# MANUFACTURING AT MICRO & NANO-DIMENSIONAL SCALES

Placid M. Ferreira
Mechanical Science and Engineering
University of Illinois at Urbana-Champaign

**Abstract:**

Mechanics and transport at the micro and nanoscale offer a rich set of efficient and controllable phenomena that can be exploited in processes for manufacturing at these scales. Using a manufacturing perspective, this talk will identify a few critical challenges in process development, tool design, metrology and integration. Within this framework, the talk will discuss solid-state electrochemical nano-patterning, heterogeneous functional integration and microscale assembly by transfer printing, and micro/mesoscale tools for nanoscale manufacturing. Additionally, we will discuss cyber-frameworks for supporting distributed community-wide generation and curation of data for nanomanufacturing process modeling.

**About the Speaker:**

Placid M. Ferreira is the Tungchao Julia Lu Professor of Mechanical Science and Engineering at Illinois. From 2003 to 2009, he was the director of the Center for Chemical-Electrical-Mechanical Manufacturing Systems (Nano-CEMMS), an NSF-sponsored Nanoscale Science and Engineering Center after which he served as the Head of the Department of Mechanical Science and Engineering at Illinois until August 2015. He graduated with a PhD in Industrial Engineering from Purdue University in 1987, M.Tech (Mechanical) from IIT Bombay, 1982 and B.E. (Mechanical) for University of Bombay in 1980. He has been on the mechanical engineering faculty at Illinois since 1987, serving as the Associate Head for graduate programs and research from 1999 to 2002. From 2009 to 2015 he served as Department Head for Mechanical Science and Engineering.

Professor Ferreira's research and teaching interests are in precision manufacturing and includes computer-controlled machines, nanomanufacturing and metrology. Professor Ferreira received NSF's Presidential Young Investigator Award in 1990, SME's Outstanding Young Investigator Award in 1991, University of Illinois' University Scholar Award in 1994, ASME’s Ennor Award for Manufacturing Technology in 2014 and SME’s Education Award in 2015. He is also a Fellow of ASME, SME and AAAS. He has served on the editorial board of a number of manufacturing-related journals.