



DEPARTMENT

AT A GLANCE

FACULTY AND RESEARCH

- 15 full professors
- 7 associate professors
- 7 assistant professors
- 5 associate editors
- 96 journal publications
- 208 presentations at conferences and invited forums
- \$3.7 million in new research awards
- 478 students in the freshman seminar
- 1,274 undergraduates enrolled
- 169 graduate students enrolled
- 46 Capstone projects in the 2018–19 school year
- \$950,000 in Capstone grants for the 2018–19 school year

Degrees Granted

- |              |     |
|--------------|-----|
| • Bachelor's | 168 |
| • Master's   | 39  |
| • Doctoral   | 6   |

SCHOLARSHIPS AND FELLOWSHIPS

Last year 10 mechanical engineering students received prestigious awards to facilitate their graduate education.

**Kim Stevens:** Lilian Gilbreth Postdoctoral Fellowship at Purdue University

**Andrew Orme and Cody Carpenter:** Science, Mathematics, and Research Transformation (SMART) Scholarship from the Department of Defense

**Nathan Pehrson and Alden Yellowhorse:** NASA Space Technology Research Fellowship

**Ben Brownlee, Jonathan Burnett, Tate Fanning, and Kim Stevens:** Rocky Mountain NASA Space Grant Award

**Andrew Davis:** National Science Foundation Award

**Allison Lee:** American Society of Mechanical Engineers (ASME) Graduate Teaching Fellowship

Dear Friends and Associates,

I hope this newsletter finds you and your families well and prospering. The past year has been an eventful one for the BYU Mechanical Engineering Department, filled with many remarkable accomplishments. In August 2018 we moved into the new Engineering Building, where we are putting many new teaching and research laboratories to good use. We saw a record number of graduates from our program, with 168 BS, 39 MS, and 6 PhD degrees awarded. External funding for research and Capstone projects totaled \$950,000 in new awards. We currently have 46 total Capstone projects in progress—the largest number ever. ME student competition teams had another strong year, placing first in the international SAE Supermileage competition and achieving top-10 finishes in three other competitions. Professor Brian Iverson was awarded a prestigious National Science Foundation CAREER Award, and students and faculty published 96 journal papers. We also moved into the new Engineering Research Laboratory and have been completing the assembly of state-of-the-art research wind and water tunnels and combustion reactors. I encourage you to read more in this newsletter about what is happening, update your alumni information at BYU, and stay connected with us.

Sincerely,

Daniel Maynes, **PROFESSOR AND CHAIR OF MECHANICAL ENGINEERING**

FROM THE CHAIR



A NEW SPACE FOR ENGINEERING

The new Engineering Building opened its doors in August and was dedicated in December by Elder David A. Bednar of the Quorum of the Twelve. The 180,000-square-foot, 5-story building features state-of-the-art research labs, experiential learning spaces, and classrooms equipped with tools for modern pedagogy.

ANNUAL ALUMNI DINNER

At the annual alumni dinner in April 2018, BYU mechanical engineering graduates **Robert Hancock** and **Eric Pope** were recognized for their years of service in their professional careers and to the community. The dinner brought alumni and faculty together and provided an opportunity for them to talk about how events are progressing and improving in their fields of study.

**Robert Hancock** (BS '88, MS '89) currently serves as the deputy for science in the Turbine Engine Division of the Aerospace Systems Directorate of the Air Force Research Laboratory. He is responsible for the in-house research and development activities of the Turbine Engine Division and for R&D interactions with universities, small businesses, and engine manufacturers. He is also responsible for reviewing and clearing the division's technical information for public release.

**Eric Pope** (BS '99, MBA '04) currently serves as vice president of operations at US Synthetic. His roles have included frontline worker, production manager, R&D engineer, and product manager. He has been a driving force behind US Synthetic's move from a typical batch-and-queue manufacturing system to a world-class, lean manufacturing facility. As part of the senior leadership team, he has been instrumental in creating a problem-solving culture at every level of the organization.







FACULTY AND STAFF HIGHLIGHTS

Last year six ME faculty and staff received awards for their significant accomplishments and contributions to the department and BYU. From left to right:

**Nick Hawkins**, manager of the Projects Lab, was awarded a President’s Appreciation Award for his contributions to the university and the Department of Mechanical Engineering.

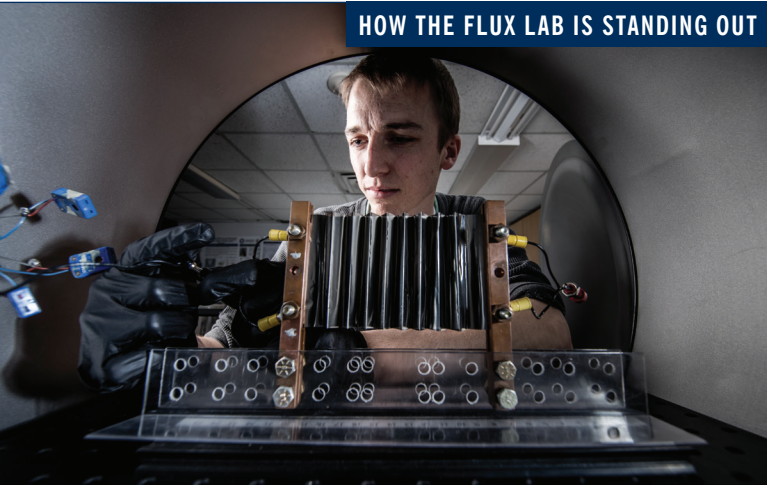
**Professor Dale Tree** was voted by students as the best mechanical engineering teacher in 2018.

