

# Physics Colloquium

**Michigan Technological University**

Thursday, October 29, 2009 at 4:00 pm

Room 139 Fisher Hall

## **SENSORS: RESEARCH AND REALITY**

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**Abstract:** Significant part of nanotechnology research is devoted to work on nanosensors and it has led to some breakthrough concepts and groundbreaking device demonstrations. However, a very few approaches have been adapted by industry for further development, for implementation in special programs, or for commercialization. This is partly because many results are in the form of laboratory demonstrations and lack answers to “frequently asked technology questions.” Semiconductor industry’s experience of over fifty years is a gold mine of knowledge on developing viable materials, process, device, and system technologies and transitioning them to manufacturing. It can be leveraged for faster advancement of nanotechnology. This presentation will briefly describe some interesting experiences from earlier technologies and lessons learned from them. We will also relate them to some results from the most popular two terminal nanosensors and discuss approaches to carefully evaluating them. Finally, we will discuss efforts that went into building a complete sensor system that was field tested at a customer site.

**Biography:** Dr. Pramod C. Karulkar is an industry consultant and has worked in microelectronics R&D and pilot manufacturing for nearly three decades in industrial, government, and academic environments. He was instrumental in developing application specific materials, processes, devices, and system components in a broad range of technologies including solid state sensors, superconducting devices, silicon, SOS, and SOI integrated circuits, multichip modules, advanced packaging technologies, and high performance interconnect. His professional interests are in advanced electronic systems, microfabrication technology, nanotechnology, and solid-state devices. He is an author for over 60 publications, three patents, and has coauthored a book on electronic industry.