., native who went on to earn an undergraduate degree in physics from Spelman College and a master's in material science and engineering from Georgia Institute of Technology.

She even kept up with a strenuous workload as a PhD student at North Car-

olina State University in the late 1990s. But despite meeting academic goals, Gregory felt a growing burden that held her back and ultimately led her to drop out of the program. What happened? She asked herself in the years that followed. Fast-forward to 2013. Gregory is back in school, finishing a doctorate degree at USU – this time in engineering education – an emerging field that experts say

is crucial to the success of would-be engineers. It was personal experience that led Gregory to choose this emphasis and her main research topic: understanding stereotype threat – a psycho-social phenomenon that can derail even the most promising student.

The term 'stereotype threat' first appeared in 1994 when researchers described how a student's academic perfor-



Photo: Tina Krohn

mance can be adversely affected simply by knowing that their behavior might confirm a racial stereotype. Gregory says this sub-conscious preoccupation with one's demeanor can affect a person's cognitive abilities in the classroom, regardless of socioeconomic status or academic talent.

"Stereotype threat means that a person is worried about confirming a negative stereotype about his or her social group to their peers," said Gregory. "Over time, these experiences can take a toll on you. There have been hundreds of studies that confirm stereotype threat is real."

As part of her dissertation research, Gregory set out to understand why, in some instances, African American students have been shown to underperform in school when compared to their white peers. She interviewed black women across the country who were pursuing engineering degrees and learned that many of them had the same experiences she did in college.

"They discussed being the only female or only black person in their engineering classes," said Gregory. "And they talked about all the experiences that come along with being the only one – like being the last person chosen as a team member, feelings of isolation and all the emotion that comes from being someone different."

The conversations helped Gregory reflect on her own past and come to terms with the decision to leave her PhD program.

"I was the only African American in my class," she recalled. "And in my concentration, I was the only female. I felt like I was always in a setting where it was just me. I literally felt like I didn't belong there. There was always a feeling like I wasn't enough."

She remembers the day she decided to leave. No one seemed to notice. No one said goodbye, confirming her feelings of



isolation.

"I was performing well but something wasn't right, and over time the stress caused me to quit. I never understood what was going on until I learned about stereotype threat."

Gregory began studying engineering education at USU in the spring of 2013, with a focus on unraveling the causes of stereotype threat. Some of her findings have already led to improvements in

"Stereotype threat means that a person is worried about confirming a negative stereotype about his or her social group to their peers."

engineering classrooms. She published portions of her dissertation and is now a research fellow at the American Association of University Women in Washington, D.C., where she helps improve education policy. She also started her own organization called Engineers for Equality that helps educators and researchers understand the perspectives of students from underrepresented minorities and those with physical or developmental disabilities.

Her research has helped reveal simple steps educators can take to eliminate

stereotype threat in the classroom:

1: Make students feel cared for. Simple things like knowing students' names can make a big difference.

2: Don't let students choose their teammates for group projects. "Often-times professors think it's good to let students choose their own teams. But if you're the last to be picked, that can ignite stereotype threat," said Gregory.

3: Don't single out women or under-represented minority students in a classroom discussion simply to highlight that they can offer a different perspective.

"That's actually the worst thing you can do," said Gregory. "A professor might think that's a good thing because they're making that student feel included, but it usually makes them feel uncomfortable."

Looking back on her experiences, Gregory says finishing her degree fulfilled two important aspects of her life: finishing what we start and making a difference for a future generation of engineers.

"I've always been a person who loves academics, I love learning," she said. "But I had this sense of incompleteness. When I became a mother, I didn't want my son to know me as a quitter. I wanted to be an example of someone who never gives up." ■

Alumni Profile: Stacie Gregory - PhD '15, Engineering Education

Current Position: Research Fellow, American Association of University Women, Washington, D.C.

COMBINING CAREERS IN Engineering

BIOLOGICAL ENGINEER BLENDS CHEMISTRY, MACHINES AND LIFE SCIENCES



Nephi Jones has spent over a decade developing more efficient bioreactors for the biotech industry. The big stainless steel vessels dot the laboratory space where he works at Thermo Fisher Scientific in Logan.

Alumni Profile: Nephi Jones - BS & MS '04, Biological Engineering. **Current Position:** R&D Manager for Advanced Technology, Thermo Fisher Scientific

- Serves on Industrial Advisory Board for Biological Engineering Department
- Facilitates corporate sponsorship of internships and senior design projects in BE, ECE and MAE departments

The machines provide a sterile environment in which specialized animal or bacterial cells create the complex proteins and enzymes used in therapeutic drugs that combat eye disease, rheumatoid arthritis and cancer. And they are constantly evolving to produce better results.

“They’re what keeps me up at night,” said Jones with a laugh. “And they’re what gets me out of bed each day to come to work.”

Jones is a Cache Valley native who always liked solving problems and building tools to make the job easier. Today, he’s the research and development manager for advanced technology at Thermo Fisher Scientific in Logan.

“I always thought I wanted to be an engineer,” he said. “I liked biochemistry, physics and life sciences, but I also liked building things and working on machines. I figured a degree in biological engineering would let me combine all those areas into one. Biological engi-

neering just seemed like the right fit for me.”

Jones earned a concurrent BS-MS degree in biological engineering and, as part of his graduate studies, collaborated on cutting-edge research in bioprocessing while working at what was originally HyClone.

