ME alumni - New job? Life change?
We want to hear what's new! You could be featured in a future issue of ME News.
Please email me-news@umn.edu with updates, along with your graduation year.

View the ME alumni web page (me.umn.edu/alumni) or connect via ME-AN LinkedIn.

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A letter from the
DEPARTMENT HEAD

Dear Alumni and Friends,

of the Department of Mechanical Engineering,

It is my privilege to introduce myself to you as the newest Head of the ME Department as of January 1st. I have been a faculty member with the department since 1991 and for seven years served as Associate Department Head under the leadership of Uwe Kortshagen. I am very proud to be selected as the head at a time when the ME Department is in the midst of tremendous growth. ME has a culture of innovation, collaboration and creativity and is made up of truly extraordinary people working at the cutting-edge of our discipline. The department’s key research areas strive to meet the needs of the future and have led us to focus on areas that will impact human health, energy production and efficiency, the environment, and transportation.

Our mission is to educate skilled engineers who are prepared to address the complex challenges of tomorrow. I echo former head Uwe Kortshagen’s great pride in our faculty’s dedication to undergraduate and graduate education. Our undergraduate program focuses on providing students with a solid background in core mechanical engineering disciplines, as well as hands-on lab and research experience. Our graduate students engage in pioneering, interdisciplinary research, to become the next leaders in mechanical engineering. I am excited and honored to work with everyone who makes up ME, our faculty, our staff and students, our volunteers, and our alumni, to lead the department into a bright and productive future.

Best wishes in 2019,

Suzan Mantell, Ph.D.,
James J. Ryan Professor, Morse Alumni Distinguished Teaching Professor, and Head of Mechanical Engineering

WHAT’S INSIDE?

4 • Mechanical Engineering and Human Health Advancements
Allison Hubel, Suhasa Kondandaramaiah, Michael McAlpine, Rajesh Rajamani

5 • Faculty Spotlight Awards
Cari Dutcher, Timothy Kowalewski

6 • ME Student Pride
Kristin Johnson, Riley Johnson, Nick Lee

8 • Proud to be UMN Driven
ME facts & figures

9 • Alumni Legacy
Jay Axness

10 • ME Generous Donors

12 • ME 2018-19 Undergraduate Scholarship Recipients

13 • ME Course Highlight, Student Profile
Ben Hamlen, Cara Piazza

14 • Richard Goldstein Retirement, Why I Stay Connected to ME

15 • In Memoriam
Perry Blackshear, Subbitha Ramirez

On the Cover
Icebergs in Jokulsarlon Iceland taken by ME graduate student Guanglin Yu. Floating ice is separated by unfrozen water, representative of the environment cells experience during freezing. Where cells are located in the unfrozen solution between adjacent ice crystals. Cell preservation methods are researched by Professor Hubel and team. Page 4

Q&A with the new ME Department Head

What is your vision for the department’s role in training the next generation of engineers?

The projected need for engineers in Minnesota is growing, and mechanical engineers are at the forefront of those needs. Our graduates are in high demand. An agile workforce is critical to the continued growth of our economy. My colleagues and I are committed to preparing engineers who are not only technically skilled but also capable of learning new material to address challenges they will face over their long careers. I realize just how important this is as I get to better know our alumni base and hear of the varied and challenging careers they have had.

What does it feel like to lead the department?

It’s truly an honor for me to be the department head of Mechanical Engineering! My entire academic career has been right here in ME. I was the first woman to be tenured in the department and I’ve had incredible support and leadership opportunities along the way. In my new role, I will work to guide and support our faculty and staff as we deliver an outstanding education, with both breadth and depth, for our students.

