VTFire: Casting the Future

By: Geoffrey Merritt

Photography By: LeeAnn Ellis

Concealed in the depths of Plantation Drive, at the end of a long country road lined with cattle and farmland scenery from the Virginia Tech agricultural department lies Virginia Tech's Foundry Institute for Research and Education (VT FIRE). VT FIRE is a relatively new program at Virginia Tech having been established in the spring of 2011, it aims to teach students the fundamentals of foundry operation, equipment, and safety as well as the art of metallurgical design. In the past 4 years, VT FIRE has grown and prospered immensely due to the continued interest of college students in areas such as metal casting and alloying as well as the experience of Dr. Alan Druschitz. For four and a half years, Dr. Druschitz has continued to accomplish more growth, and attract new students, developing an entire metal castings minor around the extensive list of courses the foundry has to offer. Dr. Druschitz, in addition to earning a Ph.D. in metallurgical engineering, has had prior real world experience in industry. This benefits the students by having the opportunity to learn how to operate the various types of foundry equipment safely and effectively, a proficiency that could prove valuable in many future careers.

The foundry is home to a wide variety of metallurgical equipment. When walking through the double doors leading to the foundry room, the first noticeable thing is the large overhead crane sitting high above in the tall ceilings. This convenient piece of equipment makes pouring large amounts of molten metal in huge stone crucibles a piece of cake, opening up the amount of options available for metal casting capabilities. The foundry is also home to two large induction furnaces, a large sand mixer for creating molds of up to 650 lbs. in weight, a dust collection fume system to provide clean breathable air, a 3D printer for creating small intricate molds and many other top of the line machines that complete the full foundry experience. During all operation at the foundry one must adhere to strict safety guide lines that include facemasks, safety glasses, fire proof aprons, jackets, and leather boots. Safety is an important aspect in any industrial setting but it is especially significant in the presence of large quantities of highly dangerous molten metal and substantial amounts of heat generated by the large furnaces. When in operation, this can all seem a little overwhelming at first, but over/time the foundry can become an exciting and interesting place to experience and explore valuable real world applications in metallurgy.

There is an undeniable need for metallurgists in today's economy, having the experience the foundry provides can

make any young engineer look attractive to many major engineering fortune five hundred companies.

This practical experience is what attracted me towards the foundry as a material science student. Having already committed towards a minor in green engineering, I was unable to take any of the classes the foundry had to offer. With this realization I sought out Dr. Druschitz himself to see if he needed any research assistants at the foundry, stressing my interest in gaining experience in a foundry environment. He allowed me to assist in steel quenching research conducted with him at the foundry. I was looking at how changing the ratio of the steel quench bath size to the size of your sample and initial quench bath temperature can affect the acquired internal and surface cooling rates of steel. By producing models from this data, one can produce an effective means of acquiring specific cooling rates desired for hardening purposes in the quenching and heat treatment process. I enjoyed the experience I gained in not only the theoretical aspects of the data we collected, but also the operation of the furnaces and creating the quench baths. I believe it will undoubtedly benefit me in years to come after college. Above all, I learned how to conduct myself in a foundry setting, which I believe gave me both the experience and confidence that I needed in order to consider pursing a job in the metallurgical engineering industry.

Although VT FIRE has proven itself to be a self-standing and beneficial program to both students and the university, continued support and contributions are always appreciated. Donations and funding are put towards furthering the foundry's capabilities for the growing number of students and future possibilities for metallurgy related materials research. In the past 4 years the foundry has already gained notoriety as a fun and exciting place as well as a reputation for excellence in all things metallic. Students gain the ability and freedom to conduct fun personal projects, such as casting life-size versions of brass Iron Man masks and aluminum Halo helmets, among many other cool castings. The foundry has room and time to grow before it reaches true adulthood, but the progress it has achieved in the last few years has been impressive to say the least.

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