Since graduating in 2004, Jones

“There are others who are coming up behind me and trying to learn and make good in the world. I just want to repay the favor that was done for me and create opportunities for others to succeed.”

has stayed connected with the Biological Engineering Department and now serves on its industrial advisory board. He also acts as an industry liaison for the BE program and has facilitated funding through Thermo Fisher for various student design projects. Jones says he looks back at his USU experience grateful to the professors who mentored him.

“It was the people who drew me into the department,” he said. “The professors

had a strong interest in student success. They did everything they could to make sure we had a good learning environment and mentors to help us. For me, Professor Tim Taylor was pivotal in my academic career, and even now we still keep in touch and have a good professional relationship and share a passion for bioprocessing.”

Jones says he contributes his time and talents to his alma mater because he wants to see the next generation of graduates be able to solve the most difficult

problems and make the world healthier, cleaner and safer.

“There are a lot of people who went before me who blazed the trail,” he said. “I realize that there are others who are coming up behind me and trying to learn and make good in the world. I just want to repay the favor that was done for me and create opportunities for others to succeed.”

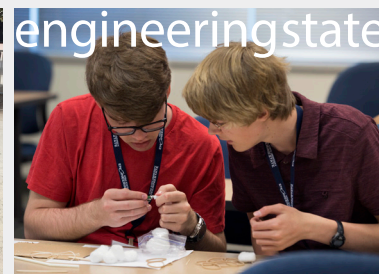
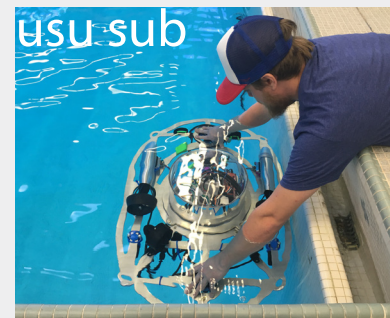
A Tribute to the Sant Legacy



The College of Engineering recognizes the ongoing support of Diann Sant who generously provides funding that supports student projects, community outreach and design competitions, along with the David G. Sant Innovation Fellowship program and the David G. Sant General Engineering Scholarship Endowment.

Sant and her late husband, Engineering alumnus David G. Sant, ('62, '64) who died in 2008, have supported the College of Engineering for 20 years.

The Sant family has donated more than \$7.5 million to Utah State University. The David G. Sant Engineering Innovation Building was dedicated June 13, 2008.





Left to Right: Brandon Eames, Joshua Daley, Michael Mamanakis, Josh Soelberg, Brandon Boldt and Andrew Briscoe pose for a photo at Sandia National Laboratories in Albuquerque, N.M. Other donors not pictured. Photo: Lonnie Anderson/Sandia National Labs.

ITSAN AGGETHING

A group of USU Engineering alumni at Sandia National Laboratories in Albuquerque, N.M., are doing something to pass along the same benefits they received as students.

The team created a scholarship fund that has awarded up to \$1,000 per year to multiple recipients. Engineering alum Henry Coakley initiated the fund.

“These are students who are in the same situation we were in college,” said Coakley who graduated in 2006 with a dual BS degree in electrical

engineering and mathematics and an MS in electrical engineering in 2008. “According to our financial aid records we didn’t need financial aid, but we actually did. We were in school, we worked hard, we had good GPAs and we just needed a little help to make it all work.”



OursincerestthankstothealumnidonorsatSandiaNationalLabS

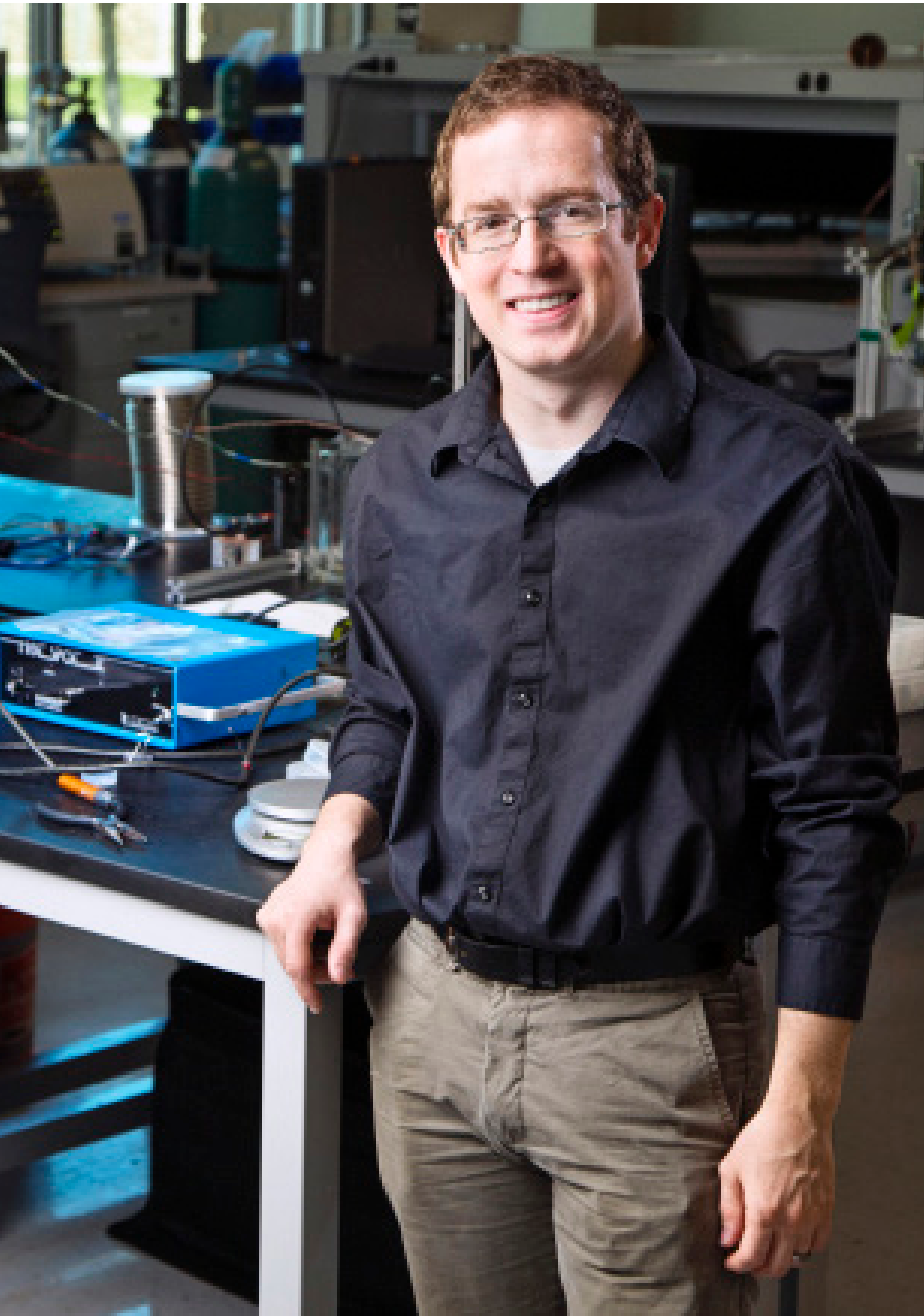
Dr. Matthew & Cylinda Areno
Brandon & Heather Ann Boldt
Andrew & Lindsay Briscoe
Abraham & Anne Clements
Henry & Jana Coakley

