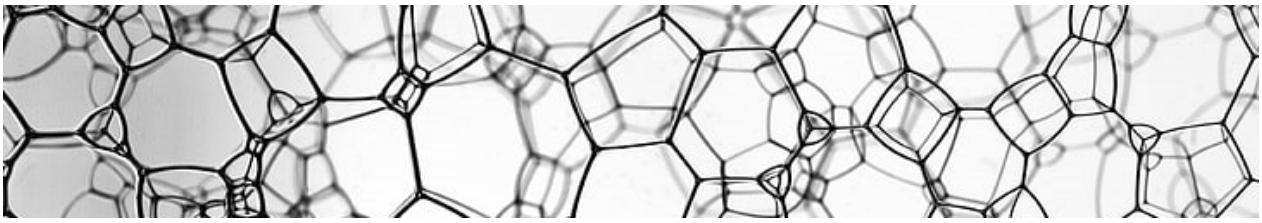

Graduate Research Opportunities in Advanced Materials Processing, Testing, and Characterization

Professor Gregory Thompson at the University of Alabama (https://www.ua.edu/) is seeking motivated graduate candidate students to join his research group in three stimulating programs: (1) Creep behavior in ultrahigh temperature ceramics (UHTCs) (2) Micro-lattice construction from directed laser deposition and (3) Structural stability and mechanical behavior in compositionally complex refractory nanocrystalline alloys. Each of these programs provide collaborative opportunities for professional development with national laboratory and/or industrial collaborators enabling an enriching graduate research experience that will extend beyond just on-campus laboratory opportunities.

Professor Thompson has a dynamic research team of undergraduate and graduate students and post-doctoral researchers who develop fundamental linkages between processing-structure-property relationships. This is achieved through developing expertise in utilizing advanced processes with analytical characterization methods. The outcomes of our work provide a fundamental basis for scientific understanding that informs engineering of new materials.

- The **UHTC effort** involves powder processing and consolidation of mixed-metal and mixed-nonmetal species to control point defects for creep responses at temperatures well above 2000 ^{o}C. Using a novel, non-contact means for thermomechanical loading, we will explore yet to be quantified behavior in relevant temperature environments. Interested candidates should have an interest in powder processing, mechanical behavior, and electron microscopy.
- The **micro-lattice project** leverages the use of laser chemical vapor deposition that enable fibers to deposit under the focal point of a laser and then grow as the laser retracts. Through multiple lasers, the ability to additively construct novel lattices is enabled. The candidate student should have a strong interest in deposition science, logic control of instrument design (mechatronics), and laser optics to build structures.
- The **refractory nanocrystalline program** involves the use of combinatorial powder processing, conformal coating of such powders by physical deposition, and thermal testing to identify refractory stabilized alloys, with solutes that alter grain boundary behavior. The interested candidate should have an interest in powder metallurgy, micro-mechanical testing, and atom probe/electron microscopy.

The University of Alabama Board of Trustees recently approved a Materials Characterization Equipment Renewal Program that will recapitalize the core analytical facility. New instrumentation includes an aberration corrected (S)TEM; modern TEM; multi-gas plasma focus ion beam (FIB); the highest resolution Ga FIB; a dedicated SEM for micro-mechanical testing; and the next-generation Local Electrode Atom Probe. These collective instruments provide exceptional opportunities to characterize and test materials in each of these programs ensuring opportunities for high impact science and engineering outcomes. Interested candidates can pursue a M.S. or Ph.D. in Metallurgical & Materials Engineering (https://mte.eng.ua.edu/) or a Ph.D. in the interdisciplinary Materials Science program (https://materialsscience.ua.edu/). Other physical science or engineering graduate degrees are options based on candidate's interest and development of the research topic above.

Prior student from Professor Thompson's research group have found gainful employment at GE Global Research, Army Research Laboratory, Knolls Atomic Lab, Intel, Seagate, Apple, and a variety of other industries in the southeast and nation.

The University of Alabama is an R1 research institution, home for 38,000+ students, and is located along the banks of the Black Warrior River in West Central Alabama. It is approximately 60 miles from Birmingham, Ala. The Tuscaloosa metropolitan area, with more than 150,000 people, has been named "The Most Livable City in America" by the US Conference of Mayors and one of the "100 Best Communities for Young People" by America's Promise Alliance. The city offers a variety of parks, an amphitheater for concerts, and a vibrant entertainment downtown.

Interested candidates should contact Professor Thompson for more information. Applicants received prior to February 1 are eligible for prestigious UA Graduate Fellowships.

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