

Portable Nano-Engineered Biosensors for Environmental and Food Safety Applications

Silvana Andreescu

**Department of Chemistry and Biomolecular Science
Clarkson University**

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Seminar host: Sonal Padalkar**

Abstract

The demand for inexpensive field portable devices that could respond to the today's needs for low cost and rapid detection with on-site measurement capabilities is growing. This presentation will discuss development, scalable manufacturing, analytical characterization and deployment of portable biosensors that incorporate functional nanoparticles and receptor molecules, and their application for environmental and food monitoring. To fabricate the sensors, we use nanoparticles that have tunable redox activity, optical and catalytic properties and can transduce and catalytically amplify signals in chemical and biological detection schemes involving biomolecules. Examples of sensors that utilize printable paper as a functional (bio)sensing platform, modification of paper and procedures enabling roll-to-roll fabrication will be discussed. A unique feature of these devices is the built-in detection mechanism with all the sensing components needed for analysis fixed onto the sensing platform that can function as an integrated all-in-one device. The sensors have been interfaced with portable databases and user-friendly signal transduction methods, and have demonstrated excellent analytical performance when used in the field. Several prototype systems designed for environmental and food safety monitoring will be discussed, with examples of applications.

Dr. **Silvana Andreescu** is the Egon Matijević Chair in Chemistry and Professor of Bioanalytical Chemistry in the Department of Chemistry and Biomolecular Science at Clarkson University in Potsdam, NY. She has received a PhD in Chemistry, specializing in biosensors from the University of Perpignan, France, and University of Bucharest, Romania in 2002, and has been a member of the Clarkson faculty since 2005. Between 2003 and 2005 she was a NSF-NATO postdoctoral fellow at the State University of New York at Binghamton. Her research interests are in analytical and bioanalytical chemistry, bio-nanotechnology, environmental nanotechnology and development of practical biosensors for clinical and environmental monitoring. Recent work involves the use of nano-impact methods to characterize surface properties and reactivity of nanoparticles for environmental and health safety assessment and sensing applications. She is the recipient of a French Government Graduate Fellowship, a NATO-NSF Postdoctoral Fellowship, the NSF-CAREER award, the John W. Graham Faculty Research Award, the Research Excellence Award and a Member of the Million Dollars Club at Clarkson University.

This seminar counts towards the ME 600 seminar requirement for Mechanical Engineering graduate students.

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