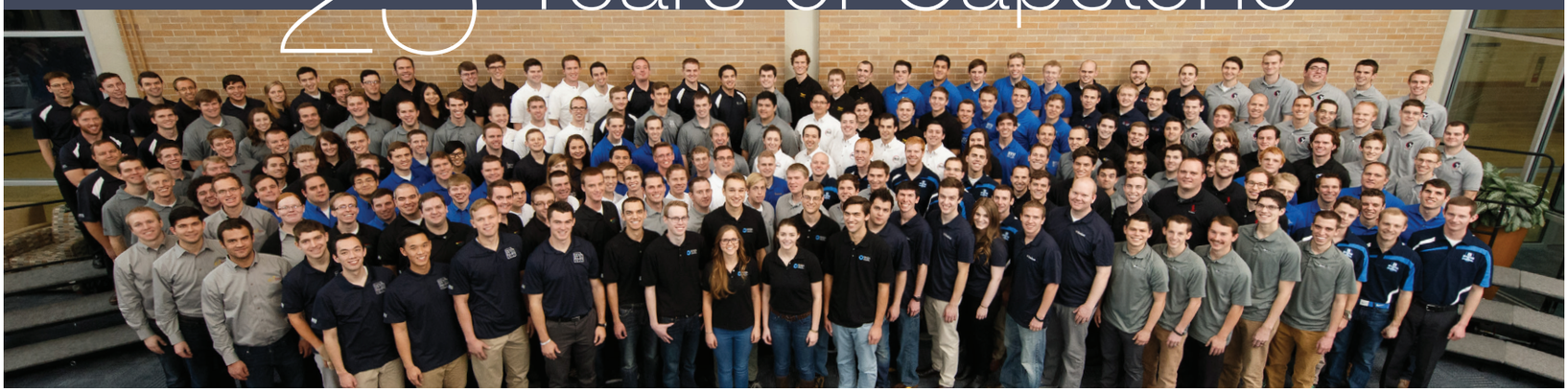
25 Years of Capstone



BYU
MECHANICAL ENGINEERING

ME HIGHLIGHTS OF 2015

FROM THE CHAIR

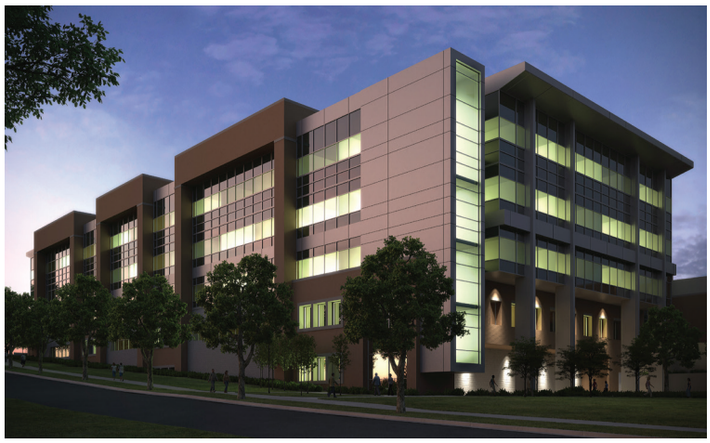
Wherever this update finds you, I hope you will take a few minutes to read about our eventful 2015. It marks 25 years since the founding of the Capstone program, which is now a model for senior design courses nationwide. Undergraduate enrollments are at an all-time high—1,110, a number sure to grow as we increase admissions by 30 percent. PhD candidates have increased to 45 students, two new faculty members joined the department, and after several years of fundraising we are looking forward to breaking ground for a new engineering building.

I encourage you to update your information at **alumni.byu.edu** and to connect with us on social media. We consistently post news to Facebook, Twitter, and our website. Have a wonderful and blessed 2016.

Sincerely,

Daniel Maynes, PROFESSOR AND CHAIR OF MECHANICAL ENGINEERING

In 2015 Daniel Maynes was named a fellow of the American Society of Mechanical Engineers in recognition of his significant contributions in fluid mechanics and thermal transport, including transport behavior in superhydrophobic surfaces, microscale liquid flows, and electroosmotic flows. He has coauthored more than 140 publications.



