



2022 DEPARTMENT STATS AT A GLANCE

Faculty and Staff	Students and Graduates
17 full professors	478 students in the freshman seminar
13 associate professors	1,182 undergraduate students enrolled
3 assistant professors	139 graduate students enrolled
14 staff	178 bachelor’s degrees awarded
Research and Capstone	36 master’s degrees awarded
118 journal publications	6 doctoral degrees awarded
51 conference papers	
204 undergraduates mentored in paid research positions	
50 Capstone projects	
\$1,025,000 in Capstone grants	

FACULTY AWARDS

In 2022 the following faculty were recognized for their contributions to BYU and the engineering profession.

Brent Webb: Karl G. Maeser Distinguished Faculty Lecturer Award (university award)

This award is the most prestigious faculty award given by the university, for demonstrating sustained and clear superiority in commitment to the Aims of a BYU Education through teaching, scholarship, and university citizenship.

Dan Maynes: Karl G. Maeser Research and Creative Arts Award (university award)

Troy Munro: Continuing Faculty Status and Advancement in Rank to Associate Professor

Brian Iverson: Fulbright Fellow, Technical University of Darmstadt

John Salmon: Fulbright Fellow, Technical University of Darmstadt

Anton Bowden: Excellence in Research (department award)

Brent Webb: Excellence in Teaching (department award)

Brian Jensen: Outstanding Citizenship (department award)

Steven Charles: Most Influential Faculty (department award)

FORMER FACULTY

We note with sadness the passing of four of our retired department faculty that were foundational to the growth of mechanical engineering at BYU. They left a legacy of service, teaching, and scholarship that continues in the department today.

Kenneth W. Chase: July 23, 2019; faculty member, 1968–2010.

Howard S. Heaton: August 4, 2020; faculty member, 1963–1998.

Richard “Dick” Ulrich: April 3, 2021; faculty member, 1960–1998.

John N. Cannon: July 12, 2021; founding faculty member, 1957–1999.

Dear Alumni and Friends,

It was great to see students and faculty getting back on the road in 2022. For the first time in three years students participated in-person on competition teams with MARS rover, SAE Baja, Spaceport America Cup, and Wind Turbine Energy. Students also participated in study abroad courses, including Singapore Product Development, Global Product Development, and Global Perspectives on Energy. Capstone continued in full gear with over 280 mechanical, manufacturing, and electrical and computer engineering students on 50 capstone design teams.

Our focus on the use of strong graduate research programs to strengthen our faculty and provide experiential learning opportunities for students continues. The faculty are producing an average of over five peer-reviewed publications per year. A record 211 undergraduates participated in paid research projects, with 51 of these students co-authoring peer-reviewed publications and 13 presenting papers at technical conferences.

Opportunities for experiential learning that impacts students’ careers is uncommonly high in our department. The number of undergraduates that report working regularly with a faculty member outside of class has increased from 38 percent to 50 percent over the past 15 years. These activities, combined with excellent in-class instruction, have led our graduates to pursue jobs of influence as well as postgraduate opportunities. The ME program at BYU is third in the nation in the number of students that go on to obtain PhDs, trailing only UC Berkley and MIT. We hope you will enjoy reading about some of the student and faculty activities that have occurred over the past year.

Dale R. Tree

Dale R. Tree

PROFESSOR AND CHAIR OF MECHANICAL ENGINEERING

FROM THE CHAIR



ALUMNI SPOTLIGHTS

Cory Tholl (BS ’04, MS/MBA ’06) joined Klymit in 2008, which at the time was a small start-up camping gear company. He helped develop its first products and launch the company. He was appointed CEO in 2011, tackling product development and making the now multimillion-dollar company a success with the skills he developed at BYU. “As an engineering student I learned how to break down problems into small, bite-sized, solvable solutions, then go out and attack them,” Tholl said. “That’s the same approach I take every day.” In 2021 Klymit was acquired by Gathr Outdoors, where Tholl is the president of the Gathr Camp group and leads business strategy.



