

UC SAN DIEGO NANOENGINEERING

Wednesday, March 29, 2017

Seminar Presentation: 11:00am – 12:00pm

Cymer Conference Center, SME 248

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Optical biosensors for point-of-care applications

Abstract:

Detection of biologically relevant targets such as microorganisms, DNA, proteins, or small molecules at low concentrations is important for applications in medical diagnostics, pharmaceutical development, food safety, defense, and environmental monitoring. Of particular interest are point-of-care biosensing systems that can be employed outside of a laboratory environment and without the need of highly trained staff. Our work is focused on the design of label-free biosensing schemes which employ micro- and nano-structured silicon surfaces, as the optical transducer element, interfaced with relevant capture probes (e.g., antibodies and aptamers). We demonstrate rapid and sensitive detection of a wide variety of common environmental pollutants, ranging from pathogenic bacteria to chemical toxins. Importantly, we show that our biosensors can identify their targets in complex biological fluids. Thus, these systems offer the possibility of designing highly stable and specific label-free biosensors, holding immense potential for application in detection of a broad range of targets, in a simple yet reliable manner. In this lecture, I will highlight design principles employed to engineer these biosensors, and I will discuss the evaluation and application of these platforms in pre-clinical and pre-industrial environments.

Biosketch:

Dr. Segal is an Associate Professor of Biotechnology and Food Engineering at the Technion – Israel Institute of Technology, Haifa, Israel. The research in her group focuses on the broad interface between materials science and biotechnology to address problems in food safety, medical diagnostics and therapy. Dr. Segal trained at the University of California – San Diego, where she was a Rothschild postdoctoral fellow (2004-2007); she obtained her PhD in Chemical Engineering from the Technion (2000-2004). Dr. Segal has authored more than 80 peer-reviewed journal articles, reviews, book chapters, and patents. She has received numerous prestigious fellowships and prizes over the course of her career, most recently the Hershel Rich Innovation Award for 2016. She has been recognized with the Excellence in Teaching Award at the Technion every year since 2009 and in 2015 she was awarded with the prestigious Yanai Prize for Excellence in Academic Education. Research in the Segal Lab is funded through grants from European Union's Horizon 2020 research and innovation programme, Israel Science Foundation, German Research Foundation, Israel Ministry of Science, and Institut Mérieux.