

MSE SPECIAL SEMINAR

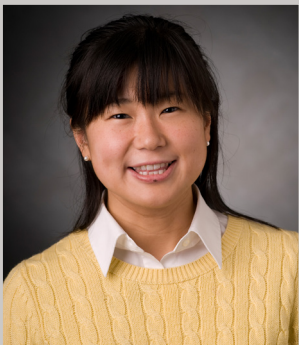
MATERIALS SCIENCE & ENGINEERING | SPRING 2018

MAY 2, 2018 | 243 WILCOX HALL | 3:00 PM



Manufacturing Multi-scale Engineered Materials and Structures for the Extreme Environment

My long-term research goal is to enable bulk application of novel multi-scale engineered materials in next-generation structures, devices, and systems in the extreme space environment. Advanced material alternatives with lightweight, higher performance, multi-functionality, and zero maintenance are sought after to increase safety, save energy, and decrease cost. Recently, multi-scale (nano, micro, to macro) materials engineering has been providing properties and performance that could not have been achieved using traditional compositing and alloying. For example, large-sized space structures, such as antennas, telescope mirrors, and solar sails, are enabled by effective compacting and deployment through integrated actuators or stored strain energy within materials. Heatless sintering is investigated to build Mars/Moon habitats by preparing nano-sized particles from onsite resources. However, bulk application of such materials is currently limited due to incomplete processing-structure-property relationship studies, and lack of scalable manufacturing technology. Throughout my career, I plan to fill in these gaps, evaluate how nano-scale behaviors are translated to macro-scale properties, and establish the design space and certification process to successfully apply these novel materials. In this presentation, I will discuss these topics, using examples of past and on-going research on multi-functional polymer nanocomposites, bimetallic lattice with ultra-low CTE, and toughened nano-porous ceramics.



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Namiko Yamamoto is an Assistant Professor of Aerospace Engineering at Penn State University. She received her B.S., M.S., and Ph.D in Aeronautics and Astronautics from MIT. After the post-doc experiences in Caltech GALCIT and NASA JPL, she started her faculty appointment in July 2014.



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