Joshua & Adrian Daley
Brandon & Natalie Eames
Lockheed Martin Scholarship Foundation
Cory Larsen
Michael & Farrah Mamanakis
Dr. Gregory Nielson

Tyler & Laura Smith
Joshua & Krissey Soelberg
Jonathan Tran
Dr. R. Derek & Jenny West
Brock & Jashley Wiberg

troy munro

from college freshman, to university professor



Alumni Profile: Troy Munro - BS, MS '12, PhD '16
Mechanical Engineering

Current Position: Assistant Professor of Mechanical Engineering - Brigham Young University, Provo, Utah

Meet Dr. Munro. You've probably seen him around campus or walked past the lab where he spent countless late nights as a graduate student. Those who know Troy Munro say he's got a rock-solid positive attitude and a humble work ethic.

At age 29, Munro joined the mechanical engineering faculty at BYU and has earned a PhD in mechanical engineering from USU and a second PhD in Physics from Catholic University of Leuven in Belgium. As an undergraduate student, he worked on cutting-edge research and flew on NASA's reduced-gravity aircraft, known among fans as the 'vomit comet.'

Munro's mentors say he's building the groundwork to become a top leader in thermal, materials and energy engineering research.

"He's an example of someone who started at the very beginning and has worked his way to the top," said Dr. Heng Ban, a professor of mechanical and aerospace engineering at USU and Munro's major advisor. "He's a first-generation college graduate who came to USU for an undergraduate degree and now he's an assistant professor at a globally recognized university."

The youngest of four siblings, Munro graduated valedictorian in 2005 from Cyprus High School in Magna, Utah. During his junior year AP physics class, he convinced his teacher to give him and his teammates an A if they could build a trebuchet capable of launching a water balloon to a third-story window. They did, and, needless to say, they all got A's.

Munro always had a knack for technical subjects, though he credits his parents and teachers for fostering his talent along the way.

"When I was about 4 years old, my parents would give me a calculator and addition problems to do in church to keep me quiet," he said with a laugh. "I enjoyed math and science, but I hadn't decided on engineering until after graduation."

He enjoys cycling, video games and spending time with his three children and wife, Michaelene. The two met while working as American Sign Language interpreters for a performance of Handel's Messiah and shared an instant connection.

"I first started learning ASL on my mission when I spent quite a bit of time with a missionary who was deaf," he explained. "I picked up a sign language book at the library and tried to interact with him as much as possible. Then I came here and took a sign language class and joined the Deaf Education Student Association.

"I found out that I was really passionate about helping people," he added. "I feel like teaching and mentoring students gave me the best opportunity to interact with a fair number of people and to have an influence for good in their life." ■

At the end of his junior year fluid mechanics course, Deryl Snyder raised his hand and told the professor he wanted to learn more. The mechanical engineering major had mastered the basics, but only felt comfortable solving very simple fluid dynamics problems.

“I wondered what I would need to learn to design something like a cooling system for a motorcycle, or something even more complicated,” he said.

His professor told him the university had recently hired a new faculty member who specialized in the relatively new field of computational fluid dynamics (CFD) who could teach Snyder everything he wanted to know. That professor was Dr. Robert Spall – a man Snyder had never met but who would change his life’s direction entirely.

“It wasn’t my intent to go into fluid mechanics when I started at Utah State,” he said. “I had come for the rockets and satellites and planned on a career in the space industry.”

But after meeting with Spall and learning what CFD could offer, Snyder was hooked and saw his future calling. “Spall got me excited about this,” he said. “He showed me where the technology was going and where it could take me, and he ended up being my advisor for both my master’s and PhD programs.”

