Editorial

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Biographical notes: Prahalada Rao is an Assistant Professor in the Mechanical and Materials Engineering Department at University of Nebraska-Lincoln. His scholastic passion can be encapsulated in three words: manufacturing, sensing, and analytics. His research focuses on thermal modelling, in-process sensor-based monitoring, and diagnosis of additive manufacturing processes (3D printing). He is the recipient of multiple grants from the National Science Foundation (NSF), including the 2018 NSF CAREER award. He earned the 2017 Yoram Koren Outstanding Young Manufacturing Engineer Award by the Society of Manufacturing Engineers.

Olga Wodo is an Assistant Professor in Materials Design and Innovation Department at University at Buffalo. Before that, she was a Postdoctoral Fellow at Iowa State University. She received her PhD in Mechanical Engineering in 2008 from the Czestochowa University of Technology in Poland. Her research interests focus on data-driven approaches as well as microstructure informatics to accelerate design of materials for a wide range of application including energy, nanotechnology, and manufacturing.

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 Master's in Computer Science from USC in 2010. Prior to joining UB in July 2013, he was a senior research and development engineer at EnvisionTec Inc. His current research interests are in the areas of computer-aided design and manufacturing (CAD/CAM) direct digital manufacturing, additive manufacturing for a wide range of applications including energy, and biomedical and electronics.

With the recent advances in automation technologies, data science, process modelling and process control, industries worldwide are at the precipice of the so-called fourth industrial revolution. This impeding paradigm-shift is captured by the term *cyber manufacturing* which envisions a multidisciplinary approach integrating physics-based process modelling, data science, cyber-physical systems, and cloud computing to drive operational excellence and support sustainable manufacturing. This cyber manufacturing vision is further propelled by the rapid dissolution of boundaries separating information technologies and operations-related technologies, which presents opportunities to deploy modelling, sensing and data analytics concepts, heretofore confined at the lab-level, to the plant and enterprise-levels.

For instance, consider the exciting new possibilities offered by additive manufacturing (3D printing). General Electric recently reported that the use of additive manufacturing to make parts for the Cessna Denali aircraft engine decreased the number of components from 855 to 12 and increased fuel efficiency as well as engine power by over 10%. However, poor process consistency and part quality currently afflict additive manufacturing. Cyber manufacturing offers a pathway to mitigate the flaws in additive manufacturing by linking computational models that predict process phenomena with basic materials science, real-time sensing, data analytics, and closed-loop control.

In this special issue are seven papers that range from additive manufacturing, non-traditional manufacturing, subtractive, nano-manufacturing, and robotics that demonstrate an aspect of the cyber manufacturing vision.