

The Department of Mechanical Engineering  
College of Engineering and Applied Sciences  
Stony Brook University

## Mechanical Engineering Seminar



**Wilson K. S. Chiu, Ph.D.**

**Department of Mechanical Engineering, University of Connecticut**  
**Friday, December 7, 2018 at 2:00 PM, Room 173 Light Engineering Building**

**Lecture:** Synchrotron-based Hard X-Ray Microscopy: A Tool for 3-D Spectroscopic Imaging at the Nanoscale

### Abstract

Advances in materials increasingly rely on the 3-D characteristics of its microstructure and chemistry at the nanoscale. This presentation will review 3-D imaging techniques that measure microstructural and chemical properties, and discuss its influence on material function and reliability. The presentation will then focus on three-dimensional microstructural imaging methods for fuel cell, gas separation membrane and nuclear waste form materials. Two 3-D imaging modalities using x-ray absorption and fluorescence-based synchrotron-based transmission x-ray microscopy will be demonstrated by characterizing the 3-D structural and chemical distribution. Challenges and opportunities for future work will then be discussed. The goal of this research will be to obtain a scientific and engineering understanding into how microstructure-induced transport mechanisms govern performance, with a long-term goal to improve current materials and create new materials that will enable improved device performance and increased long-term reliability for advanced engineering applications.

### Biography

Wilson K. S. Chiu earned his M.S. and Ph.D. degrees in Mechanical Engineering from Rutgers University in 1997 and 1999, respectively. His research was supported by the U.S. Army Research Office, Department of Energy, National Science Foundation, Office of Naval Research, and industry. He published 4 book chapters/special volumes, 112 journal articles and 175 conference articles/abstracts. Among his honors, he was elected fellow of American Society of Mechanical Engineers (ASME), elected into the Connecticut Academy of Science and Engineering, received the Rutgers University School of Engineering Medal of Excellence Award for Distinguished Young Alumnus, and the United Technologies Corporation Professorship in Engineering Innovation. He is the editor of the ASME Journal of Electrochemical Energy Conversion and Storage, and serves on the editorial board of Scientific Reports and several other journals. He has given over 100 plenary, keynote and invited lectures in the United States and abroad.

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