UCLA Samueli
Materials Science & Engineering

## Materials Science and Engineering Winter 2020 Seminar Series

**Friday, January 24, 2020 | 10:30 AM – 12:00 PM | 2101 Engineering V**

# DEVELOPMENT, MANUFACTURING AND CHARACTERIZATION OF NANOSTRUCTURED MATERIALS FOR STRUCTURAL APPLICATIONS IN EXTREME ENVIRONMENTS


***Haiming Wen***
***Assistant Professor***
***Department of Materials Science and Engineering***
***Department of Mining and Nuclear Engineering***
***Missouri University of Science and Technology***



Bulk nanostructured materials, with structural units (e.g., grains) falling in the nanometer range, have emerged as a new class of materials and received world-wide attention. They are structurally characterized by a significant volume fraction of grain boundaries, which significantly enhances their mechanical and physical properties (e.g., irradiation tolerance) in comparison with those of their conventional coarse-grained counterparts. Nano science and engineering can be utilized to improve performance of materials to enable them for extreme environments such as neutron irradiation and ballistic impact. In this talk, research projects will be discussed involving nano science and engineering in an effort to develop, manufacture and evaluate nanostructured materials with enhanced mechanical properties and irradiation resistance. Ultrafine-grained or nanocrystalline Cu and Al alloys with dramatically higher strength than their coarse-grained counterparts were fabricated and thoroughly characterized. Bulk nanostructured steels and high-entropy alloys are fabricated using advanced manufacturing techniques (e.g., equal-channel angular pressing, and additive manufacturing) and assessed for mechanical properties and irradiation performance. The structures of the materials are tailored on the nanometer scale in order to achieve desired properties and performance. Characterization of neutron irradiated nuclear fuels will also be discussed. Furthermore, a nanostructured Al alloy – ceramic particle composite will be described for ballistic impact applications.


**Haiming Wen** is an Assistant Professor in Department of Materials Science and Engineering and Department of Mining and Nuclear Engineering at Missouri S&T. He obtained his PhD from University of California – Davis in 2012, and subsequently held postdoctoral appointments at Northwestern University and Idaho National Laboratory. Prior to joining Missouri S&T in August 2017, he was a Research Assistant Professor at Idaho State University and a staff scientist at Idaho National Laboratory. Dr. Wen has extensive experience in research and development of advanced structural materials, including those for nuclear applications. He has been leading multiple research projects funded externally. Dr. Wen has authored or coauthored more than 50 peer-reviewed journal publications. He serves on the Editorial Board of the journal *Materials Science and Engineering A*, and has served as the lead guest-editor of a special issue in *AIMS Materials Science*. He regularly reviews manuscripts for many journals and research proposals for Department of Energy and National Science Foundation.

*LIGHT REFRESHMENTS WILL BE PROVIDED.*