After nine years at the Logan campus, Snyder earned three degrees in mechanical and aerospace engineering including a joint PhD from the von Karman Institute for Fluid Dynamics near Brussels, Belgium. His career took off quickly. He landed jobs with firms including Jacobs Engineering and Lockheed Martin and, most recently, CD-adapco – a global firm that develops CFD software tools. The company was recently acquired by Siemens.

Snyder serves as CD-adapco’s vice president for global business development, leading an organization of industry experts, technical specialists and developers that help engineers apply CFD to improve their products. He travels the world cultivating partnerships with new and existing customers in the automotive, aerospace, marine and a range of other industries. The company’s powerful software can make a car more aerodynamic, improve the environmental control system on a jetliner, or even make food manufacturing more efficient.

Snyder is an active supporter of USU Engineering. He offers mentor support to future engineers and serves on the industrial advisory board for the MAE department. He says giving back to a future generation of engineers helps him pass along the benefits he received as a student.

“Being at Utah State absolutely changed what I thought I would do in my career,” he said. “The reason that the course of my life changed was because of the people I met – faculty, or colleagues, or even people who visited for a guest lecture. All of those individuals opened my eyes and showed me what I could become.” ■

derylsnyder

how a professor changed the course of my life



Alumni Profile: Deryl Snyder BS '98, MS '99, PhD '02
Mechanical & Aerospace Engineering

Current Position: Vice President of Business
Development at CD-adapco in Orlando, Fla.

- Serves on Industrial Advisory Board for MAE
Department

'myentirelife HAS BEEN INFLUENCED BY THE SPACEINDUSTRY'

ELECTRICALENGINEERINGALUMINAWHOGREWUPAROUNDROCKETSSNOWALEADERINAEROSPACE

Alumni Profile: Jessica Gregory - BS '04, MS '10,
Electrical Engineering

Current Position: Systems Engineer, Orbital ATK
Promontory, Utah

- Serves as Society of Women Engineers and E-Week industry mentor



Photo: Thomas Evans

Jessica Gregory remembers looking up on her way to elementary school and seeing rockets blaze into the morning skies. She was raised near Santa Maria, Calif., in the 1980s at a time when rocket launches from nearby Vandenberg Air Force Base were a common sight.

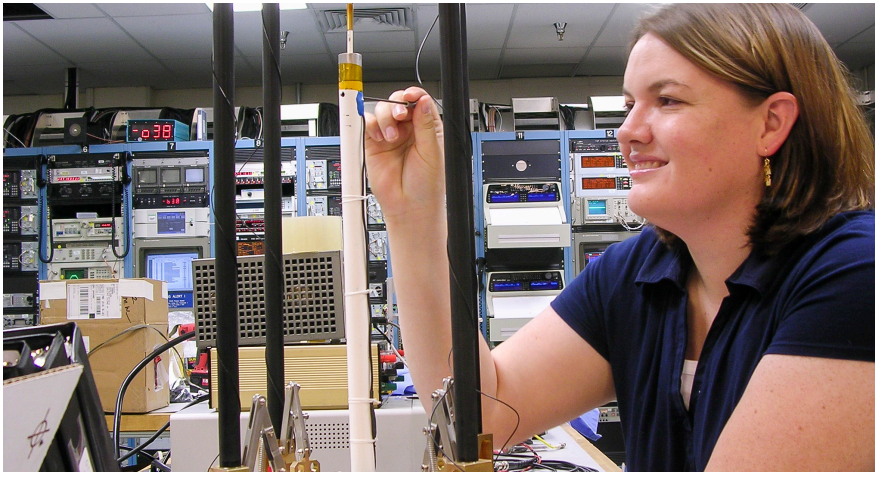
She didn't know it at the time, but Gregory would become a part of the space industry she grew up around and

would lead a team of engineers who are building a spacecraft that will reignite American space exploration.

Gregory was born in Logan, Utah, while her father was attending USU for a degree in civil engineering. He later got a job in the nuclear industry and moved his family to Santa Maria where the space industry was expanding rapidly.

Plans were in place to build a space shuttle launch pad at Vandenberg, and

business in that area was booming. With so many people moving to the region, her father started a side business renting furniture and home goods to incoming families. That little side business eventually became the family's main income and the Gregorlys were doing well. But all that changed in January 1986 when the Challenger shuttle exploded, bringing the space industry to an abrupt halt. After business in Santa Maria dried up, the



As an ECE graduate student, Jessica Gregory worked on the payload for a NASA rocket mission.

Gregorys moved back to their home state of Idaho.

Life went on, and after starting college at USU, Gregory considered several career paths including culinary arts. But the math whiz inside her knew she could also succeed in a technical field. By 2001 she decided to pursue a degree in electrical engineering.

Near the end of her junior year, she was looking for an opportunity to get more involved in engineering research. A mentor named Sue Ellen Haupt, who oversaw the student chapter of the Society of Women Engineers, told Gregory to apply for an undergraduate research opportunity in space sciences. Through a twist of luck, she was selected for a 10-week research grant working under ECE Professor Dr. Charles Swenson who specializes in space science instrumentation.

"I basically walked into his office and asked if he had anything for me to do," she recalled. "He put me to work at the Space Dynamics Lab working on systems that measure atomic oxygen in the ionosphere."

She spent the next 10 weeks learning about the ionosphere and how it affects everything from satellite communications to the national power grid. She said she liked the topic so much she chose it for her senior design project and was later hired to work with Swenson on a NASA sounding rocket mission.

