

DEPARTMENT OF MECHANICAL ENGINEERING

WILLIAM MAXWELL REED SEMINAR SERIES

“Advanced Manufacturing for Sustainable Energy Solutions: Welding Radioactive Materials and 3D Printing with High Temperature Alloys”

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Abstract: Numerous factors are currently driving an advanced manufacturing revolution in the U.S. Weight reduction is a critical aspect of mission capability and energy utilization in land and sea-based transportation, as well as in commercial aviation and space travel. In the automotive industry, use of lightweight alloys and the incorporation of multi-material assemblies are practically requisite for maintaining competitiveness and complying with fuel economy standards. In the energy sector, renewable technologies are poised to transform domestic energy production, storage, and transmission, while at the same time utilities are extending the operating lifetimes of aging nuclear power plants. These industrial objectives and constraints present numerous technical challenges. This seminar will highlight areas in the energy sector in which advanced manufacturing techniques are addressing significant challenges and leading to impactful, sustainable outcomes. In-process quality monitoring techniques that were originally developed for solid-state joining of lightweight aerospace alloys have been successfully applied to the problem of remotely monitoring weld repair activities for nuclear reactor internals. Additionally, the development of a framework for making informed-decisions about Selective Laser Melting parameters, which will enable the additive manufacture of Molybdenum targets for the accelerator-based production of a medical radioisotope, will be presented.

Bio: Dr. Gibson is a member of the Materials Processing and Joining Group, which resides within the Materials Science and Technology Division of Oak Ridge National Laboratory (ORNL). As a part of the core mission of ORNL to advance materials and nuclear energy, Dr. Gibson works to develop weld repair capabilities for nuclear reactor internals and enable metal additive manufacturing with high temperature materials. Prior to joining ORNL, he studied as a Tennessee Space Grant Fellow in the Vanderbilt University Welding Automation Laboratory. His primary research interests reside at the intersection of robotics and materials processing, with topics that include metal additive manufacturing, advanced welding technologies, in-process quality monitoring, robotic control, and signal processing. Gibson holds a doctorate (2015) and master's degree (2011) in mechanical engineering from Vanderbilt University and a bachelor's degree (2009) in mechanical engineering from the West Virginia University Institute of Technology. He is a member of the American Society of Mechanical Engineers, the American Welding Society, and the Society of Manufacturing Engineers, and he was named a SME Outstanding Young Manufacturing Engineer in 2017.

Date: Friday, Feb. 16

Place: CB 122

Time: 3PM

Contact: Dr. Alexandre Martin 257-4462

Meet the speaker and have refreshments
Attendance open to all interested persons