THANK YOU TO UWE KORTSHAGEN

A grateful thank you comes from the department and its friends to Professor Uwe Kortshagen who stepped down as department head in December after serving ten years in the position. Under his leadership the department continued to demonstrate why it is one of the leading mechanical engineering departments in the country, and one of the most popular undergraduate majors in the College of Science and Engineering. Professor Kortshagen placed a renewed emphasis on undergraduate and graduate education with 94.4% of ME graduates in high demand. Many progressed directly into professional employment, or continued their education at leading graduate programs throughout the country. Most notably, Professor Kortshagen guided the hire of an extraordinary number of world-class faculty that brought new vitality and energy to the teaching and research missions of the department. Under his leadership, 16 new faculty were hired who not only strengthened many of our existing, distinguished research areas, but are also leading the department down new research avenues. These as well as many other of Professor Kortshagen’s accomplishments during his tenure will assure that Mechanical Engineering at the University of Minnesota will continue to lead the way.
Mice are a vital mammalian model organism in neuroscience. Neuroscientists need to perform delicate surgeries on the mouse skull, which is sub-millimeter thick, to open ports and probe the underlying brain. This is a tricky and challenging procedure. The technology, developed in Assistant Professor Suhasa Kodandaramaiah’s Biosensing and Biorobotics Laboratory and dubbed the “Craniobot,” allows neuroscientists to automatically perform such surgical procedures. Thus, computer numerical controlled machining that is common in machine shops and manufacturing plants, is now being applied for rodent neurosurgery.

This interdisciplinary research bridges two key MnDRIVE initiatives – Robotics, Sensors, and Advanced Manufacturing, and Brain Conditions. MnDRIVE – Minnesota’s Discovery, Research, and InnoVation Economy – is a partnership between the University of Minnesota and the State of Minnesota that aligns areas of research strength with the state's key and emerging industries to address grand challenges.

Imagine a printed model fabricated with layers of 3D printed biological material combined with electronics. Now imagine this is a prototype for a bionic eye, a replica of an organ model for surgery prep, or a scaffold to connect damaged nerve tissue.

Michael McAlpine, the Benjamin Mayhugh Associate Professor of Mechanical Engineering, along with a team of dedicated researchers, are revolutionizing a pathway to bionic organ transplant with 3D printing utilizing silicones, metals, and human cells. These devices “hear” radio frequencies beyond the normal human range, translate light into electrical signals, and promote spinal cord function.

For patients with conditions like heart failure or chronic venous insufficiency, early detection of fluid build up is key to avoiding disease deterioration and hospitalization. Professor Rajesh Rajamani, along with ME Ph.D. student Song Zhang, developed a compact water content sensor to recognize fluid accumulation in lower extremities; providing early detection to avoid hospitalization. This citation was authored for the Annals of Biomedical Engineering, Vol. 46, No. 12, pp. 2079-2090. December 2018.

Mechanical Engineering Assistant Professor Timothy Kowalewski received the NSF CAREER Award to study "Scientific Foundations for Augmented Human Performance in Robotic Surgery." The CAREER Award allows promising early career faculty to pursue cutting-edge research while simultaneously advancing excellence in education. Professor Kowalewski will investigate how skilled humans use handheld robots to accomplish precision tasks.

Mechanical Engineering Assistant Professor Cari Dutcher received the George W. Taylor Career Development Award, granted by the College of Science and Engineering. This award recognizes exceptional contributions to teaching by a candidate for tenure.

This work was recently discussed in a paper published in the journal Scientific Reports. ME Ph.D. student and U of MN Informatics Institute (UMII) MnDRIVE Graduate Assistantship recipient Leila Ghanbari, and BME Ph.D. student Mathew Ryenes, coauthored the study.

At-home monitoring with ultrasound and magnetic sensing

Redefining biomedicine with 3D printing

Engineered cell preservation

Controlled rate freezing of cells

Robotic cranial microsurgeries on mice allow for delicate operations with micro-meter precision

Leila Ghanbari

Mathew Ryenes

Robotic cranial microsurgeries on mice allow for delicate operations with micro-meter precision

Enginnered cell preservation

Recent clinical trials in cancer suggest that using engineered immune cells could transform the treatment of cancer. Unlike radiation and chemotherapy, cell therapies for the treatment of cancer require living, viable cells. Professor Allison Hubel’s research develops effective methods of preserving the cells so they are viable when the patient needs them. When the Biopreservation Core Research team started the project they questioned, “Why do trees survive Minnesota winters?” The answers are utilized to improve the preservation of cells used to treat disease.
Kristin Johnson

Undergraduate Mechanical Engineering Schaller Scholarship recipient, Kristin Johnson, chose ME at UMN because the degree not only matched her strengths and interests, but also offered a clear transfer path. Education wasn’t emphasized in Kristin’s childhood growing up in Blaine. She had a lot of talent and interest in math, applied science, and problem solving, but didn’t consider engineering until she was 30 years old, working 40-60 hours per week, and raising four children. Although it was an undertaking of great magnitude, Kristin enrolled in Anoka Ramsey Community College (ARCC) where she received her A.S. in Engineering, becoming the first person in her family to earn a degree.