"Dr. Swenson told me I'd learned so much he didn't want me to leave," she said. "He asked me to be part of a mission to launch a sounding rocket over a tropical storm to see how major

weather events affect the upper ionosphere."

Swenson needed a payload that could blast into space and take a series of electrical measurements using technology that hadn't been developed yet.

"We started by standing in front of a whiteboard and scratching out ideas on how we could collect all this data," said Gregory. "It was pretty comprehensive. We took it from a conceptual design all the way through functional integration ready for flight on a sounding rocket."

The mission was dubbed NASA 'STORMS' and, after a successful launch from Wallops Flight Facility in Virginia in 2007, provided Swenson and fellow researchers with new data about the makeup and behavior of the ionosphere. Swenson credits Gregory for helping make the mission successful.

"She was responsible for the entire integration of the USU instruments to the payload and we relied on her for the success of the program," he said. "Jessica was an excellent graduate student and wrote a very effective MS thesis on rocket probes for measuring electric fields in the space environment."

Gregory graduated with a BS degree in electrical engineering in 2004 and started working for what is now Orbital ATK just two years later thanks in part to her association with current SWE advisor Nina Glaittli. In 2010 she earned a master's degree in electrical engineering and today is a systems engineer for Orbital ATK, managing the NASA requirements that influence the design of SLS – the spacecraft that

will replace the space shuttle.

She says her life so far has been a series of fortunate opportunities that pointed her toward a career in space.

"If it wasn't for my association with Dr. Haupt and with Nina, I wouldn't have had my undergrad research experience and I wouldn't have applied at ATK," she added. "I didn't know it until I started working in this business, but my entire life has been influenced by the space industry." ■

Congratulations Recipients of the 2016-2017 Richard and Moonyeen Anderson Scholarship



Jacob Cazier, Blaine Cook, Ember Fairbanks, Katie Glaittli, Levi Kearn, McKenna Sumrack, Carly Lofthouse, Alanna Nieves, Justin Pace, Brian Rex, Zakk Rhodes, Tyrel Rupp, Bradley Siler, Carson Sparks, Zeke Villarreal, Hanna Young, Joshua Larkin, Trevor Naumann

For Richard and Moonyeen Anderson, providing a student scholarship is a lot more than just writing a check. The Wellsville, Utah, couple – both alumni of USU – personally visit campus each year to meet the student recipients and treat them to lunch.

To date, nearly 200 engineering students from Cache and Box Elder counties have received scholarship funding from this generous couple. Thank you, Mr. and Mrs. Anderson. ■



subashgutala

computerSciencealumturnedgoogleengineerpaysitforward

Just one year after graduating from USU with a master's degree in computer science, Subash Gutala donated funding for a scholarship that would give a future student the same quality experiences he had.

The computer science alumnus came to Logan from a small town near Hyderabad, India and instantly connected with new friends, colleagues and the faculty and staff of the Computer Science Department.

"Utah State has a very special place in my heart," said Gutala who now lives in Mountain View, Calif.,

and works as a Sr. Software Engineer for Google Play – Music. "Coming to Logan, was my first time in a different country, and I found the people to be very friendly and supportive."

Gutala worked under Dr. Stephen Clyde on distributed systems – an increasingly common area of study for

computer scientists. Distributed systems are the backbone of cloud computing and any platform in which users access information from multiple computers. The two worked on cutting-edge technology that linked databases at the Utah Department of Health to simplify the way health practitioners access patient data.

After graduating, Gutala worked

"When I came to Utah State, I arrived with almost no funding. And later when I did get funding, I realized that it makes a big difference in the quality of education and quality of life."

briefly for the National Center for Hearing Assessment and Management, developing software tools used to improve the lives of children who have hearing loss. He then worked as a software engineer at Microsoft and in 2011 landed a data analytics job at Google where he studies data on Google Play users.

"We're trying to understand how users search for music, what recommendations they receive and, overall, how to better understand user behavior," he explained.

Gutala credits his mentors and members of the community for making his USU experience so positive. He recalled how a local family invited him into their home for Thanksgiving one year. They picked him up and dropped him off afterward, and even – to his surprise – accommodated his vegetarian meal preference.

"I loved my experiences in Utah," he said.

"When I came to Utah State, I arrived with almost no funding. And later when I did get funding, I realized that it makes a big difference in the quality of education and quality of life. That's why I wanted to give something back to the university." ■

Alumni Profile: Subash Gutala - MS '04, Computer Science

Current Position: Sr. Software Engineer for Google Play - Mountain View, CA

- Donated scholarship funding one year after graduation
- Serves on Industrial Advisory Board for Computer Science Department



