

Joint Analytical & Chemical Biology Seminar

Thursday, April 7, 2011 at 12:15 p.m.
Room 1315, Chemistry



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Multiparameter Biomolecular Analysis Using Chip-Integrated Silicon Photonic Sensor Arrays: Technology Development for Personalized Medicine

The concept of personalized medicine is predicated on an ability to comprehend a patient's disease state in a highly informed manner that ideally illuminates an effective, molecularly-targeted treatment strategy. A growing body of evidence suggests that the simultaneous measurement of 10s, 100s, or even 1000s of biomolecular signatures (DNA, RNA, proteins, metabolites, etc.) from a single clinically relevant sample would be incredibly enabling in achieving such an informative diagnosis. Unfortunately, this is an analytical feat that is currently not possible using established methods, thereby limiting the implementation of informative molecular diagnostic and theragnostic strategies in the clinical treatment of disease. In response to this and other bioanalytical challenges that simultaneously require high sensitivity, high level multiplexing capability, and scalable and cost effective sensor fabrication, our group is developing a new biomolecular analysis platform based upon silicon photonic microring resonators. This detection strategy leverages well validated semiconductor fabrication, laser sources from optic telecommunications, and conventional microarraying tools to create highly multiplexed and robust biosensor arrays that are extraordinarily sensitive to biomolecular binding events. In this talk I will describe our efforts to develop this emerging platform for the analysis of disease-relevant protein and nucleic acid biomarkers in the context of creating multiplexed detection solutions for a range of both clinical diagnostic and fundamental bioanalytical challenges.