

PhD Positions in Nanostructured Metals and Ceramics

Two PhD positions are available in Dr. Marvel's research group at Louisiana State University (LSU). The research group focuses on evaluating processing-structure-property relationships of nanostructured metals and ceramics to design novel materials. Each research assistant will have access to LSU's impressive additive manufacturing facility ([video](#)), and get trained on a Thermo Scientific Plasma Focused Ion Beam (PFIB) and a newly acquired Thermo Scientific Spectra 300 Scanning Transmission Electron Microscope (STEM). Both electron microscopes are located in the LSU Shared Instrumentation Facility ([SIF](#)). The Spectra 300 is double-corrected and will be equipped with state-of-the-art GIF Continuum K3 EELS and Super-X EDS systems. Most of the research will also be conducted in renovated materials research laboratories located in Patrick F. Taylor Hall ([virtual tour](#)).

More details of each project is described below:

- Improving processability of refractory nanocrystalline metal alloy powders - One position will focus on tailoring nanocrystalline metallic powders by designing grain boundary structures/compositions that facilitate solid-state consolidation. The research assistant will lead the development of cryogenic milling procedures, characterize the microstructures using a variety of X-ray and electron microscopy techniques, and fabricate bulk specimens via additive manufacturing.
- Extracting thermodynamic and kinetic parameters of grain boundary complexion transitions - One position will study complexion transitions in rare-earth doped spinels. The research assistant will lead the effort in sintering doped ceramic powders via field-assisted sintering technology (FAST), anneal ceramic diffusion couples at different temperatures and times, characterize bulk microstructures, measure grain boundary diffusivity, and compare grain boundary structures/chemistries.

Minimum Qualifications:

Bachelor's degree in Mechanical Engineering, Materials Science and Engineering, Chemical Engineering, Chemistry, Physics, or a related field. Preference will be given to candidates with a Master's degree, and to those who have prior research experience. A strong understanding and/or experience in at least one of the following: (i) electron microscopy, (ii) powder metallurgy, (iii) solid-state sintering. Coding experience in MATLAB or Python is also highly recommended as well as excellent written and verbal communication skills.

Application Instructions:

Highly motivated and interested candidates are encouraged to send an email with the subject "Prospective Ph.D. student" to Dr. Marvel (cc Graduate Coordinator Elise Bridgewater: gradmie@lsu.edu) with the following information: (i) CV; (ii) Unofficial transcripts; (iii) A short letter of interest (limit to one-page) describing relevant experience, interest, and fit for the aforementioned research directions. The positions will remain open until filled, but candidates who can start in January 2023 will be given immediate consideration. For more details or any other inquiry, please contact Dr. Marvel at cmarvel@lsu.edu.