

## ***Heterogeneous Functional Integration and Manufacturing at the Micro and Nanoscales***

At Illinois, our research group, working in the Nanoscale Chemical-Electrical-Mechanical Manufacturing Systems (Nano-CEMMS) Center, a NSF-sponsored Nanoscale Science and Engineering Center (NSEC), is exploring and developing new processes and tools that exploit chemical, mechanical, and electronic phenomena and processes for manufacturing at the micro- and nanoscale.

Using a manufacturing perspective, this talk will identify critical challenges in process development, tool design, metrology and integration. Within this framework, the talk will discuss an ambient nanoscale patterning processes it will introduce the idea of heterogeneous functional integration and describe new variants of micro-transfer printing, a process that is central to achieving such integration. Finally, it will discuss new developments in MEMs-scale parallel-kinematic machines for applications in metrology and processing.

### **Placid M. Ferreira**

*Head and the Grayce Wicall Gauthier Professor Mechanical Science and Engineering, University of Illinois at Urbana-Champaign*



Dr. Placid M. Ferreira is the Head and the Grayce Wicall Gauthier 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. 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. Professor Ferreira's research and teaching interests are in the area of precision manufacturing and includes computer-controlled machine-tools, nanomanufacturing and metrology. Professor Ferreira received NSF's Presidential Young Investigator Award in 1990, SME's Outstanding Young Investigator Award in 1991 and the University of Illinois' University Scholar Award in 1994. In 2012 he became an SME Fellow. He has served on the editorial board of a number of manufacturing-related journals.