PURDUE UNIVERSITY

Nuclear Engineering
COLLEGE OF ENGINEERING

Nuclear Engineering Seminar

Dr. Sam Sham

Argonne National Laboratory

Wednesday, March 27, 2019

3:30pm | PHYS 112

Challenges and Opportunities in the Applications of Structural Materials in the Design and Construction of Advanced Non-Light Water Reactors

Abstract

The Office of Advanced Reactor Technologies (ART) serves as a pipeline in the transitioning of the nation's nuclear power reactor fleet from light water reactors to advanced non-light water reactors by identifying and resolving technical challenges of advanced reactor technologies.

In this presentation, an overview of the ART Advanced Materials Program will be presented and the challenges and opportunities in the applications of structural materials in different advanced non-light water reactor systems (fast reactors, gas-cooled reactors, molten salt reactors, heat-pipe reactors) will be discussed. An overview of the requirements for the Code qualification of advanced alloys in the nuclear section of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code in support of the design, construction and licensing of advanced non-light water reactors will also be presented.

Nuclear energy is always on, produces zero carbon emission, and contributes to energy diversity. Nuclear is a vital part of the energy mix that provides economic and environmental benefits for the United States.

We encourage the best and the brightest graduates from the premier university programs to join us to address these materials challenges and to contribute to a clean energy future.

Dr. Sam Sham is the Program Leader of Advanced Reactor Materials in the Applied Materials Division of the Energy & Global Security Directorate at Argonne National Laboratory. His technical specialty is in deformation and failure of advanced materials and structural mechanics technologies for high temperature reactors. He is the Technology Area Lead of the advanced materials R&D program for the Offices of ART, NE and DOE. In addition, he leads the DOE-NE international R&D efforts on advanced materials and code qualification for sodium-cooled fast reactor structural applications.

He is a member of various committees. He chairs BPV III Subgroup on Elevated Temperature Design, which is responsible for the development and maintenance of design rules for nuclear components in elevated temperature service. He was elected ASME Fellow in 2000.

Before he joined Argonne in 2015, Dr. Sham was a Distinguished R&D Staff Member at ORNL, held senior positions with AREVA NP Inc. and Knolls Atomic Power Laboratory, and was a tenured faculty at Rensselaer Polytechnic Institute. He holds a B.Sc. in ME from the University of Glasgow, Scotland, and M.S. and Ph.D. degrees from Brown University.