



**Nanotechnology Conference
IEEE Southeastern Michigan Section
Wednesday, November 18, 2009
11am – 8pm
Eagle Crest Conference Center, Ypsilanti**

Invited Speaker for Nanotechnology



**"Integrating Nanotechnology Into Sensors, Lab-on-chip Systems
and Other Electronic Devices"**

Prof. Cindy Harnett, Ph.D.

Electrical and Computer Engineering Department, University of Louisville
Chair, Nanotechnology Committee, IEEE Instrumentation and Measurement Society

Abstract:

Nanomaterials offer the enticing prospect of controlling the surface properties of microfabricated electronic devices at the sub-micron scale without nanoscale lithography. Because the term "nanomaterials" can mean different things to different researchers, this topic will be presented through three general categories of nanomaterials: chemicals applied in the liquid phase, structured nanomaterials such as carbon nanotubes, and thin films with engineered properties. Examples include:

- Aligning liquid crystals in displays, polarizers, sensors and other applications using self-assembled monolayer control surfaces.
- Integrating carbon nanotubes with microfabricated electrodes for impedance-based chemical sensing in "lab on chip" systems.
- Applying thin films with engineered stress for self-assembled three-dimensional electrodes, actuators and resonators (the "nano-origami" concept).

This presentation introduces engineers to some of the available materials, techniques, equipment and motivations for integrating nanotechnology into existing and future electronic devices.

Bio:

Cindy Harnett is currently an assistant professor of Electrical and Computer Engineering at the University of Louisville. Her research group works in the area of sensors and smart materials, producing new functionality through three-dimensional arrangements of insulators, conductors, sensors, and actuators from the nano to macro scale. The Ph.D., Masters, and undergraduate student researchers investigate nanomaterial-based chemical sensor elements, microfluidic sensors, microfabricated resonant structures for sensing and data transmission, and calibration systems for retrieving accurate sensor data.

Previously, Cindy worked for four years at Sandia National Laboratories (California) in microfluidics and "lab-on-a-chip" systems, after a one-year postdoc at Cornell developing materials for nanolithography. Cindy received a Ph.D. in 2000 from Cornell University in Applied and Engineering Physics, in the research area of micro- and nanofabricated devices, and a BS in physics from Harvey Mudd College in California. She is the recipient of a NSF CAREER award in the area of wireless environmental sensors, and currently has about 50 research contributions, including journal publications, research presentations, patents and conference proceedings. She regularly teaches undergraduate and graduate courses in electromagnetics and numerical analysis software (MATLAB) at the University of Louisville, with a new Microfluidics graduate course slated for spring 2010.

Service activities include reviewing manuscripts (IEEE Transactions on Instrumentation and Measurement, Lab-on-a-Chip, Langmuir, and Biosensors and Bioelectronics) and proposals (U.S. National Science Foundation). She is the Technical Committee Chair of TC-34, Nanotechnology in Information and Measurement, in the IEEE Instrumentation and Measurement Society (IMS) and contributed a tutorial on wireless networks in environmental measurements at the annual IMS conference in 2009.

The Full Day Schedule is online <http://www.ieee-sem.org> → calendar → Nanotechnology Conference. Conference organized by the IEEE Nanotechnology Council Southeastern Michigan Chapter. Speaker provided by IEEE Technology Management Council Chapter and IEEE Aerospace and Electronic Systems Society Chapter. Registration required.