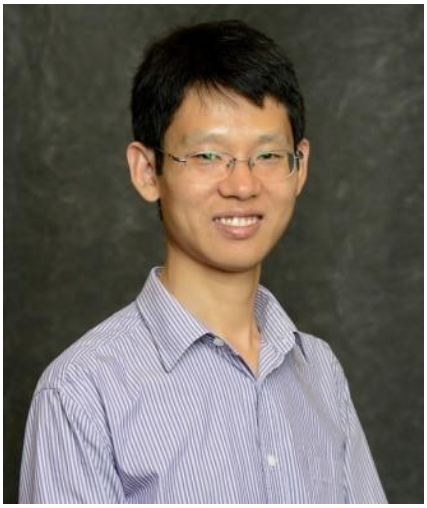
EPSTEIN INSTITUTE SEMINAR ▪ ISE 651

Additive Manufacturing of Multiscale, Multifunctional Structures

ABSTRACT - Nature is the most efficient and effective designer. Multiscale architectures molded and refined by nature are common characteristics of living organisms. Creating nature-inspired multiscale and multifunctional materials by learning from nature has long been of interest to science. However, it has proven extremely difficult to replicate the naturally designed biological materials in synthetic materials, partially because their intricate structures need to be developed over many length scales. Additive manufacturing, or 3D printing, with the capability to fabricate a part directly from a digital model in a layer-by-layer fashion, has the potential to address this challenge. This talk will report our recent work on developing new additive manufacturing processes to fabricate multiscale and multifunctional structures from nanomaterials and biomaterials. After a brief overview of current 3D printing technology, a freezing nano printing approach to fabricate complex multiscale porous materials will be presented. The key challenges including the thermal management and material diffusion will be discussed. After that, a rapid stereolithography based additive manufacturing technique to fabricate multiscale life-size vascularized cell-laden tissue will be presented. Some promising applications enabled by the 3D-printed structures will also be demonstrated and discussed.



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SPEAKER BIO - Dr. Chi Zhou is an assistant professor in Department of Industrial and Systems Engineering at the University at Buffalo (UB). He received his doctorate in industrial and systems engineering from the University of Southern California in 2012 and his master's degree in computer science from USC in 2010. Prior to joining UB in July 2013, Dr. Zhou was a senior research and development engineer at EnvisionTec Inc. He participated in various R&D projects related to the development of featured 3D printing machines. Dr. Zhou's current research interests are in the areas of computer-aided design and manufacturing (CAD/CAM) related to direct digital manufacturing. His research has been published in high-quality venues. He received several best paper awards in SME and ASME-related conferences and journals. Other major awards he received include the Outstanding Young Manufacturing Engineer Award from the Society of Manufacturing Engineers (SME) in 2014, Young Investigator Award from UB in 2017, and the National Science Foundation Faculty Early Career Development (CAREER) Award in 2019.

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TUESDAY, APRIL 23, 2019
3:30PM – 4:50PM
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