While planning her transfer to the University of Minnesota, Kristin became interested in the co-op program and multiple semester work experiences. Eventually she participated in an internship at Polaris, as well as two at Medtronic.

“\"I’m learning so much from the job and gaining experience that will help guide my career path.\"”
-Kristin Johnson, ME Student

Kristin has always been a community leader and has diverse interests. She was president of a women’s STEM club and the math team at ARCC. She co-founded as well as held the position of vice president of She is ME, a club focused on growing and supporting women in ME. In addition, Kristin is a math and science tutor for middle school, high school, and college students. She is taking a break from coaching six years of gymnastics to focus on finishing her degree, while also enjoying hiking, Japanese joinery, fantasy/science fiction from the 60s and 70s, doughnuts, 1930s Allis-Chalmers tractors, and dad jokes.

Nick Lee and Riley Johnson

You don’t have to look far to find connections within the Department of Mechanical Engineering circle. One example of this is the interesting link between Nick Lee and Riley Johnson.

Upon graduation from Mechanical Engineering in 2005, Nick joined BlueSky Designs where he collaboratively developed products as a lead mechanical engineer. During Nick’s 12 years at BlueSky, he and Dianne Goodwin (BlueSky Designs founder) developed the Mountain Mover and Powr Mount product lines. Let’s take a step back and mention that Nick and his classmates’ ME Senior Design project was to prototype an ergonomic robot arm that would attach to a wheelchair and support laptops and speech devices. That concept is now commercialized as the Powr Mount line of BlueSky products, controllable via a smartphone app!

The Mountain Mover that Nick collaborated on at BlueSky is now a patented, customizable ergonomic wheelchair mount for positioning devices. The design revolutionized the niche industry of wheelchair mounts — allowing people to independently operate, lock, and move their tray or device. Notable users of the Mountain Mover include current U of M CSE undergrad, Riley Johnson, disabilities activist Rick Cardenas, and hockey player Jack Jablonski.

Riley Johnson, who will soon graduate from the Department of Mechanical Engineering, uses the Mountain Mover on a daily basis, the exact same product Nick helped develop.

“I like the Mountain Mover because it was designed with independence in mind,” said Riley. A lot of chair trays aren’t movable, and even if they are, the person in the chair most likely can’t move it. Riley is easily able to move the Mountain Mover, which is highly advantageous. “I can write notes, do homework, type reports, eat, etc., all independently because I don’t need help, allowing me to be more independent,” stated Riley.

Growing up, Riley liked learning how things worked and his dad was always fixing something. This combination allowed for the two of them to work together building things, and soon led to a teacher recommending mechanical engineering as a career. Riley hasn’t looked back. His sophomore year he joined the UMN Solar Vehicle Project. “I thought that experience was pretty cool and rewarding seeing how passionate the team was using engineering for real life applications,” said Riley. Ideally Riley hopes to work in a manufacturing environment one day, but at the moment Riley is busy as a member of the US National Team for powerchair soccer!

Riley Johnson uses his Mountain Mover on a daily basis

He’s played in France and will be in Brazil for the World Cup qualifiers (COPA) this summer. If they win qualifiers, Riley plans on trying out for the next World Cup held in Australia, 2021.

“\"I like the Mountain Mover because it was designed with independence in mind.\"”
-Riley Johnson, ME student, referring to the product Nick Lee (ME’05) helped develop.

Nick Lee became co-owner of BlueSky in 2011 due to his passion for developing solutions for people with disabilities. In addition to developing mechanical and electrical products, he presented award-winning accessibility solutions nationally and internationally. In 2017 he joined 3M’s Consumer Healthcare Division in St. Paul as a Senior Product Developer, supporting ACE™ and Futuro™ brands of braces and joint supports.

