

University of Southern California

---

**DANIEL J. EPSTEIN DEPARTMENT OF  
INDUSTRIAL AND SYSTEMS ENGINEERING**

---

**EPSTEIN INSTITUTE SEMINAR • ISE 650 SEMINAR**

# ***Heterogeneous Integration and Manufacturing at the Nanoscale***

**Dr. Placid Ferreira**

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

**ABSTRACT:**

Nanoscience – the ‘science of the small’ – produces stunning revelations that, almost daily, redefine the realm of the possible. Yet, the manufacturing processes and systems to transform this new knowledge into technologies and products that benefit us in our daily life are crucial missing elements. 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 methodologies and tools that exploit chemical, mechanical, and electronic phenomena and processes for manufacturing at the nanoscale.

This talk will describe heterogeneous integration in product design as a motivation for a repertoire of micro and nanoscale manufacturing technologies and explore how emerging processes such as electrochemical patterning, microtransfer printing and electro-jet writing provide new possibilities for integrating mechanical, optical and electrical functions into materials. It will also examine challenges in enabling technologies such as positioning and sensing associated with nanoscale manufacturing.

**TUESDAY, MARCH 1, 2011**

**ELECTRICAL ENGINEERING BUILDING (EEB) ROOM 248**

**3:30 – 4:50 PM**

## **BRIEF BIO**

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 industrial automation and include computer-controlled machine-tools, nanomanufacturing and metrology, computational geometry and solid modeling with applications to automated process planning, and the discrete-event control of large-scale flexibly automated systems.

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. He has served as an associate editor and editor for IIE Transactions on Design and Manufacturing and editor for IEEE Transactions on Automation Science and Engineering (2003-2007) and on the editorial board for the International Journal of Computer Integrated Manufacturing.