## The Program

Penn State’s College of Engineering is home to the first industrial engineering program in the world (established in 1908). The Harold and Inge Marcus Department of Industrial and Manufacturing Engineering has made a name for itself in the engineering industry through its storied tradition of unparalleled excellence and innovation in research, education, and outreach.

Both the undergraduate and graduate industrial engineering programs are nationally ranked as top programs in the country thanks to a diverse faculty, exceptional students, ever-evolving curricula, world-class facilities, and extensive research and outreach efforts. Industrial engineering students at Penn State emerge as the next generation of leaders in industry, research, and academia.

Students graduate with a BS in Industrial and Manufacturing Engineering. They can continue their education and earn both an MS and a PhD in Industrial and Manufacturing Engineering.

## The Curriculum

There are three “metalcasting” classes available in the Industrial & Manufacturing Engineering track. Manufacturing Processes is a five-week metalcasting class which includes a lab and is required for the BS degree. Foundry Engineering (15 weeks with a lab and project) and Manufacturing with Materials (3 weeks with a project) are both electives for the BS, MS and PhD.

Comprehensive teaching which includes laboratory-instruction and a research program focused on metalcasting industry projects contribute to the high level of knowledge and experience that put Penn State student graduates at the top of their field.

## The Facilities

The Industrial and Manufacturing Department is housed in the Leonhard Building which was built in 1999. The metalcasting area of the lab provides students with instructional experiences including the use of software tools for gating, risering, and solidification modeling. The lab includes an induction furnace, green sand and no bake molding, sand testing equipment, cooling curve analysis instrumentation, and a patternmaking facility as well as access to state-of-the-art microscopy and analytical equipment throughout the university. Students gain valuable hands-on experience by being able to mold and cast themselves using state-of-the-art equipment.

## The Professor

Bob Voigt attended the University of Wisconsin-Madison receiving his BS in Mechanical Engineering as well as an MS and PhD in Metallurgical Engineering. Bob was presented with the FEF/AFS Distinguished Professor Award in 2002. He has published more than 300 technical papers in the metalcasting field as has supervised over 100 MS and PhD students.

Bob can be reached at rvoigt@psu.edu. The FEF Key School Contact for Penn State is Matt Sullivan who can be reached at matt.sullivan@buckcompany.com.
Processes and experiences that are available to the students are:

- **Molding:** Green Sand, Permanent Mold, Lost Foam, and Chemically Bonded
- **Metals:** Aluminum, Copper Base, Iron, Steel, and Zinc
- **Core Making, Pattern Making, 3D Printed Patterns, Casting Simulation, and Cooling Curve Analysis**
- **Processes:** Heat Treating, Machining, Metallography, Mechanical Testing, NDT, and Metrology

Penn State students host and participate in open foundry nights which sometimes include local community visitors. They also enjoy foundry tours throughout the year, participate in a focused metalcasting job fair twice a year, enjoy learning from industry speakers at their AFS student chapter meetings and interacting with the metalcasting advisory committee members. Penn State Behrend students also participate in the main campus metalcasting activities including attending AFS regional meetings and conferences.

Over the past four years, 16 FEF registered students have taken a job in metalcasting or related industry, and 12 students have participated in internships and/or co-ops in metalcasting or related industry in the past two years. The Penn State FEF Program is also supporting the FEF Affiliated Penn State Behrend Metalcasting Program directed by Assistant Professor Paul Lynch.