Jessica Morgan (BS ’11, MS ’15) is a systems engineer and section supervisor at the Johns Hopkins University Applied Physics Laboratory in the Air and Missile Defense Sector. Her first engineering class was a senior Capstone design project sponsored by NASA, which led to a NASA summer internship. The internship was informative and provided exposure to companies, organizations, and subject matter experts in different fields. She later received a PhD in aerospace engineering at Penn State in 2018. Morgan says the opportunity at Johns Hopkins was unexpected and provides a dream environment between academia, government, and industry where she is able to use her broad background to teach, mentor, do impactful work, and propose new ideas.

NEW FACULTY

Dr. Ben Terry received a BS in mechanical engineering from BYU, an MS in engineering systems from the Colorado School of Mines, and a PhD in mechanical engineering from the University of Colorado Boulder. Prior to coming to BYU, he was an associate professor of Engineering at the University of Nebraska–Lincoln. He also spent nine years as a research engineer in industry developing commercial medical devices. His research interests are in medical device and surgical tool design and swallowables for gastrointestinal health.



Dr. Brady Davies received BS, MEM, and PhD degrees in mechanical engineering, all from BYU. Prior to returning to BYU, he worked at various mechatronic design and manufacturing companies, from a national lab and startups to defense organizations. He held technical leadership roles (senior member of the technical staff, senior fellow) as well as management leadership roles (director of engineering, vice president of engineering) during his career. His areas of expertise include robotics, MEMS, sensors, design, and management.



EXPERIENTIAL LEARNING

The department has continued to focus on experiential learning to enhance students’ engineering skills and experiences outside their formal courses. This occurs through Capstone senior design projects, study abroad programs, com-

petition teams (e.g., mini-baja, Mars rover, supermileage), student clubs (e.g., Rocketry Association, Biomedical Engineering Association, Mechatronics Club, Wind Energy), and undergraduate participation in faculty research labs. Listed below are a few examples of recent activities.

CAPSTONE PROJECT HIGHLIGHT

Gold Family Farms

Gold Family Farms manages over 300 acres in Hillsboro, Oregon, providing plants and shrubs to garden centers, landscapers, and wholesalers. The family business is continuing to grow production by automating processes in their nursery with the help of BYU Capstone teams.

This is Gold Family Farms’ second year sponsoring projects with Capstone. In the most recent project, a team of five students designed a system to automate removing a growing plant from its pot to be repotted into a larger container.

According to Steve Gold (BS '97), the small investment in Capstone has brought great rewards. Capstone’s reliance on collaboration, mentorship, and creativity helps avoid many problems that can come from hiring one person to design a project.



Steve plans to return to Capstone for assistance as he continues looking for ways to automate processes. To help implement the students’ work on-site, he even hired one of the star students from last year’s team, who is a great addition to their team.

VIDEO: Learn more in this video produced by Gold Family Farms about the impact of working with BYU Capstone: <https://youtu.be/3MMP39JctMI>



ROVING TO MARS

The most Mars-like terrain on earth happens to be at the aptly named Mars Desert Research Station near Hanksville, Utah.

That’s where BYU engineering students and undergrads from universities representing 10 countries traveled last June for the annual University Rover Challenge. There they tested their student-built rovers to the limits.

BYU’s team was one of only 35 finalists selected to compete in Hanksville and placed ninth out of 100 total teams.

In the competition, run by the Mars Society, the rovers had to accomplish a lengthy list of functions:

- Manipulating toggles, switches, latches, and keyboards
- Picking up and putting down objects
- Drilling through desert materials and detecting life
- Handling sand, wind, rain, and other weather conditions

In the end, BYU’s team, led by Rover Challenge veterans Marc Killpack and McKay Christensen, performed best in the autonomous navigation mission, finishing fifth in that category.

And while the BYU Mars rover is not the Perseverance rover built by NASA, building the BYU rover has prepared students for such adventures in the future.