INNEED

OFA

LIFT

MAE Students Design Innovative Patient Lift System

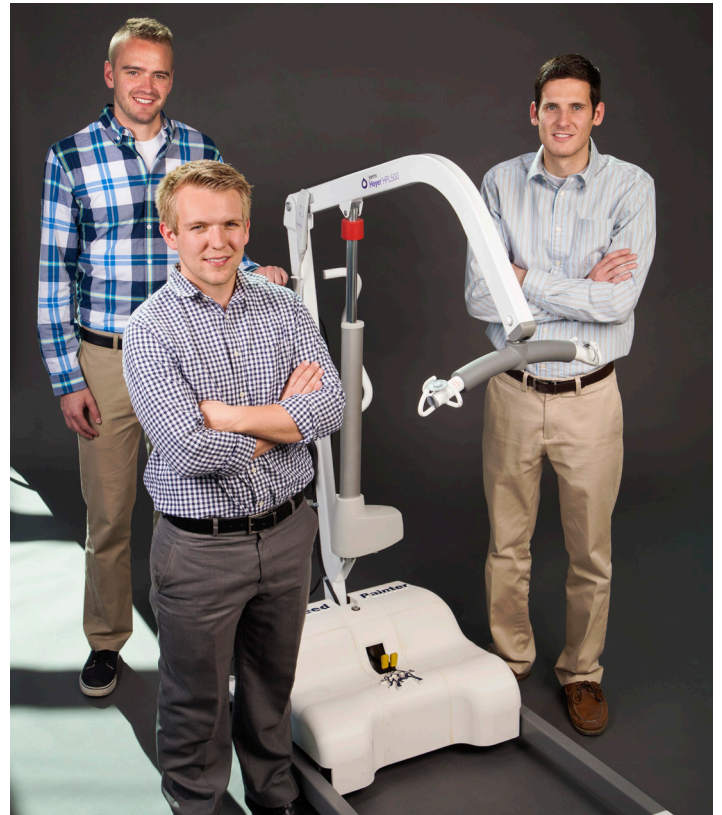
Senior design students in the Mechanical & Aerospace Engineering Department have created another assistive technology device that may lead to improvements in patient care and mobility.

The mobile patient lift system is designed to transfer an individual from a chair or bed to another location. The device, called 'Mobilift,' is a combination of an existing commercially available hydraulic patient lift coupled with a custom motorized base. The machine can support a maximum of 300 pounds and can be maneuvered manually or with the motorized wheels using a handheld remote.

Students Kyle Christian, Kye McCleary and Matt Schumann wanted to build something new and creative that could be marketable in the assistive technology industry.

"It was very exciting to work on a project that provided an opportunity to create something new and innovative while improving someone's quality of life," said Kye McCleary ('16 BS, MAE). "These are two reasons anyone would want to be an engineer, and we got to do both."

After the lift was completed and tested for safe opera-



From left: Kye McCleary, Matt Schumann and Kyle Christian (all BS '16, MAE) combined a hydraulic lift with a motorized base to create a mobile patient lift system.



USU alum Reed Painter, left, uses the Mobilift in his home with help from student designer Kyle Christian.

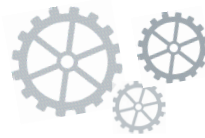
"It was very exciting to work on a project that provided an opportunity to create something new and innovative, while improving someone's quality of life." - Kye McCleary

tion, it was donated to a Cache Valley man who has suffered from the effects of muscular dystrophy since he was 15. Reed Painter of Providence, Utah, is a USU alumnus who worked as a senior librarian and instructor of library sciences at USU for 33 years. Today, Painter has limited mobility and depends on his wife and daughter to be able to move around his home.

Instead of manual lifting, Painter is fitted with a sit-down style-harness that clips into the lift mechanism. His wife or daughter can then push the lift between rooms and position Painter into a different location.

Mobilift, which has since earned the nickname 'Reed Painter,' was completed with direction from MAE Professor Rees Fullmer and Clay Christensen, an administrator for the Utah Assistive Technology Program at USU's Center for Persons with Disabilities. ■

DESIGN REQUIREMENTS



- Comply with governing standards: (ADA & ISO)
- Support a maximum of 300 lbs
- Support a person up to six feet tall in standing position
- Maximum Height: 80 inches, Max width: 29 inches
- Maneuverable through standard doorway
- Capable of swiveling user 360 degrees
- Able to lift to full position in 20-30 seconds



TWO NSF CAREER AWARDS IN 2016

The Faculty Early Career Development (CAREER) Program is the National Science Foundation's most prestigious award program in support of junior faculty who exemplify the role of teacher-scholars through outstanding research, excellent education

and the integration of education and research. Two College of Engineering faculty received the award in 2016. The two grants, approximately \$500,000 each, will help advance fundamental research in areas of water resources engineering and computer science.

Kyumin Lee,
Assistant Professor, Computer Science, is developing new tools that detect and target crowdsourced manipulation. From falsified online product reviews to artificial social media accounts, this ongoing study will help build a more trustworthy Internet and defend the open Web ecosystem.



Jeff Horsburgh,
Assistant Professor, Civil & Environmental Engineering, will create new software tools to collect, shrink and transform the data from 'smart' water meters into useful information products for water managers. His work will close the gap in our ability to quantify and forecast urban water use.



e-state turns 25

Engineering Summer Camp Made Possible by Generous Donors

In 1990, the Department of Civil and Environmental Engineering created an event that introduced young people to the basics of engineering. A year later, the College of Engineering adopted the program and added learning activities that represented its other departments for a weeklong summer camp for 16 and 17 year olds. The organizers didn't know it at the time, but they had created a long-standing USU Engineering tradition.

Engineering State, or E-State, has become one of the most popular engineering outreach programs at USU. Each year, high school students from across Utah and Idaho sign up for the camp, and many go on to major in engineering and become professional engineers.

The program is made possible by several generous donors including Rocky Mountain Power, Hewlett-Packard and Nucor. Steve Rowlan, a USU civil engineering alumnus who recently retired from Nucor, said supporting E-State creates a pathway for future engineers who he hopes will pursue engineering careers in heavy industry.

"There's a lot of opportunity in heavy industry," he said. "We need engineers to



Dr. Jake Gunther, left, works with students at an E-State event attended by Nucor donor and USU civil engineering alum Steve Rowlan.

"We need engineers to help us design building components, water systems, infrastructure and the power systems that make this country." - Steve Rowlan

help us design building components, water systems, infrastructure and the power systems that make this country."

