

## **Title: Model-based Data-driven Optimization for Intelligent Manufacturing**

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**Abstract:** Rapid advancements in imaging/computing technologies and machine intelligence have motivated manufacturers to develop online sensing methods to maintain product quality with improved production rate. This talk introduces methods to derive potentially low-cost solutions that combine non-contact field-based measurements with high-fidelity physics-based computational models for process optimization, parameter estimation and direct field-based feedback control. Illustrated with findings from an intelligent machining research involving multi-scale and multi-fields (mechanical, thermal, magnetic and electric), a method to derive closed-form solutions to physics-based models, reconstruct the distributed-parameter physical fields, and infer its system properties from limited measurements for analyzing and controlling its dynamic behaviors, will be presented. This talk will conclude with a discussion on existing challenges and future opportunities in response to global calls for developing new “intelligent” technologies to meet challenges of emerging applications.



**Kok-Meng Lee** ([kokmeng.lee@me.gatech.edu](mailto:kokmeng.lee@me.gatech.edu)), received his M.S. and Ph.D. degrees in mechanical engineering from the Massachusetts Institute of Technology in 1982 and 1985, respectively. He has been with the Georgia Institute of Technology since 1985. As a Professor of mechanical engineering, his research interests include dynamic systems/control, actuators/sensors, mechatronics, machine vision, robotics, and intelligent manufacturing. He is also Distinguished Professor with the School of Mechanical Science and Engineering at the Huazhong University of Science and Technology, and Pao Yu-Kong Chair Professor of the Zhejiang University.

Dr. Lee is a Life Fellow of ASME and a Fellow of IEEE. Currently, he is founding Editor-in-Chief (EIC) for Springer *International Journal of Intelligent Robotics and Applications*, and serves as co-Chair on the Conference Advisory Committee for the *IEEE/ASME International Conference on Advanced Intelligent Mechatronics* since 1997. He was EIC (2008-2013) for *IEEE/ASME Trans. on Mechatronics* (TMech), and served on the Executive Committee of ASME Dynamics Systems and Control Division (2013-2107, Chair 2016). Prior to serving as EIC for TMech, he served as its Technical Editor (1995-1999) and guest edited four focused sections. He had also held representative positions within the IEEE Robotics and Automation Society: served as Associate Editor for its *Trans. on Automation Science and Engineering* (2003-2005), *Trans. on Robotics and Automation* (1994-1998), and *Robotics and Automation Magazine* (1994-1996), and as Chair or Co-Chair for numerous international conferences; and founded/chaired Technical Committees on Manufacturing Automation and on Prototyping for Robotics and Automation.

Recognitions of his research contributions include Presidential Young Investigator (PYI) Award, Sigma Xi Junior Faculty Award, International Hall of Fame New Technology Award, Woodruff Faculty Fellow and more recently, ASME Michael J. Rabins Leadership Award. He is also recognized as advisor for more than ten Best Student Paper and Thesis Awards.