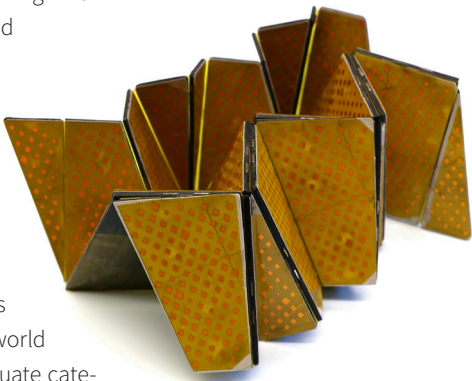
“The BYU Mars rover isn’t going to Mars, but the people who are developing it might,” said BYU ME student Dallin Cordon. “And this isn’t a hypothetical. Currently we have BYU alumni working at NASA’s Jet Propulsion Lab.”

A MECHANISM COMPETITION DYNASTY

Since 1998, students working with Professors Larry Howell and Spencer Magleby in the Compliant Mechanisms Research Lab have created a winning dynasty in the ASME International Student Mechanisms Competition. This competition attracts entries from students around the world in undergraduate and graduate categories. Students are mentored for the competition through reviews, practices, and lab-wide critiques.

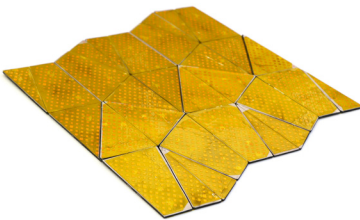
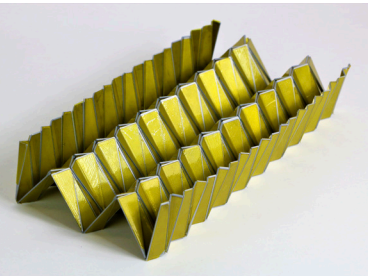
Below are a few interesting facts about BYU and the competition.

- Of the 19 times that the competition has been offered, BYU students have been finalists over 50 times, had podium finishes 26 times, and placed first nine times.
- Two times, in 2009 and 2013, BYU



walked away with three top finishes across the undergraduate and graduate categories.

- In three cases, students have placed as undergraduates and then again as graduate students.
- Three current ME faculty placed in the competition as BYU students: Brian Jensen, Nathan Crane, and Chris Mattson.



The origami-based mechanism submitted in 2022 by students Hunter Pruett and Nathan Coleman received third place.

STUDY ABROAD

After a two-year hiatus caused by the COVID-19 pandemic, students again participated in department-sponsored study abroad experiences in 2022. These are remarkable opportunities for students to travel and learn about globally important engineering topics and issues. In addition to the technical aspect of these programs, students are exposed to rich cultural experiences in the countries they visit. Students consistently report that these experiences are among the most impactful that they participate in at BYU.

Global Perspectives on Energy and the Environment

This program is directed by Professors Daniel Maynes and Brent Webb. Fourteen students participated and the class visited more than 20 energy sites in Utah, Italy, Denmark, and Sweden. Visits of note included touring a nuclear power plant in Sweden; visiting the Vestas blade design facilities in Denmark, where the longest turbine blades in the world are designed; touring an offshore wind farm; seeing large-scale glacial retreat firsthand in the Alps; and visiting a pumped hydroelectric storage system in Italy.

Global Product Development—Europe

Ten students participated in this program, directed by Professors Chris Mattson and John Salmon. The class visited many engineering design and production facilities in Utah, Italy, and Sweden. The goal of the program is to foster face-to-face interaction between students and engineering professionals in their workplaces so that they can compare and contrast how the engineering design is affected by cultural and societal influences.

International Product Development—Singapore

This program is a collaboration between the National University of Singapore (NUS), BYU, and Penn State University. During May 2022, 16 BYU students, 15 Penn State students, and 11 NUS students collaborated on campus in Singapore. Professor Mark Colton led the BYU contingent. The goal of the class is for students to learn product development principles for global markets while working on a design project with an international team.

STAY CONNECTED



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