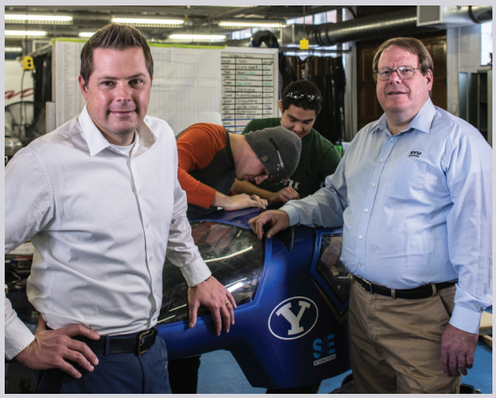
FUNDRAISING COMPLETE!

BYU president Kevin Worthen has announced that the $80 million for the new engineering building is officially in the bank. Pending final approval by the BYU Board of Trustees, we hope to break ground in March or April.

CAPSTONE CELEBRATES 25 YEARS

ASME Award

There is no better way to celebrate 25 years of Capstone success than with a national recognition from ASME. **Associate Professor Chris Mattson** (left) and **Professor Carl Sorensen** (right) received the 2015 Ben C. Sparks Medal for their outstanding contribution to ME education through their innovative leadership in developing and directing the Capstone program. Sorensen also received the BYU Alumni Professorship Award for teaching excellence.



Since 1990 over 3,700 students have graduated with hands-on experience in the design/build/test process, more than 30 academic articles have been published by program directors, and at least 40 other schools have created similar programs.

Project Sponsors

BYU is unique in exempting the sponsors' educational donations from overhead charges and ensuring that sponsors retain ownership of intellectual property developed. The number of projects completed annually has increased from four in 1990 to 32 in 2015. There have been 260 unique sponsors from 27 states and 12 countries, with 47 percent sponsoring multiple projects. The top five Capstone project sponsors are

- ATK (26 projects)
- BD Medical Systems (23 projects)
- Boeing (22 projects)
- Burr Oak Tool (18 projects)
- Autoliv (17 projects)

Humanitarian Projects

Thanks to the generous donations of a few alumni, the Capstone Humanitarian Endowment Fund has been established. Human-powered water drills, affordable neonatal resuscitators, and solar-powered food/medicine preservation are a few examples of past humanitarian projects. With this new support, Capstone humanitarian efforts will continue to bless others. At its current level, the fund will provide partial support for a 2015–16 humanitarian Capstone project. We invite alumni to increase the impact by donating at **me.byu.edu/content/alumni-home.** For information email **me-externalrelations@byu.edu.**

ALUMNI NEWS

Troy Schank (BS '99; PhD Georgia Tech) recently won the Alfred Gessow Award from the Vertical Flight Technical Society for coauthoring the best technical paper at the 71st International Forum of the American Helicopter Society. Troy does research and design in the dynamics department of Bell Helicopter. Troy married his high school sweetheart, Megan Roze (BS '96); they have four children.

Mike Trego (BS '86) was recently honored with the Honeywell Aerospace President's Award for his leadership on engine designs for business aviation propulsion. Mike's love of designing jet engines has motivated his 28-year career with Honeywell. His father and sister are engineers and his daughter is majoring in ME. He married Melinda Chappell (BA '86), and they have three children.

Sterling Anderson (BS '07) was asked to lead the Model X SUV program shortly after joining TESLA motors. After resolving significant design, cost, and schedule challenges in only 10 months, the vehicle was launched in September 2015. Prior to TESLA, Sterling launched two companies of his own and was a management consultant with McKinsey & Company. He and his wife have three daughters.

Please send spotlight information on yourself or other BYU Mechanical Engineering alumni to **me-externalrelations@byu.edu.** We share spotlight information through social media, our website, and our annual alumni mailer.