Riley participating on the US National Powerchair Soccer Team
Jay Axness worked at the ExxonMobil Baytown Refinery during Hurricane Harvey. The petrochemical facility, which produces 580,000 barrels of crude oil daily, was shut down due to the hurricane. Photo credit: Brian McFatridge/ExxonMobil

University of Minnesota alumnus Jay Axness (ME’08) helped get gasoline flowing again after Hurricane Harvey hit Texas in 2017. At that time Axness had worked nine years in the oil industry. He began his career with an internship through the University’s co-op program with ExxonMobil in Houston. “I enjoyed the work and the team and challenges, so I decided to come full-time,” he said. He’s always worked with “fixed equipment,” which includes valves, pipes, storage tanks, reactors, distillation towers, and pretty much anything that doesn’t have rotating parts. His work takes crude and turns it into something useful, “whether it’s motor gasoline or jet fuel or the chemical products that go into making plastic or rubber or wax,” said Axness. “People don’t realize it, but almost anything you use on a daily basis is impacted by oil and gas.”

When the hurricane arrived Axness was a section supervisor overseeing 20 engineers at one of the largest petrochemical complexes in the world, ExxonMobil’s Baytown Area facility. The Baytown Refinery processes 580,000 barrels of crude oil daily. For safety, almost everything had to be shut down when the storm hit.

The first priority was to repair the refinery’s docks and clear debris from the Houston Shipping Channel so gasoline, diesel, and jet fuel could be brought in by tankers from facilities not affected by the hurricane. Axness worked in an incident response room dispatching engineers to make inspections and repairs wherever necessary. “In the middle of the hurricane recovery we had multiple sites shut down and not producing gasoline for people’s cars, not producing jet fuel,” he said. “Ultimately, I was doing what we do every day, but this had a different sense of urgency and perspective.”
PROUD TO BE

2018-19 undergraduate scholarship recipients

Aarsvold, Nick – Flynn Scholarship
Ahmed, Omar – Murphy, and Nelson Scholarships
Anderson, Rachel – Jarvis, and
A. F. Johnson Scholarships
Andrews, Austin – Marple Scholarship
Au, Soung Hui – Fried Scholarship
Bain, Colin – Leaf, and Nelson Scholarships
Barrett, Jacob – Larson Scholarship
Bartels, Laura – Schaller, and Larson Scholarships
Bauers, Kailey – Suryl Scholarship
Brose, Margaret – Magel, and Larson Scholarships
Burke, Silas – Freund, and ME Scholarships
Butler, James – Nyman/St Paul,
and Johnson Scholarships
Campos, Maria – Ramsey Scholarship
Can, Emre – Hanson Scholarship
Carvalho, Danel – ME Scholarship
Christen, Chase – Horton Scholarship
Dwyer, Timothy – Boeing, and
Nelson Scholarships
Eckstein, Amber – A. Swanson, and Larson Scholarships
Fernandes, Andres – A. F. Johnson Scholarship
Fritz, Andrew – Pankow, and Pierce Scholarships
Gardner, Mitchell – Ibele, and Larson Scholarships
Giese, Cailen – ME Scholarship
Goedeke, Lee – Person Scholarship
Holmquist, Tess – Floren, and
A. F. Johnson Scholarships
Johnson, Kristin – Schaller, and ME Scholarships
Karpaya, Kavinesaan – Janezich Scholarship
Karpich, Ivan – Wright, and Larson Scholarships
Keester, Adam – Janezich, and Erickson Scholarships
Khalife, Rony – K. Swanson Scholarship
Korkko, Kyle – Auneess, and A. F. Johnson Scholarships
Kupetz, Ryan – Wilson Scholarship
Langseth, Alex – Larson Scholarship
Lindstrom, Andrew – Larson Scholarship
Long, Adam – Larson Scholarship
McFeters, Jessie – Wicklund Scholarship
McQuillan, Tess – Suryl, and
Swanson Scholarships
Mohr, Eric – ASHRAE, and Horton Scholarships
Mueggenberg, Nathan – Fried Scholarship
Nartovich, Victor – Larson Scholarship
Nguyen, Khoi – Boeing, and
A. F. Johnson Scholarships
Nguyen, Scott – Janezich Scholarship
Nguyen, Tuan – Pierce Scholarship
O’Connor, Ryan – Larson Scholarship
Pahl, Nicholas – A. F. Johnson Scholarship
Peer, Zachary – Pierce Scholarship
Pomroy, Jackson – Janezich Scholarship
Prior, Sean – Elios, and ME Faculty Scholarships
Reak, Jonathan – Benjamin,
and Larson Scholarships
Roeser, Jett – Wilson Scholarship
Ruchti, Nicholas – Ramsey,
and ASHRAE Scholarships
Scull, Joe – ME Scholarship
Sebastian, Audrey – A. Swanson Scholarship
Smeaton, Steven – Janezich Scholarship
Sousa Schulman, Daniel – Christenson,
and A. F. Johnson Scholarships
Spurlock, Kristen – Janezich Scholarship
Stemler, Robert – Larson Scholarship
Stinson, Elizabeth – MMC Scholarship
Tomaska, Robert – Wicklund,
and A. F. Johnson Scholarships
Tran, Kiet – Ogata, and A. F.
Johnson Scholarships
Vig, Natalie – Kierlin, and ME Scholarships
Voelkman, Matthew – ME Faculty Scholarship

