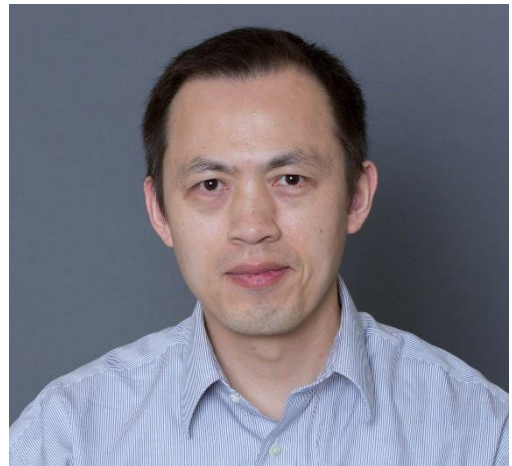


# EPSTEIN INSTITUTE SEMINAR ▪ ISE 651

## Translational Manufacturing for Nano-Engineered Structures with Superior Properties

**ABSTRACT** - Our recent explorations into the generation and integration of engineered nanostructures in structural and functional components have enabled new opportunities and challenges in large scale manufacturing of materials system for energy, automobile, aerospace, biomedical, electronics and photonics applications. This seminar starts with overviewing the methodologies of our research group in advanced materials processing that promote the science-based engineering of materials instead of empirically based engineering. This talk will focus on our recent study on large scale manufacturing of nanoengineered structures for structural and functional components. Hybrid laser energy sources were utilized to integrate engineered nanostructures in 3D structural components, leading to significant improvement in strength, formability, fatigue life, corrosion resistance. Photo-mechanical based manufacturing platform has been developed to generate large area nanopatterning (down to 10nm) of crystalline materials (e.g. metals, ceramics 1D-2D crystals), and strain engineering of nanomembranes and 2D crystals. Integration of functional nanocrystals (2D materials, nanowires and nano-dots) for electronic additive manufacturing and roll to roll manufacturing of functional devices.



**Dr. Gary Cheng**

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**SPEAKER BIO** - Prof. Gary Cheng holds his Ph.D. in mechanical engineering from Columbia University (2002). He is an associate professor in School of Industrial Engineering in Purdue University and an ASME fellow. His research and teaching interests include laser materials processing, mechanical behaviors, additive manufacturing, electrical and optical devices, plasmonic, metamaterials. He has published about 150 articles in journals including Science, Advanced Materials, Materials Today, Nano Letters, ACS Nano, Small, and Acta Materialia etc. His research was highlighted in Nature Photonic, Nature Research Materials, NanoToday. He has 5 US patents awarded and 8 applications. He has been recognized by NSF CAREER Award, ONR Young Investigator Award, SME outstanding young manufacturing engineer, ASME Cho & Trigger Young Investigator Award, National Research Council senior research fellowship, University Faculty Scholar Award, ASME best papers, Purdue Innovator Hall of Fame.

**USC Viterbi**

School of Engineering  
*Daniel J. Epstein Department of  
Industrial and Systems Engineering*

**TUESDAY, JANUARY 29, 2019**

**3:30PM – 4:50PM**

USC ANDRUS GERONTOLOGY CENTER (GER), Room 206