

# ISMI 2018 & IEEE SMILE 2018

International Symposium on Semiconductor Manufacturing and  
Intelligence & IEEE International Conference on Smart Manufacturing,  
Industrial & Logistics Engineering

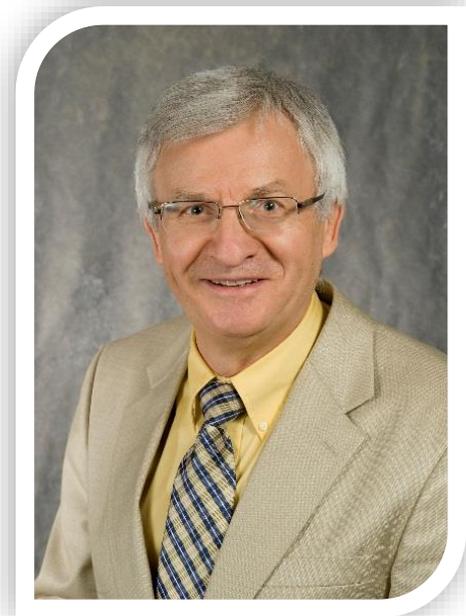


February 7-9, 2018, Hsinchu, Taiwan

## Keynote Speech (I)

### Smart Manufacturing and Big Data

**DR. ANDREW KUSIAK** is a Professor in the Department of Mechanical and Industrial Engineering at The University of Iowa, Iowa City and Director of the Intelligent Systems Laboratory. He has chaired two departments, Industrial Engineering (1988-95) and Mechanical and Industrial Engineering (2010-15). His current research interests include applications of computational intelligence and big data in automation, manufacturing, product development, renewable energy, sustainability, and healthcare. He is the author or coauthor of numerous books and hundreds of technical papers published in journals sponsored by professional societies, such as the Association for the Advancement of Artificial Intelligence, the American Society of Mechanical Engineers, Institute of Industrial Engineers, Institute of Electrical and Electronics Engineers, Nature, and other societies. He speaks frequently at international meetings, conducts professional seminars, and consults for industrial corporations. Dr. Kusiak has served in elected professional society positions as well as various editorial boards of over fifty journals, including five different IEEE Transactions.



Andrew Kusiak  
Professor  
The University of Iowa  
Editor-in-Chief  
Journal of Intelligent Manufacturing

**Abstract**—Smart manufacturing is an emerging form of production encompassing concepts ranging from cyber-physical systems and internet of things to artificial intelligence and data science. Increasing volumes of data are being collected on materials, products, equipment, and events surrounding supply chains, production, and distribution. The data collected is used to enrich decision making with predictive models anticipating events at different time scales and horizons. The key differentiators of smart manufacturing are the greater use of data, predictive capabilities, resource sharing, networking, and sustainability. Driven by big data, predictive engineering offers a new paradigm in constructing high-fidelity models (digital

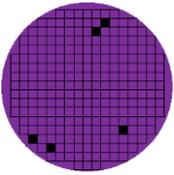


**ISMI**



清華-台積電卓越製造中心  
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representations) of phenomena of interest. Such models allow exploring future spaces, some within the realm of existing technology and others that have not been studied. Resource sharing aims at better utilization of the investments made with benefits expressed in fiscal and sustainability metrics. Sustainability is of paramount importance in smart manufacturing. New forms of manufacturing ranging from shared and distributed to autonomous and tightly integrated enterprises will emerge. Insights into anticipated changes in manufacturing are provided. Leading theories applicable to modeling smart manufacturing are presented. The concepts discussed are illustrated with applications. Professor Kusiak is a Fellow of the Institute of Industrial Engineers and the Editor-in-Chief of the Journal of Intelligent Manufacturing. Details of his research can be viewed at <https://research.engineering.uiowa.edu/kusiak/>.



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