

Spring 2008 SEMINAR SERIES

F21C Bioprocessing & Biosensing Center

• DIVISION OF FOOD SYSTEMS & BIOENGINEERING •

PRESENTER:

Dr. Terry L. Smith

3M Company, Corporate Research Materials Laboratory
St. Paul, Minnesota

TITLE:

New Directions in Optical Micro-Resonator Based Bio-Sensors

ABSTRACT:

Optical micro-resonators based on micro-spheres, tori, capillaries, and integrated optical cavities have been widely investigated for optical bio-sensing applications. By coating the surfaces of these structures with specific binding chemistries such as antibodies, and monitoring the resonant frequency shift induced by the interaction of the evanescent optical field with bound species, very low detection limits can be achieved. However, most of the approaches investigated to date suffer from disadvantages related to manufacturability, stability, or system cost. Here we present a new approach to the use of optical micro-resonators for sensing, that relies upon the interaction of the evanescent field with metal nanoparticle taggants. This approach not only results in enhanced frequency shifts, but also enables a new sensing mode based on the fact that the nanoparticles can induce coupling between forward and backward modes propagating in the resonator. Using this effect, simple, cost-effective systems can be realized.

BIOGRAPHY:

Terry L. Smith joined 3M in 1979, after receiving a Ph.D. in Physics from the University of Illinois, Urbana-Champaign. His 3M career has included development of a variety of optoelectronic devices and systems, including x-ray imagers, optical recording media, electro-photographic systems, ZnSe blue-green laser diodes, lithium niobate integrated optical switches and fiber gyroscope chips, parallel fiber-optic data links, fiber-optic Bragg gratings, dispersion compensation systems, and micro-mechanically self-aligned optical splitters for Fiber-to-the-Home networks. He currently leads the Optical Physics Group in the Corporate Research Materials Laboratory, pursuing programs in integrated optical sensors and visible light-emitting devices.

DATE • TIME • LOCATION:

Tuesday, February 12, 2008, 4:00 pm

Ag Eng Bldg 105 • Refreshments