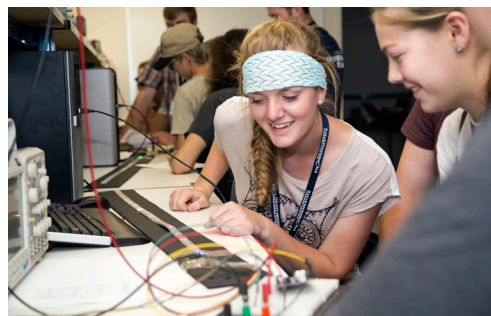
Rowlan says it can be difficult for Nucor to recruit talented engineers because so many young engineering students are drawn to software development and computer science.

"We recognize that there's a need for software engineers," he added. "But there is also tremendous need and opportunity in heavy industry. We want young people to know that before they get to college, and we want them to be familiar with heavy industry and to get excited about it."

One USU Engineering student who is following the pathway to a career in heavy industry is Colton Kilmer.

"Colton came to E-State as a high school student, he enrolled in engineering in college and now he's interning with our Vulcraft division in Brigham City," said Rowlan. "That's a great example of how influential E-State can be."

E-State 2017 is June 5-8. ■



AGGES

in the

Arctic

CEE Alumna turned Water Quality
Researcher decodes icy watersheds



When it comes right down to it, scientists and environmental engineers will tell you that nearly every ecosystem on Earth is driven by one simple thing: temperature.

Oceans, rivers, forests and deserts are a product of the chemical and biological processes that depend on a predictable mix of hot and cold. Even in the Arctic, where shallow soils are frozen most of the year, tiny variations in temperature can impact entire regions.

For the past seven years, Dr. Bethany Neilson has spent part of her summers in the Arctic, wading through the chilly waters of Northern Alaska – about 68 degrees north latitude at the Toolik Field Station. Neilson, an associate professor of civil and environmental engineering, and an alumna of Utah State, is among the first to investigate what's happening to stream and river temperatures in watersheds in some of the coldest places on earth. She and her



Alumni Profile: Beth Neilson, '98, '01, '06
Civil & Environmental Engineering

Current Position: Associate Professor,
Department of Civil and Environmental
Engineering, Utah Water Research Lab,
Utah State University

students are trying to understand what dictates water temperature in the Arctic and how climate change could impact the delicate ecosystems there.

“We wanted to know how in-stream temperatures will vary with climate change,” she said. “We’re trying to better understand how water moves through these landscapes and understand its influence on arctic streams and rivers under current conditions.”

But it turns out there had been little to no research done on what controls temperatures in Arctic Basin rivers. Using a small team of USU and University

of Alaska Fairbanks student researchers, a grant from the National Science Foundation and a helicopter, Neilson set out to place hundreds of in-stream sensors along stretches of the Kuparuk River basin and through a smaller headwater basin – Imnavait Creek on Alaska's North Slope. Knowing how temperature changes – and when it changes – is key to understanding how these unique arctic watersheds work.

“Temperature is very important for any kind of biological or chemical process,” she added. “For example, it affects fisheries and nutrient fate and transport within streams, rivers and lakes.”

Much of the ground here is frozen year round, and summertime temperatures thaw only one or two feet of the soils – three feet at most near rivers. The resulting temporary aquifer in these



Cover Image: Mitchell Rasmussen and Beth Neilson carrying out equipment from Imnavait Creek field site, June 2016. Lower: Tyler King and Beth Neilson prepare a midnight tracer injection in the Kuparuk River in 2015.



Tyler King places sensors in the Kuparuk River, Alaska in July 2015

shallow soil layers, accompanied by summertime rain showers, can quickly fill Alaska's rivers and streams with surging cold water – the lifeblood of downstream fisheries.

This cold water makes its way to the rivers by running over the land surface, and it also flows underground through the shallow aquifer. As flow diminishes, experience teaches us that the stream's temperatures would rise.

“When I saw how low the flows get during dry periods, I questioned how the water temperature remained viable for the fisheries,” said Neilson. “When similar conditions occur in most environments, the water becomes too warm and it stresses the fish.”

But arctic watersheds have an extraordinary ability to defy conventional patterns. Even when flows slow to a trickle, water temperature remains

relatively low.

“Because much of the ground remains frozen at shallow depths, we found that the water entering rivers and streams from the landscape remains cold,” she added. “Similarly, water mov-

“The connectedness between polar systems and our daily lives is indirect but you can't disconnect the two.” Dr. Bethany Neilson

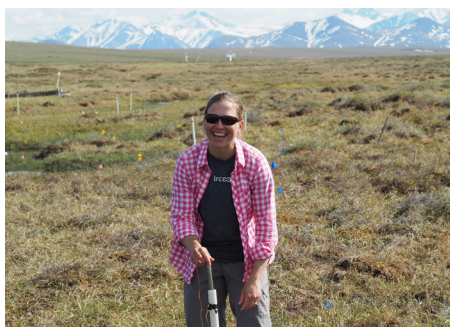
ing through the sediments below and adjacent to the stream is influenced by the frozen ground which creates a significant net cooling effect. This means that even when the rivers have very low flow, they remain cool.”

For Neilson and her team, including Ph.D. student Tyler King, the next question becomes: what will happen when air temperatures in the Arctic rise and the soils thaw deeper and deeper into the frozen tundra?

