Department of Industrial & Systems Engineering
Cullen College of Engineering

ISE FRIDAY SEMINAR

BROADEN HORIZONS EXTEND MINDS

Professor Chi Zhou
Department of ISE
SUNY University at Buffalo
Buffalo, NY

Date: Friday, October 10, 2025

Time: 1 - 1:50 pm

Location: D2 Lect2

Zoom Meeting ID: 97076565407. **Passcode:** 477211

Additive Manufacturing of Multiscale, Multifunctional Structures

Abstract: Additive manufacturing (3D printing) has emerged as a transformative approach to design and fabricate materials and structures with unprecedented complexity, functionality, and scalability. In this talk, I will present our recent efforts in advancing multi-scale and multi-functional additive manufacturing by integrating novel materials, innovative printing strategies, and cross-scale structural design. First, I will introduce our freeze nano printing platform, which combines inkjet printing with freeze casting to enable the fabrication of materials with both complex macro-architectures and engineered porous microstructures. This hybrid approach leverages freeze-drying to achieve tailored porosity while addressing fundamental challenges such as thermal management and jetting dynamics in high-resolution printing. Next, I will discuss our work on biomass-based 3D printing for sustainable construction applications. Using a direct ink writing (DIW) approach, we transform agricultural byproducts such as wheat straw fibers into lightweight, thermally insulating wall panels, offering a sustainable alternative to conventional building materials. Finally, I will highlight our progress in bioprinting vascularized hydrogel structures using fast stereolithography 3D printing. This approach enables the creation of hierarchical, multi-scale architectures that mimic biological tissue environments, paving the way for advanced biomedical applications. Together, these advances highlight how additive manufacturing can unite functions across scales and drive the next generation of material innovation.

Short Bio: Dr. Chi Zhou is a 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), Exceptional Scholar for Sustained Achievement Award from UB, SUNY Chancellor's Awards for Excellence in Scholarship and Creative Activities, and the National Science Foundation Faculty Early Career Development (CAREER) Award.

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