DEPARTMENT AT A GLANCE

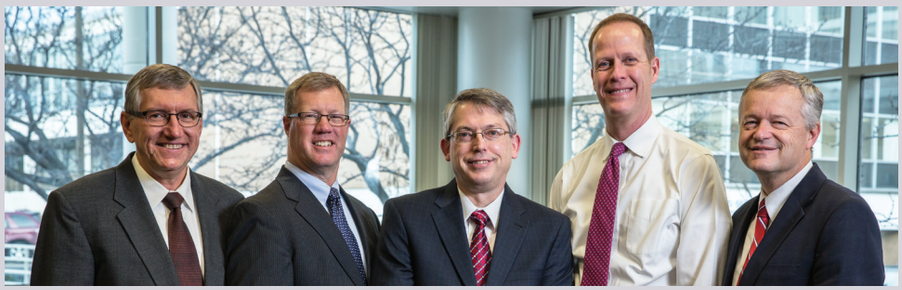
Faculty and Research

- 2 new faculty members for a total of 12 professors, 9 associate professors, and 7 assistant professors
- 5 faculty members serve as associate editors for archival journals
- 56 papers published by faculty members in professional journals
- 27 patent applications filed by 11 faculty members
- 120 presentations by faculty members at professional conferences and 46 peer-reviewed papers
- $3.5 million in external research awards

Degrees Granted

- Bachelor's 113
- Master's 35
- Doctoral 4

FACULTY HIGHLIGHTS



From left to right:

- Students voted **Associate Professor Jerry Bowman** as the Best Mechanical Engineering Teacher for 2014–2015.
- **Associate Professor Steven Gorrell** was selected as the 2015 Outstanding Mechanical Engineering Faculty Member.
- **Professor Larry Howell** received BYU's most prestigious faculty award, the Karl G. Maeser Distinguished Faculty Lecturer Award, for superiority in both scholarship and teaching.
- **Professor Tim McLain** received the BYU University Professorship Award for outstanding scholarship, creative work, and classroom teaching.
- **Professor Dale Tree** was honored with the BYU Edwin Cozzens Teaching and Learning Faculty Award and selected as the 2015 ASME Educator of the Year.

NEW FACULTY

Associate Professor Bradley Adams (MS '85, left), came to BYU after 30 years in industry with expertise in technical management and research and development in heat transfer, combustion, and air-pollution control. Current research interests include advanced power generation, radiative heat transfer, and multi-physics simulations.

Assistant Professor Oliver K. Johnson (BS '10, right), came to BYU after completing his PhD at MIT, where he had a national defense graduate fellowship. His research incorporates theoretical, computational, and experimental approaches to design and synthesize advanced materials.

GREG JENSEN RETIRES

Professor C. Greg Jensen retired after teaching for 32 years at BYU. He mentored hundreds of students in CAD design and held the Ira A. Fulton College Professorship of Global Engineering. From 2006 to 2010 he directed a PACE project that involved 26 national and international schools in the modeling, analysis, and manufacturing of four Formula One–type racecars.

MATERIALS RESEARCH WITH STUDENTS IMPACTS MANY INDUSTRIES

Seven grants with total funding of $3.5 million were given to ME faculty members who research materials. All faculty research includes meaningful participation of graduate and undergraduate students, who often coauthor related journal publications. Although materials research takes place on a micro scale or nanoscale, it has the potential for "macro" impact on multiple industries.

For instance, new NSF funding ($375k) will allow researchers to embed newly developed piezoresponsive nano-composite sensors into people's shoes and clothing, providing gait analysis for patient rehabilitation and athletic training by sending a continuous flow of data to a smart phone.

Another grant ($450k) funds a collaboration with Ford Motors to assist in meeting fuel economy targets. This research will provide a foundational framework of deformation microscopy to advance the development of lightweight steels. As a result, auto owners will ultimately be able to travel more miles per gallon while driving cars with the structural and safety advantages of steel.

NEW DISTINGUISHED ALUMNI AWARD

The first BYU Mechanical Engineering Distinguished Alumni Award will be given in 2016 to recognize outstanding engineering achievement in leadership, educational, technical, or humanitarian areas. Letters of nomination should be sent to **me-externalrelations@byu.edu.**

STAY CONNECTED

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