



With great enthusiasm, we unveil a new Alumni chapter for current and past BYU Manufacturing majors! Our aspiration is that this chapter will open doors to mentoring, internships, networking, career development, and vibrant social gatherings; all while nurturing the cherished spirit of Brigham Young University. We warmly invite you to participate in this momentous journey. Gatherings in your area coming soon.

Message From Our Department Chair

Dear Alumni and Friends,
As this is the inaugural Manufacturing Engineering Annual Newsletter, I could go on and on about all the changes and great things that have transpired over the past few years, but, I want you to read this newsletter and look forward to receiving the next one. So I will be brief and only highlight what I feel are some of the significant changes that impact students broadly.

Manufacturing Engineering became its own department in 2019 and received ABET accreditation in 2021. Growth, recruiting and opportunities for students have increased favorably with this change. Our current undergraduate enrollment is 202 with roughly 45 graduating per year. The past two years we have had 80% placement by April graduation with 100% placement by June. In 2023 I sat in a meeting with our College Deans and other department chairs when Toyota announced it was making BYU one of its premier institutions. Then went on to state that, while they were impressed by BYU overall and would also look to hire graduates from other programs, they were primarily at BYU because of the Manufacturing Engineering program and the SMART Manufacturing curriculum developed by Dr. Hovanski. Yes, I had a lot of pride well up in me at that moment (not all of which was righteous), but I was able to restrain myself and maintain my professional decorum with my colleagues.

External research funding has grown from \$640K in 2019 to over \$1.8MM in 2024. These funds are used to support undergraduate and graduate student participation in focused mentored learning. Some of the companies/agencies providing funding include the Boeing company, Northrup Grumman, General Electric, National Science Foundation, Department of Energy, among others. In 2024 we had 49 undergraduate students and 27 graduate students working on research projects with our faculty. I hope this gives you a snippet of the great things occurring in our department. Our faculty and staff are committed to the students here, the mission and vision of the department and university, and are doing great things to offer our students a first-class education in manufacturing engineering.

-Tracy Nelson

Alumni Chair Bill Nordgren



Celebrating more than 30 years in his profession, Mr. Nordgren was the founder, president and chief executive officer of FlexSim Software Products, Inc (FSP) until it was acquired by Autodesk in 2023. He began his career as an engineer with Boeing Airplanes Co. and eventually founded FSP in 1993 under the name F & H Simulations, Inc. He obtained a Bachelor of Science in Manufacturing Engineering Technology and a Master of Science in Computer Integrated Manufacturing, both from Brigham Young University. Mr. Nordgren served as an adjunct professor for undergraduate and graduate courses in manufacturing simulation for the Manufacturing Engineering Department at BYU from 2017 to 2024. Mr. Nordgren used his expertise in simulation software and process improvement to expand his business into various channels around the world. Additionally, throughout his career, Mr. Nordgren has contributed his expertise to the industry and is a co-author of the textbook, "Applied Simulation: Modeling and Analysis Using FlexSim." Mr. Nordgren is a current member of the Industrial Advisory Board for the BYU Manufacturing Engineering Department.





BYU

Manufacturing Engineering



Tracy Nelson
Professor, Department Chair
Specializing in metal materials and joining

Yuri Hovanski
Associate Professor, CFSP Director
Specializing in joining and automation

Michael Miles
Professor, WIM Advisor
Specializing in metals processes, simulation, and lean

Eric McKell
Professor, SME Advisor
Specializing in CAD/CAM, material removal, and tool design

Philippe Passeraub
Associate Professor
Specializing in additive mfg of microsystems and medical devices

Quentin Allen
Assistant Professor, Graduate Coordinator
Specializing in the tribology of orthopedic biomaterials

Lile Squires **New professor this year*
Assistant Professor
Specializing in metal additive manufacturing and wire-arc directed energy deposition

Staff

Genevieve Baker: Business & Graduate Program Manager

Clint Bybee: Lab Supervisor Extraordinaire

John Reinhard: Computer Support Rep

Mikelle Sevy: CFSP Administrator

Alisha Wall: Undergraduate Academic Advisor & Internship Coordinator

Adjunct Faculty

Aubrey Houck: Packaging Engineer at Merit Medical

John Lee: President of Alpha Quality Consulting and Alpha Training and Consulting

Jacob White: Technology Consultant at Autodesk

2024 Students and Graduates in Manufacturing Engineering

- 202** Undergraduate students enrolled
- 27** Graduate students enrolled
- 45** Manufacturing Engineering BS degrees awarded
- 7** Manufacturing Engineering MS degrees awarded
- 49** Undergraduate Research Assistants
- 27** Undergraduate Teaching Assistants
- \$ 143K** Undergraduate Research Assistant wages
- \$ 1.8MM** Research funding

Internships

BYU Manufacturing Engineering Department had 36 student internships in 2024. Internships provide invaluable hands-on experience that enable our students to apply their classroom knowledge. They also provide networking, skill development, and a competitive edge in the job market. Please consider if you might be able to offer this amazing opportunity in your place of business. Reach out to Alisha for more information; alisha_wall@byu.edu

2024 LAB UPGRADES

The Manufacturing Engineering Department made significant upgrades and additions to its equipment this year. Our water jet, partially built by students in 1990, was fitted with new flow components, ensuring its continued functionality well into the future. Additionally, we replaced several aging welders and plan to acquire more in 2025. A key highlight is our new Keyence non-contact measuring system. With it, we've enhanced our capability to measure surface texture, part dimensions, and tolerances. This tool will also be invaluable for reverse engineering; making it a vital asset to the department moving forward.

