

## Construction of Convenient Biosensors Based on Optical Techniques

**Dr. Qiaoli Yue**  
**Liaocheng University & Utah State University**

**Friday, October 2nd, 2015**

**Lecture: 9:00 AM-10:00 AM**  
**ENGINEERING CENTER**  
**ROOM EC 2300**  
**10555 WEST FLAGLER STREET**  
**MIAMI, FL 33174**



**Abstract:** Optical biosensors, as a powerful alternative to conventional analytical and biochemical techniques, enable the highly sensitive, real-time, and high-frequency monitoring of analyte without extensive sample preparation. In concept, optical biosensors are those based on the detection of changes on absorption of UV/visible/Infrared light when chemical reactions occur or on the quantity of light emitted by some luminescent process. Our research is focused on developing precise, sensitive, specific, rapid, and easy-to-use biosensor using functional biorecognition materials like aptamers, proteins, mitochondrion and whole cells based on the enhancement of nanostructured substances. These materials provide specificity through use of specific receptors and enhance sensitivity through optical amplification, and they employ materials that can integrate naturally with tissue, such as nanoclusters and nanoparticle suspensions. With an emphasis on monitoring of cancer cells and the mitochondrial diseases, we have demonstrated hydrogel-based biochemical sensors that change optical properties as measured by luminescence intensity, lifetime, and fluorescence correlated spectrum. This talk will describe several examples of these materials and the underlying motivation for their design, particularly highlighting the major challenges to long-term monitoring. To conclude the talk, recent *in vivo* observations revealing interesting apparent physiological changes will be presented. The data illustrate the feasibility of this approach, but also open new questions and new ideas about the value of collecting chemical information continuously.

**Biography** Dr. Qiaoli Yue is an associate professor in the School of Chemistry & Chemical Engineering. She has a broad engineering background, with specific training in instrumentation, optics, biosensor technology, and biomaterials with extensive experience in micro/nanostructures for sensor materials. Dr. Yue currently is a visiting professor in the Department of Chemistry & Biochemistry of Utah State University. Over the past 5 years, she has pioneered the application of nanoparticles' enhancement for development of optical biosensing systems, including some poisonous metal ions, DNA sequence and protein. This research is primarily funded by National Science Foundation of China, and has resulted in approximately 30 journal papers.

**Contact:** [claudia.estrada1@fiu.edu](mailto:claudia.estrada1@fiu.edu), Office: 305-348-6717

**Map:** <http://campusmaps.fiu.edu/Engineering Center>