

The Department of Mechanical Engineering  
College of Engineering and Applied Sciences  
Stony Brook University

## Mechanical Engineering Seminar



**Dr. Tsz-Ho Kwok**

**Assistant Professor, Department of Mechanical, Industrial and Aerospace Engineering  
Concordia University, Montreal, Canada**

### **Lecture Title: Design and Manufacturing in Industry 4.0**

**Monday, December 17, 2018 at 11:00 AM, Room 173 Light Engineering Building**

#### **Abstract**

Industry 4.0 (I4.0) is the new trend of automation and data exchange in manufacturing technologies. It is a fully-integrated, collaborative manufacturing system that responds in real time to meet changing demands and conditions in the factory, in the supply network, and in customer needs. As the next phase in the digitization of the manufacturing sector, the foundation of I4.0 consists of system integration, simulation, Internet of Things (IoT), Augmented Reality (AR), Additive Manufacturing (AM), etc. One major characteristic of I4.0 strategy is the strong customization of products under the conditions of highly flexible production, enabling mass customization. The custom product offers inherent advantages over their mass-produced counterparts, but it is a very difficult task in design. Current Computer-aided Design (CAD) system requires complex operations with high cognitive load, and therefore are difficult for being accessible to users without special training. Moreover, current CAD systems lack support for structural optimization, and users have to use other analysis software and iteratively improve their design back and forth. This design process is complicated and time-consuming, which again prevents the non-expert users from expressing their design intentions. In this seminar, some new design and manufacturing technologies in I4.0 are presented. The topics may include AR-based design interface, machine learning, topology optimization, 4D printing, and soft robotics.

#### **Biography**

Dr. Tsz-Ho Kwok is an Assistant Professor in the Department of Mechanical, Industrial and Aerospace Engineering at the Concordia University, Montreal, Canada. Before joining Concordia, he was a Postdoctoral Research Associate in the Epstein Department of Industrial and Systems Engineering at the University of Southern California. He received his Ph.D. degree in the Department of Mechanical and Automation Engineering from the Chinese University of Hong Kong. His research interests include 3D printing, design for additive manufacturing, functional design and fabrication, cyber-manufacturing system, and mass customization. Dr. Kwok has received several awards including the 8th Chinese Youth Science and Technology Innovation Prize, the Microsoft Research Fellowship Nomination Award, and the CUHK Postgraduate Research Output Award. He serves as an Associate Editor in the Transactions of the Canadian Society for Mechanical Engineering (TCSME) and an Executive Member in ASME CAPPD technical committee.

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