Zachary Bryan

Graduate Institution: University of Florida

Graduate Discipline: Materials Science and Engineering

Hometown: Orlando, FL

Relevant SC Research: Basic Energy Sciences

Research Interest:

My research involves studying anisotropic materials through the use of an experimental approach that is informed by computational thermodynamics. Computational thermodynamics allows me to calculate and predict underlying phase transformations in these unique materials, thereby leading to the creation of specific, designed microstructures. I am currently designing a magnesium-based alloy with improved formability to replace more traditional, higher density alloys in lightweight structural applications. This study uses a novel, statistically-informed microstructural design approach to identify dominant factors in the texture evolution of magnesium during deformation and recrystallization. Ultimately, I will use the knowledge gained about the connections between microstructure and texture to design an alloy with an optimized microstructure. I am interested in applying these experimental methods to other anisotropic materials to create alloys with improved mechanical performance.

About Me:

Zachary Bryan obtained his bachelor's degree in Materials Science and Engineering from the University of Florida in 2009 and remained at the university to pursue a Ph.D. in Materials Science and Engineering with an emphasis on metallurgy. As a graduate student, he has been involved with several projects, many of them aimed at improving the formability of magnesium alloys. His primary dissertation work involves using statistically-informed microstructural design to modify texture during recrystallization, which could potentially yield alloys with greater ductility. On this project, he has collaborated with General Motors and the National Synchrotron Light Source at Brookhaven National Laboratory.

Zach is also very involved with other students' projects. He has collaborated on other magnesium projects, such as the effect of nanoparticles on the activation of higher order slip, as well as another project examining the dynamic mechanical response of metal matrix composites reinforced with ferroelastic particles. As part of these efforts, he has enjoyed teaching and mentoring three undergraduate students and two graduate students.

He is a member of Materials Advantage, a student program that includes membership in the American Ceramic Society, ASM International, the Association for Iron and Steel Technology, and The Minerals, Metals and Materials Society (TMS). At the 2012 TMS Annual Meeting, he presented a poster on his thesis work that was recognized as the Best Graduate Poster in the Light Metals Division. He also was an author/coauthor on three oral presentations and eight posters.

Zach is a member of the Graduate Student Advisory Committee (GSAC) under the NSF Innovation through Institutional Integration program at the University of Florida. As part of GSAC, he has helped to prioritize other graduate students' needs and facilitate communication with administration about improvements that can be made to shape graduate education. He currently serves on the Ethics Subcommittee, which is aimed at improving the quality and availability of ethics training for graduate students.

After graduation, he plans to pursue a career in either industry or academia, using his materials design experience to discover, design, and synthesize innovative multifunctional materials. He believes his computational thermodynamics knowledge, when coupled with his statically-based approach to experimental design, will dramatically reduce the time required to develop novel materials.