The Program

Virginia Tech's College of Engineering has an excellent reputation which comes from a "hands on, minds on" philosophy towards engineering education. The faculty and staff of the College are committed to providing an active-learning atmosphere for their students. They also engage in high quality research which is timely and focused on problems of great importance to society, as well as promoting early adoption of new learning technologies for their students.

Feeding off of the "hands on, minds on" philosophy, the Materials Science & Engineering Department provides that hands-on education – the opportunity to mold, melt and pour metal – sometimes at over 3000 degrees Fahrenheit. Students are exposed to and practice traditional and state-of-the-art processes.

The focus of the program is to provide students with well-rounded education including knowledge and experience in a multitude of areas: mold design (procast modeling), making molds, melting and pouring metal, analysis of liquid metal as well as solid (after making the casting). They even learn to use power tools (power drill, belt sander, etc.) which has become a lost skill.

Students graduate with a degree in Materials Science & Engineering or Mechanical Engineering. They can earn a BS, MS and PhD in either of these disciplines.

The Curriculum

VA Tech offers a wide range of foundry related courses. From Elementary Metal Casting (lab) to Foundry Safety; from Test Methods for Foundry Laboratories to Introduction to Rapid Prototyping; metalcasting is covered throughout. Labs are an important part of the learning process and are included in several of the classes: Physical Metallurgy of Metal Casting, Modeling of Metal Casting, Advanced Metal Casting Laboratory, and Manufacturing Processes Laboratory.

Whether students choose a degree in Materials Science & Engineering or Mechanical Engineering, metalcasting is given a high priority. For an MSE degree, metalcasting is a concentration; for an ME degree metalcasting is an elective and thesis projects include aspects of metalcasting.

The Facilities

The Kroehling Advanced Materials Foundry was recently built to house the extensive and state-of-the-art pieces of equipment the students have access to. Some of those machines include: a 125kW VIP Power Supply and 300 lb capacity Induction Tilt Furnace, a Lift Swing Induction Furnace capable of handling a 60# crucible, a Rotary Inert Degas Unit for Aluminum, a Continuous Sand Mixer, Investment Slurry Tanks & Rainfall Sander, Sand Testing Equipment, and a 3-D Rapid Prototyping Machine.
The Professor

Alan Druschitz earned a BS and PhD in Metallurgical Engineering at the Illinois Institute of Technology. He spent several years in industry prior to becoming a professor. Alan spent 14 years at General Motors in research and nearly 12 years at Intermet as the Director of Materials Research & Development. He taught foundry and metalcasting classes at the University of Alabama-Birmingham prior to joining Virginia Tech. He has been teaching metalcasting and metallurgy classes at VA Tech for the past 7 years. Alan was presented with the FEF/AFS Distinguished Professor Award in 2016.

Alan can be reached at adrus@vt.edu. The FEF Key School Contact for Virginia Tech is Libby Ryder who can be reached at lryder@grahamwhite.com.

The Students

Processes and experiences that are available to the students are:

- **Molding:** Investment Casting, Chemically Bonded, and 3D Sand Printing
- **Metals:** Aluminum, Copper Base, Super Alloys, Zinc, Iron, Steel, and Pewter
- **Pattern Making:** 3D Printed Patterns, Casting Simulation
- **Processes:** Heat Treating, Metallography, Mechanical Testing, NDT, and Blacksmithing

Virginia Tech students hone their skills by participating in many casting competitions and senior design projects. They network with industry people by attending local AFS Chapter meetings and national shows such as Cast Expo and Casting Congress. The students enjoy foundry tours and student AFS Chapter meetings throughout the year and host open houses for other students and interested individuals.

Over the past four years, 19 FEF registered students have taken a job in metalcasting or related industry, and 4 students have participated in internships and/or co-ops in metalcasting or related industry in the past two years.