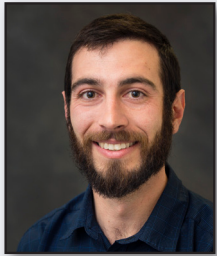
“What we're finding is that the influence of water draining from the landscape is significant during periods of rain, but the exchange of water and heat with sediments adjacent to the river and the proximity of frozen soils also appears to buffer temperatures during low flows,” she said. “While our main focus has been on the thermal influences of these inflows, they also control the delivery of carbon and nitrogen to the rivers and the Arctic Ocean.”

Because warming at high latitudes will affect the entire planet, Neilson's research will help show us how connected we are to the Arctic.

“There are some very interesting feedbacks in these systems,” she added. “What happens up there, impacts what happens here. The connectedness between polar systems and our daily lives is indirect but you can't disconnect the two” ■



WelcomeNewFaculty



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Professional Practice
ASSISTANT PROFESSOR
Mechanical & Aerospace
Engineering



Yu huang
ASSISTANT PROFESSOR
Biological Engineering



Doug Hunsaker
ASSISTANT PROFESSOR
Mechanical & Aerospace
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Dean Mathias
LECTURER
Computer Science



Angie Minichiello
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Farewell to a Mentor

Dean of Engineering Departs for New Role at Texas State University

After 22 years of service to Utah State University, College of Engineering Dean Dr. Christine Hailey stepped down for a new leadership role in Texas and to be closer to family.

Hailey was named dean of the College of Science and Engineering at Texas State University in San Marcos, midway between Austin and San Antonio. She started her new role in July, leading one of the state's largest academic institutions that houses seven departments: biology, chemistry & biochemistry, computer science, engineering technology, materials science, mathematics, physics and the Ingram School of Engineering.

A native of Boulder, Colo., Hailey holds a bachelor's degree in mathematics from Colorado State University and master's and doctorate degrees in mechanical engineering from The

University of Oklahoma. She worked for nine years as an engineer at Sandia National Laboratories in Albuquerque, N.M., and began teaching at Utah State in 1994 as an assistant professor in the Mechanical and Aerospace Engineering Department. She was named dean in 2013 and in a short time ushered in significant improvements including nearly doubling female undergraduate enrollment and laying the groundwork for Utah's first PhD program in aerospace engineering.

Hailey advocated for differential tuition to help cover the costs of lab upgrades, teaching assistants and student design projects. She also championed increased diversity in USU's engineering programs with her ongoing support of the student chapter of the Society of Hispanic Professional Engineers and other student programs.



Hailey announced earlier this year that she and her husband, David, would move to Texas to be closer to their daughter and two grandchildren. She says leaving USU and Cache Valley was no easy decision.

“There is something special about Utah State,” she said. “Every day I see our faculty, our advisors and administrators taking an extra step to help a student achieve a little more.”



Hailey’s colleagues say they’ll miss her leadership and tireless commitment to improving the student experience.

“Chris has been a great colleague focused on creating a world-class university,” said Dr. Mark McLellan, USU Vice President for Research and Dean of Graduate Studies. “Her passion for teaching, research and outreach speaks to her commitment to the land-grant and space-grant missions of this



university.”

Dr. Robert Spall, Department Head for Mechanical and Aerospace Engineering at USU, has worked closely with Hailey for many years as the department has grown to become one of the largest on campus.

“Chris Hailey was a member of the search committee when I interviewed here 20 years ago,” said Spall. “Ever since, she has proven to be a wonderful



colleague and a good friend.”

Dr. Stacie Gregory, a USU alumna and research fellow at the Washington, D.C.-based American Association of University Women, said Hailey was one of the most supportive administrators she ever worked with.

“Having someone in my corner who wanted me to succeed was what helped me along,” said Gregory.

USU Executive Vice President and Provost Dr. Noelle Cockett said Hailey has had a relatively short but excellent tenure as dean.

“Her efforts have focused on the success of students and faculty,” she said. “On a personal note, I have loved working with Chris because of her warm and caring nature. She puts people first in all of her comments and decisions. She will be greatly missed but I wish her

the very best in the next chapter of her life.”

Looking back on her education and career so far, Hailey is quick to credit others who have influenced and mentored her. In fact, it was an early mentor at the University of Oklahoma who saw a potential engineer in Hailey who, at the time, was working as a technical typist for an engineering department.

“He said to me, ‘you have a degree in math; what are you doing working as a typist?’” she recalled. “He told me to take a fluid mechanics course from him just to see what engineering was about. So I did, and I nailed it because that course and others like it are based on math.”

That mentor who steered Hailey toward her lifelong

profession was Dr. Martin Jischke, a faculty member at UO’s School of Aerospace, Mechanical and Nuclear Engineering who would eventually become the 10th president of Purdue University and a renowned leader in American higher education.

“Martin Jischke had a magical way of reaching out to people and helping to paint a picture of what they could become,” said Hailey. “Which is why mentorship is so important to me.” ■



DONOR PROFILE: CHRISTINE E. HAILEY

- Served as USU College of Engineering Dean 2013-2016 and on faculty since 1994.
- Recipient of the Governor’s Medal for Excellence for outstanding service in academia, education and industry, 2015.
- Recipient of the Utah Engineers Council Engineering Educator of the Year award and the Society of Women Engineers Distinguished Engineering Educator Award.
- Established Aerospace MS degree program and helped create Utah’s first Aerospace Engineering PhD program.
- Served as director of the National Center for Engineering and Technology Education, an NSF-funded Center for Learning and Teaching.
- She and her husband, David, are members of USU’s Old Main Society in recognition of their charitable donations.



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