Cara Piazza

Cara Piazza is a shining example of a UMN student whose drive for excellence matches supreme intellect and talent. She’s a UMN women’s hockey team member as well as a Mechanical Engineering student. Cara, who grew up in Darien, Illinois, received a hockey scholarship and was a member of the team for the last four years, finishing up as captain her senior year. She’s proud to say the team won two NCAA D1 national championships in 2015 and 2016, as well as a few league championships! “I will soon receive my Bachelor of Science in Mechanical Engineering this May, and I’m looking forward to attending graduate school here as well, as I’ve earned a 2019-2020 Mechanical Engineering Department Fellowship,” said Cara. “I trusted the University of Minnesota to give me a great education and experienced firsthand exposure to state-of-the-art academics and facilities, such as my involvement with the Earl E. Bakken Medical Device Center,” added Cara.

Mechanical Engineering Professor and Director of the Bakken Medical Devices Center, Art Erdman, has been an immense influence on Cara. As every professor she has come in contact with, she’s felt so much respect and encouragement to pursue an engineering career. “Professor Erdman saw potential in me, and has been a great role model in my life as an engineer, leader, and person,” said Cara.

Her advice for future engineers would be to find your passions inside and outside the realm of academics for a balanced life. Cara states that it’s not only important to be smart and do a job well, it’s just as important to form relationships and influence others. “I would not have played hockey at the U or been accepted to the Mechanical Engineering Ph.D. program if it was not for the wide array of people who have invested in me to get to this point,” said Cara. She believes it’s also important to return the favor and invest in others to help them pursue their goals. “While my engineering work is incredibly important, I should also use my platform to help others and encourage them, just as many people have done for me,” added Cara.

“...a great education and experienced firsthand exposure to state-of-the-art academics and facilities, such as my involvement with the Earl E. Bakken Medical Device Center.” – Cara Piazza, ME student

Mechanical Engineering Course Highlight

Introduction to Mechanical Engineering: Ben Hamlen’s class project

Make an autonomous robot that does something useful for 20-60 seconds. Undergraduate student Ben Hamlen created a “Target Practice Robot” that shoots from various positions and includes a demo mode and a user interactive mode. Taking the Introduction to Mechanical Engineering (ME 2011) course set a standard in Ben’s life for solving problems. He’s not afraid to calmly tackle challenges and seek out knowledge from experts in the field. Watch Ben’s robot video: https://vimeo.com/280111083
GOLDSTEIN RETIREMENT

Regents and James J. Ryan Professor Richard J. Goldstein joined the Department of Mechanical Engineering as a faculty member in 1961, and served as the Department Head from 1970-1990. Many of his friends were in attendance when his commitment and dedication to the department were celebrated this past year. Umesh Madanan, a Teaching Fellow for the ME department, recounted the honor and pleasure of working with Professor Richard J. Goldstein, and described him as one of the greatest minds in heat transfer. “His guidance and advice helped me develop a deeper appreciation for the physics behind a problem, especially when approaching a research experiment,” said Umesh. Professor Goldstein was admired for how he always went beyond his role as an understanding and accommodating advisor. “I gained a professional and personal role model, who helped me grow as a researcher and teacher,” added Umesh.