-Clint Bybee, Lab Supervisor

We Need You

We have a growing number of students in the department. Ensuring these Manufacturing Engineering students have access to high quality learning opportunities will require additional resources. We invite your support in making this a reality. Consider visiting our website to learn how to donate today. MFGEN.BYU.edu

Another way to offer support is to join the ranks of our alumni organization. For those interested, kindly reach out to Billnordgren@gmail.com or Mikelle.Sevy@byu.edu. Here are some roles where you could lend your talents:

- Regional Lead, orchestrating events in your local area
- Esteemed Chair Member
- Keeper of the Treasury
- Guiding Mentor

RESEARCH



By: Elizabeth Williams Aug 22, 2024 Y News

One assistant professor is making strides with his students to improve the lifespan of hip and knee replacements through friction stir processing. When Dr. Quentin Allen was in high school, he tore the meniscus in his left knee—making him a high risk for arthritis and knee replacement later in life. As he found his passion in manufacturing engineering, he joined a research project working specifically with surface texturing of hip replacements. He loved the project so much that it became his Ph.D. research and continued with him as a professor at BYU.

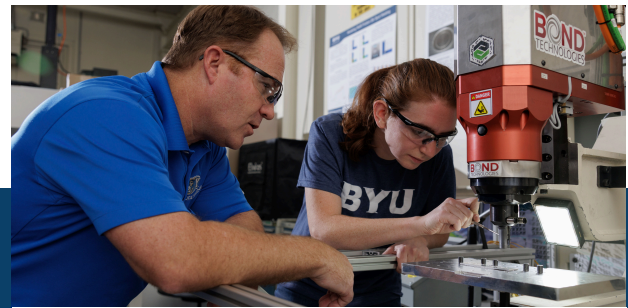
“I’ve been researching that injury and what they did to treat me. I’ve been pain free for years now, which is great. But I’m at very high risk for developing arthritis in my knee and needing a knee replacement. So that was my personal connection into this area,” Allen explained.

Currently, Dr. Allen is working on friction stir processing and surface texturing to improve the longevity of hip and knee replacements. Comfort, functionality, and durability are all critical to the user of a new knee or hip. Because it takes so long to have biomedical materials approved by the FDA, researchers focus on improving the existing top alloy: cobalt-chromium-molybdenum (CoCrMo).

Friction stir processing is a method used in advanced manufacturing in which a tool is spun very quickly and plunged into the metal; the friction softens the metal, giving the engineer more control over its properties.

The intention is to make the CoCrMo metal harder, more wear resistant, and more corrosion resistant—which will make the implants last longer.

Surface texturing increases the amount of lubricant in between the bearing surfaces (ball and socket) of the joint replacement; this reduces friction, wear, and squeaking. Both projects, although separate, are critical in the advancement of biotechnology.



By: Dan Evans; Nov 12, 2024 Fox13

PROVO, Utah — Brigham Young University students and Toyota are working on a breakthrough development engineering that could change how cars are manufactured. BYU Associate Professor of Manufacturing Engineering, Dr. Yuri Hovanski, says Refill Friction Stir Spot Welding is the future.

From an energy standpoint and from the material, enabling this allows us to use materials that were very difficult for us to use before and at the same time has a significant lower impact from an environmental,” Hovanski explained. This process could also help Toyota and other manufacturers meet a mandate that the auto industry not only make their vehicles more efficient but also make the manufacturing process cleaner.

To reduce vehicle weight, car manufacturers are increasingly ditching steel in favor of lighter-weight aluminum. However, the current welding process, resistance spot welding, presents challenges since it was designed for steel.

Since aluminum has a higher thermal conductivity and low melting point, it has a smaller window of workability than other metals and can easily lead to burn-through.

Dr. Hovanski says refill friction stir spot welding uses 40 times less energy, emits fewer emissions, and produces welds that are 10 times stronger.

It joins the metal without ever melting it. Pressure is applied and a pin is inserted into the metal, softened by friction. The two sheets of aluminum are stirred together with a tool, and when pressure is released, the hole fills in, leaving a strong-quality joint.

View Full story: <https://www.fox13now.com/news/local-news/byu-engineering-students-could-change-how-cars-are-manufactured>



Office Update

The department office got a facelift! Gone is the nondescript wooden door. In its place is a beautiful glass storefront making our entrance more visible and inviting. Reception was redesigned to open up the space and improve flow for faculty and students. New cabinetry and furnishings were added. The advisor and manager offices were expanded and windows added to bring in natural light, make the offices more welcoming, and enhance engagement. Custom signage and finishing details are still to come. We feel this new environment has improved the student experience. Please stop by to see the wonderful changes for yourself.



Let's Stay in Touch

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