



Photo: A Capstone team works with BYU Global Engineering Outreach to build prosthetic foot shells in Ecuador. The team is featured in this year’s BYU national commercial spot and the Fall 2023 edition of Y Magazine.

ME By the Numbers

Faculty and Staff

- 15 Full Professors
- 15 Associate Professors
- 4 Assistant Professors
- 14 Staff

Research and Capstone

- 98 journal publications
- 47 conference papers
- 213 undergraduates mentored in paid research positions
- 56 Capstone projects
- \$1,099,000 in Capstone grants

Students and Graduates

- 343 students in the freshman seminar
- 1,174 undergraduate students enrolled
- 108 graduate students enrolled
- 170 degrees awarded
- 19 master’s degrees awarded
- 6 doctoral degrees awarded

Faculty Awards

Department Awards

- Troy Munro, Excellence in Research Award
- Steven Charles, Excellence in Teaching Award

College Awards

- Chris Mattson, Excellence in Scholarship Award
- Brent Webb, Most Influential Faculty Award

University Awards

- Spencer Magleby, Abraham O. Smoot Citizenship Award
- Marc Killpack, Early Career Teaching Award
- Steven Charles, Karl G. Maeser Excellence in Teaching Award
- Mark Colton, Karl G. Maeser Professional Excellence Award

From the Chair: As an instructor of the internal combustion engines class, I can say that in 2023, the BYU ME Department was firing on all cylinders. Our students demonstrated resilience, leadership and engineering abilities through their success in research, competition teams, and capstone design. Please enjoy more details on some of their experiential learning stories in this newsletter and see how you can contribute to expanding these opportunities for more students.

The Rocketry team took first place in categories of 10,000 ft targeting, modeling and simulation at the international Spaceport Americas Cup. The Supermileage team received first in the prototype division of the international Shell Eco-marathon Challenge. The MARS rover team took third place overall with student Jaxson Jones named Top Scientist for the competition.

Capstone continues to grow with over 55 projects. Interdisciplinary teams from various Engineering majors worked together to solve their design problems. Multi-university capstone teams designed and flew small-scale aircraft. This year, 317 undergraduates participated in mentored research with a faculty member: 213 participated in paid research projects, 48 co-authored a research paper, and 44 attended and participated in a professional conference.

We are thrilled to welcome three new faculty into our department and grateful for the contributions of Carl Sorensen who retired this year.

Dale Tree, Chair

Spotlight: Dr. Carl Sorensen



Dr. Carl Sorensen concluded his 36 year career as a professor at BYU this summer. During his time here he has changed the face of engineering at BYU and made contributions that will last for generations.

During his time at BYU Dr. Sorensen was always interested in ways to make college students and companies more competitive. The Capstone program was founded in 1989 collectively by Sorensen and Professors Spencer Magleby and Robert Todd. Dr. Sorensen says: “I was really trying to make it so that we could

do a good job of teaching students design processes that were aimed at developing engineers who do a better job and help industry in the real world.”

They developed the Capstone program with its most fundamental characteristic—students working on real-world projects sponsored by a customer in industry. What started with four projects and 20 students has become a nationally renowned program, now regularly with over 50 projects and 350+ students per year, something that Sorensen is immensely proud of.

Dr. Sorensen’s advice for students is to take counsel from your faith, not your fears: “Being a student can be challenging and daunting and overwhelming, and it’s easy to believe you don’t belong here, to believe you aren’t good enough or smart enough or right enough or capable enough, but that’s not true. Work hard and have faith and trust in the Lord, and things will work out.”

New Faculty



Dr. Jason Porter holds a BS, MS, and PhD in mechanical engineering from BYU, the University of Texas at Austin, and Stanford University, respectively. Prior to coming to BYU, he spent thirteen years as a faculty member at the Colorado School of Mines. His research focuses on developing novel optical tools to study energy conversion and storage technologies. Current applications include studying ion transport in battery electrolytes to improve battery fast charging, measuring polysulfide shuttling to improve cycling in lithium-sulfur batteries, and studying the role of electrolyte instability in battery fires.



Dr. Nathan B. Speirs holds a BS in ME from BYU and a PhD from Utah State University. Prior to BYU he worked as a post-doctoral fellow at King Abdullah University in Saudi Arabia and at the Naval Undersea Warfare Center. His research incorporates high-speed photography with various visualization techniques and modeling to study interfacial fluid dynamics. Areas of particular interest include how objects enter a body of water, the dynamics of vaporous cavitation bubbles, and the microphysical interactions of droplets and airborne particulate matter.