**Professor Julie Crockett** was awarded the department’s Outstanding Teaching Award for 2018, was a BYU devotional speaker in March 2018, and was a finalist for the Engineering Educator of the Year Award from the Utah Engineers Council.

**Professor Brian Iverson** received an NSF CAREER Award, which is presented to outstanding scholars in the beginning of their academic career. He was also given the department’s Outstanding Research Award for 2018.

**Professor Tim McLain** was awarded the Sponsored Research Recognition Award, recognizing his success in receiving external research funding to support student research.

**Professor David Fullwood** (not pictured) was awarded a Mechanical Engineering Research Professorship, a three-year award that will provide annual financial support for mentoring graduate and undergraduate students in his research program.



The Flux Lab, directed by Professor Brian Iverson, received significant support from the National Science Foundation to fund basic research. Under the direction of Professors Iverson, Matthew Jones, Daniel Maynes, and Julie Crockett, the lab has focused its research in two key areas: First, the Flux Lab is using origami to explore the use of structured, angular surfaces to control radiative absorption and emission of energy. Researchers in the lab have shown the ability to dynamically control the rate of heat transfer through the actuation of these surfaces. This helps with adaptive thermal control in environments in which radiation is a dominant mode of heat transfer (e.g., space). Second, the Flux Lab is exploring the use of micro- and nanostructured surfaces to achieve condensation on superhydrophobic surfaces by using water droplets. These mobile droplets can be more easily removed in an effort to increase condensational heat transfer rates for efficient condensers.

Additionally, the Flux Lab is working with the Chemistry, Electrical Engineering, and Statistics Departments at BYU, as well as with Iowa State University, to conduct ongoing research in electrochemical biosensors and gas chromatography. Efforts in these areas focus on achieving efficient chemical detection by improving heat and mass transfer. Recent works include the use of a point-of-care sensor that eliminates the need for laboratory testing to detect both oral cancer in saliva samples and infections that lead to John’s disease in dairy cattle.



Since 2001 the humanitarian arm of The Church of Jesus Christ of Latter-day Saints, LDS Charities, has provided roughly 700,000 wheelchairs to disabled people in more than 130 countries. BYU Capstone students have created a hand-trike assembly—complete with an additional wheel, drive, and hand-powered element—that can be attached to wheelchairs created by LDS Charities. The hand trike lets people pedal with their hands instead of their feet and enables users to travel greater distances with less effort. This project will be life changing for many people, and the hope is to produce 5,000 units per year.

MECHANICAL ENGINEERING COMPETITIONS

BYU mechanical engineering students competed in many competitions throughout the United States in 2018.

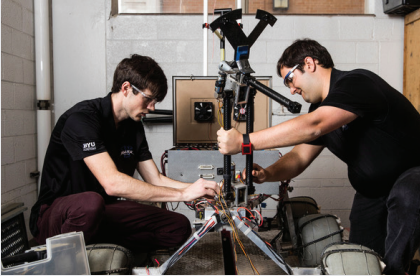
In April the **Supermileage Team** (coached by Professor Dale Tree) traveled to Detroit and competed in the Shell Eco-Marathon Americas competition, an international event with approximately 50 entries. The BYU team took first place, with their best run yielding 1,985 miles per gallon.



Members of the **BYU Rocketry Club** set a Guinness World Record competing in the Bayer Alka-Rocket Challenge. The rocket reached 883 feet in the air—more than double the previous record. The club received a cash prize of \$30,000.



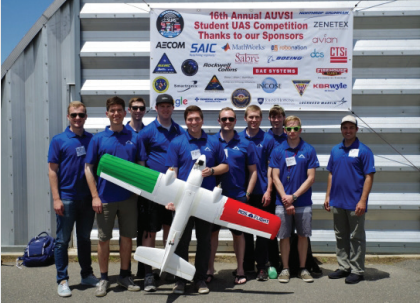
The **Mars Rover Team** (coached by Professor Marc Killpack) traveled to Hanksville, Utah, in June to compete in the University Rover Challenge against 35 international teams. BYU placed fifth overall, making it their sixth time on the podium.



The **Baja Team** (coached by Professor Yuri Hovanski) traveled to Portland, Oregon, for the Baja Society of Automotive Engineers (SAE) Mobile competition. Groups participated from around the world, including the United States, Canada, Mexico, India, and China. Out of more than 100 school entries, BYU placed 42nd overall.



BYU’s **Association for Unmanned Vehicle Systems International (AUVSI) Team** (coached by Professors Andrew Ning and Tim McLain) competed in the SUAS (small unmanned aircraft systems) 2018 competition in Maryland. BYU placed ninth out of 63 teams.



STAY CONNECTED



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Mechanical Engineering alumni website:  
me.byu.edu/content/alumni-home  
Capstone program: capstone.byu.edu