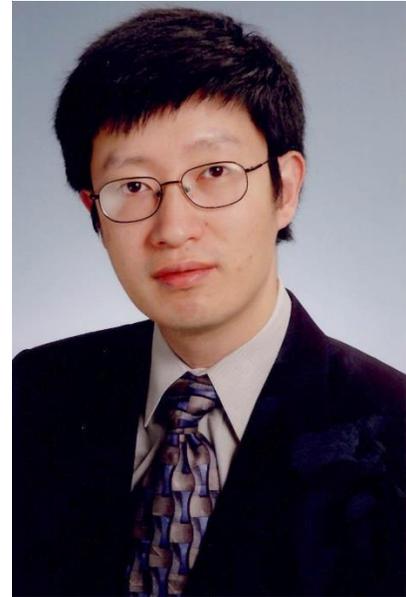


# EPSTEIN INSTITUTE SEMINAR ▪ ISE 651

## ARCHITECTURED METAMATERIALS: FROM TUNABLE THERMAL EXPANSION TO MICROVASCULAR TISSUE SCAFFOLDING

**ABSTRACT** – Three-dimensional lightweight material building blocks, through the combination of molecular design of material behavior and microscale geometric patterning, show promise to revolutionize the ability to dissipate energy and manipulate wave propagation. Such materials are desirable for a broad array of applications such as structural components, catalysts supports and energy efficient materials.

In this seminar, Dr. Fang will present the development of three dimensional micro/nanofabrication technique, projection microstereolithography (PuSL), to enable design and exploration of digitally coded multifunctional and multi-material lightweight metastructures at unprecedented dimensions. The ultra-high resolution and multi-material capabilities of the 3D printing system and the modeling tools developed can be used to design and fabricate architected materials for combined functions, including energy absorption, actuation/morphing, and micro-scale bioreactors for tissue engineering. These structures show promise on focusing and rerouting acoustic waves through broadband and highly transparent metamaterials. I will also discuss the development of engineered, three dimensional arrays of copolymer fibers that serve as mimetics of neuronal axons, using a combination of materials engineering and high resolution 3D microfabrication, which enable study of OPC engagement and subsequent myelination in vitro.



**Dr. Nicholas X. Fang**  
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**SPEAKER BIO** – **Dr. Nicholas X. Fang** received his BS and MS in physics from Nanjing University, and his PhD in mechanical engineering from University of California Los Angeles. He arrived at MIT in Jan 2011 as Associate Professor of Mechanical Engineering. Prior to MIT, he worked as an assistant professor at the University of Illinois Urbana-Champaign. Professor Fang's areas of research look at nanophotonics and nanofabrication. His recognitions include the ASME Chao and Trigger Young Manufacturing Engineer Award (2013); the ICO prize from the International Commission of Optics (2011); an invited participant of the Frontiers of Engineering Conference by National Academies in 2010; the NSF CAREER Award (2009) and MIT *Technology Review Magazine's* 35 Young Innovators Award (2008).

**USC Viterbi**  
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**TUESDAY, OCTOBER 31, 2017**

**3:30PM – 4:50PM**

USC ANDRUS GERONTOLOGY CENTER (GER), Room 206