Michigan Technological University began as the Michigan Mining School in Houghton in 1885. It was established by the state of Michigan to train mining engineers to better operate the local copper mines. Today Michigan Tech offers educational excellence in many fields of engineering – the College of Engineering currently consists of eight separate academic departments, one of which is the Materials Science & Engineering Department.

The College of Engineering strives to provide an inclusive and accessible undergraduate and graduate education for a diverse workforce in engineering and applied science, as well as providing technical leadership, guidance, and support to industry and government.

One focus of the Materials Science & Engineering Department is to provide students with a focus on metallurgy and microstructure in both ferrous & non-ferrous materials. Students are exposed to solidification modeling, printing 3D patterns, and casting parts – they experience real world projects, problems, and solutions. Not only do the students graduate with knowledge, they work well with their hands and look forward to contributing to the success of their employer whether it’s in Michigan or 3000 miles away.

Students graduate with degrees such as a BS in Materials Science & Engineering, Mechanical Engineering, or Mechanical Engineering Technology.

**The Curriculum**

The curriculum at Michigan Tech emphasizes metalcasting and opportunities for hands-on experience. Each semester includes classes related to metalcasting.

Most of these classes include a lab – Principles of Metalcasting, Manufacturing Processes, and Introduction to Manufacturing. Students are also able to put into practice what they’ve learned through Senior Design and Advanced Metalworks Enterprise.

Students have access to courses that allow them to explore a wide variety of materials; they can find out what controls the properties, behaviors, and performance of metals, plastics, electronic materials, and more.

**The Facilities**

The foundry facility supports metalcasting activities, primarily focusing on aluminum and ferrous casting. Michigan Tech is one of only a handful of educational institutions nationwide that have retained an in-house foundry with a focus on metallurgy. Undergraduate students, graduate students, faculty, research staff, and Enterprise teams use the facilities for educational and research purposes. Some of the specialized lab equipment that is available in the foundry includes: arc melter, induction furnaces, resistance furnace, extrusion press, vacuum induction melter, and melt spinning.
The Professor

Paul Sanders received his BS in Metallurgical and Materials Engineering from Michigan Tech and his PhD in Materials Science and Engineering from Northwestern University. He did post-doc work at both Argonne National Laboratory (Technology Development Division) and Harvard University (Division of Engineering & Applied Science, Materials Kinetics Group).

Prior to joining the faculty at Michigan Tech (2009), Paul worked on chassis materials in the Materials Department within Research and Advanced Engineering at Ford Motor Company. At Michigan Tech, he and his students are heavily involved in alloy and process metallurgy research funded by industry and government. Paul was presented with the FEF/AFS Distinguished Professor Award in 2015.

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The Students

Processes and experiences that are available to the students are:

- **Molding:** Green Sand, Chem-Bond Sand, Permanent Mold, Investment Casting, and Lost Foam
- **Metals:** Aluminum, Ferrous, Magnesium, Copper, Nickel-Based Superalloys, and Zinc
- **Core Making, Pattern Making, 3D-Printed Patterns, Casting Simulation
- **Processes:** Heat Treating, Machining, Metallography, Mechanical Testing, NDT, Metrology, Extrusion, Rolling, Wire Drawing, and Swaging

Michigan Tech students have many opportunities to network with industry professionals at regional and national conferences and their local AFS Chapter meetings. They participate in casting competitions and several different types of outreach activities. Foundry Fun Days attract not only other-major students from campus but also community individuals and groups like the Boy Scouts. The students also use the Foundry in a Box to demonstrate to other campus students how to cast in tin. An annual highlight is the Materials Day activities which include an outdoor cupola pour in the center of campus – https://www.youtube.com/watch?v=Q-evTlxopHk

Over the past four years, 17 FEF registered students have taken a job in metalcasting or related industry, and 23 students have participated in internships and/or co-ops in metalcasting or related industry in the past two years.