



## Rare Cell Analyzer for the Next Generation Diagnostics Platform

**Date** : Friday, March 2, 2018

**Time** : 4:00 pm – 5:00pm

**Location** : Neckers 240

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### **Abstract:**

Advances in microfluidics and nanotechnology are driving analytics toward single-cell sensitivity and higher specificity. Nanoparticle amplification can increase the sensitivity of immunoassays to  $\sim 10$  cells/ $\mu\text{L}$ , which is necessary to test blood drops in a point-of-care (POC) setting for clinical analysis of proteins/nucleic acids. However, current *in-vitro* diagnostic systems for single cell analysis have several pitfalls for large-scale population studies, and fluidic biopsies are currently prohibitively expensive. Diagnostic simplification in the Rare Cell Analyzer has been achieved by coupling nanoparticles for single cell sensitivity within miniaturized microfluidic systems, and integrating an affinity-based mass spectrometry (MS) platform known as signal ion emission reactive release amplification (SIERRA) for multiplexing and quantitation. Hundreds of different proteins can be captured and analyzed from a clinical sample without interference from the blood matrix, or the loss of cytological imaging information. The sample also remains stable for more than 30 days after isolation. This platform allows rapid molecular phenotyping by detection of antigens using highly multiplexed diagnostic immunoassays while providing for confirmatory genotyping by detection of nucleic acids using the polymerase chain reaction, PCR.

### **Bio:**

Michael Puglia is the Research Fellow & Director of the Single Cell Analytics Center (SCBC) at Indiana Biosciences Research Institute in Indianapolis. He received his B.S. degree from Clarkson University in Potsdam his Ph.D. degree from the Texas Tech University at Lubbock, and conducted his industrial research and development with Bayer and Siemen Healthcare from the former Miles Laboratory sites for Ames Diagnostics. He was the Principal Key Expert for Strategic Innovations for the Diagnostic Division of Siemens Healthcare. Dr. Puglia's research addresses the challenges associated with diagnosis for personalization of medicines in human diseases.