Dr. Nathan Usevitch received a BS in mechanical engineering from BYU, and an MS and PhD in mechanical engineering from Stanford University. Prior to coming to BYU, he was a research scientist at Meta Reality Labs developing wearable haptic technology. His research interests are in the design of novel robots. This includes robots made of soft material such as rubber and fabric, as well as robots that can function as wearable and assistive devices.

Experiential Learning

A key focus area for the department is to grow opportunities for enhanced student learning and development of critical engineering and leadership skills through experiential learning activities, such as those featured below. These are experiences outside of the classroom where featured students

have a chance to work as part of a team on a specific project that helps to integrate what they are learning into a practical hands-on experience. These experiences include various competition teams, undergraduate research, student clubs, Study Abroad and our Senior Capstone Design program.

Supermileage Team Takes 1st Place Internationally



Engineering students at BYU have built a vehicle that can travel from Provo to Niagara Falls on one gallon of gas. To be exact, it can travel 1,916 miles per gallon, an astounding distance that is not only the best in the United States, but the best across the Americas.

Despite long odds and countless obstacles, the BYU Supermileage Team took home first place at the vaunted Shell Eco-marathon, an international competition hosting teams from across North and South America trying to build the most fuel-efficient vehicles on Earth.

“It felt very rewarding to win because it really demonstrated how well we worked together as a team,” student Yazan Tuffaha said. “Seeing the team pull together — everybody was contributing as much as they could — it was a great feeling.”

BYU's Supermileage vehicle was best in the country — and the continent.

Students Explore Product Development in Singapore



Each May for the past 10 years, Brigham Young University mechanical engineering students have been traveling to Singapore for a product design and development study abroad experience.

The professors over the study abroad tasked the students with finding an issue to solve or improve from the conditions they observed in Singapore. To come up with these projects, students visited museums, talked with emergency medical technicians, and surveyed the public.

Garrett Graham, a biomedical student, shared the ways the study abroad better prepared him for his future career: “I learned lots of things about how to be a better teammate, how to work with others, and to play to their strengths. And those are lessons that will last with me.”

Biomechanics Conference

Dr. Charles’ research assistants took the Rocky Mountain Chapter of the American Society of Biomechanics by storm in April. Eight of the ten research assistants (RAs) who represented Brigham Young University presented their research, and BYU took home three of the eight awards given at the conference.

Much of the current research in Dr. Charles’ lab is centered around tremors in the hands and the arms.

Jacob Cox was the winner of the Best Undergraduate Poster Presentation. Cox, a West Virginia native, entered the program last year and joined Dr. Charles' research in September. His presentation was titled “Comparison Between Landmark and Postural Methods for Establishing Sensor-To-Body Calibration for Motion Capture of Whole-Arm Movements.” He said that every part of the process from the preparation to the presentation of the poster was a valuable learning experience.

“In preparing it and practicing presenting it, I felt like I learned a lot. It helped me to really clarify the things that I understood about the project and opened my mind to some of the questions that I could be asking but haven’t tried yet,” Cox said. “Working with Professor Charles and then presenting at the conference, I was able to get an even better understanding of the research I’m doing in the first place.”



Capstone Project Highlight

On a Thursday in early April, the WSC Ballroom was turned into a show-room for 56 different projects as part of the annual Capstone Design Fair. The teams for these projects presented design work and prototypes to their project sponsors, students that will be in Capstone the following year and the university community.

Students thrive in this environment where the decisions they make and the work they do matters.

The Rugged Raft team, sponsored by Lawrence Livermore National Laboratory, was tasked with designing a raft able to be hit by fragments traveling at high speed and stay afloat while protecting onboard diagnostic equipment.

The students shared, “One of the most fulfilling things about working on this project has been being able to create something that will actually be used. This isn’t just some prototype, our sponsor is actually taking what we’ve built and using it for their first test, and they’ll continue using our suppliers and design for further testing, and so it’s really fulfilling to know that our design is directly being applied.”



Supporting Student Opportunities

Providing these quality and transformative experiential learning opportunities for all ME students will require significant additional resources and we ask for your help to make this possible. Follow the QR code to learn how you can partner with the ME Department in our quest to prepare the influential engineers of the future.

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