Richmond Hatley Mechanical Engineering Professor Terry Simon said, “Professor Goldstein led by example, demonstrating the art of quality research and advising students, with the right mix of direction and freedom, while treating all in the Department with consideration and respect.” He welcomed all newcomers to the University as well as the engineering science community as a whole. Richard Goldstein taught valuable lessons to the many people he encountered, and his dedication has been invaluable.

WHY I STAY CONNECTED TO ME

Engineering in their blood: The Jungkunz Family

The Jungkunz family has engineering in their blood. Dave Jungkunz likes to say that “My dad George, who graduated in 1958 with a mechanical engineering degree, “programmed” his kids to be engineers and taught us to give back and share our experiences, skills and talents with others.” After graduation and receiving his BME in 1978, Dave spent 18 months at Chrysler and then moved on to an interesting and varied career at 3M, where he says it’s been “a very good ride.” Rosemary, Dave’s sister, also paid attention to their dad, earning her BME in 1987. The first five years of Rosie’s career were at Textron Lycoming working on quality issues of the Army’s XM-1 Tank, but she couldn’t resist the call to work in the automotive industry and spent the next 25 years at Ford Motor Company in Detroit. Her responsibilities included Front End Accessory Drive (FEAD) projects, engine planning for the Cleveland manufacturing plant, and finally managing an engineering team back at FEAD. Lastly, Dave’s son Adam continued the tradition, earning his BME in 2005.

When Adam was a sophomore in CSE he asked his Dad to help him with a robot project and Dave soon found himself reconnecting with the University of Minnesota. Dave realized the value of the Solar Vehicle Project (SVP) program and has since spent the past 12 years championing the efforts of the team while also serving many years on the advisory board. Dave also collaborated with SVP advisors Pat Starr, Mechanical Engineering professor emeritus, and Jeff Hammer, former adjunct professor, to help the team secure 3M material sponsorships to the SVP, CSE’s Solar House, and the SAE car. He says, “3M actively promotes on-campus involvement and continues to be rewarded by employing top notch CSE students who facilitate the creation of innovative products used around the globe.” “In a nutshell, it’s a win for all!” added Dave.

Perhaps someday Dave’s young grandsons Issac (7) and Henry (5) may continue the tradition, after all, engineering is in their blood! 💡

IN MEMORIAM

Perry Blackshear

Perry Blackshear was a visionary leader who focused on applying engineering principles to improve health care. Mechanical Engineering Professor and Director of the Earl E. Bakken Medical Device Center, Art Erdman states, “Perry was an inspiration to countless colleagues and students based on his continuous curiosity into secrets underlying the functions of the human body. His impact worldwide is difficult to measure, yet he would be the last one to accept any accolades.”

Former University of Minnesota past-President Kenneth Keller met Perry Blackshear shortly after Ken arrived on the campus in 1964. A collaboration began between Ken, Perry, and research-oriented surgeon Gene Bernstein related to the development of a centrifugal artificial heart. Numerous studies of blood flow with synthetic materials led naturally to participating with the UMN Medical School involving an NIH project on hemoglobin.

“Perry was one of the most imaginative “big idea” people that I have ever known, and also a warm and supportive colleague. He set the tone for working on a multidisciplinary research collaboration and I feel lucky to have had the chance to work with him,” said Ken Keller. 💡

Subbiah Ramalingam

Subbiah (Ram) Ramalingam was a resourceful and inventive researcher, brilliant engineer, member of the National Academy of Engineering, and highly respected by companies that frequently came to him for help with their engineering problems. He was also a brilliant lecturer who spoke without notes, clearly illuminating the topic he was teaching that day. Liberal in both his praise and his censure, he would celebrate a student’s best efforts, and inspire an unprepared student to do better.

Ram was an expert at metal cutting theory, coatings, and closed loop control of machining. He and former ME colleague Barney Klamecki developed the Computer Assisted Design of Cutting Tools (CADT) program. Perry Blackshear shortly after Ken arrived on the campus in 1964. A collaboration between Ken, Perry, and research-oriented surgeon Gene Bernstein related to the development of an arterial heart. Numerous studies of blood flow with synthetic materials led naturally to participating with the UMN Medical School involving an NIH project on hemoglobin.

Subbiah Ramalingam was a remarkable engineer and professor whose contributions over the years left an indelible mark on our community. 💡