

# Departmental Seminar Announcement

**Mass Spectrometry Imaging Beyond “Show & Tell”:  
100 nm-Scale Imaging and Identification of Molecular Chemistry  
by Parallel Imaging MS/MS**

**Dr. Gregory L. Fisher**

**Principal Scientist at Physical Electronics**

The fundamental limitation of rapid high lateral resolution mass spectrometry (MS) imaging, e.g. TOF-SIMS, has been the lack of a capability for unambiguous molecular identification; tandem MS is a common approach employed for molecular identification. A unique TOF-TOF imaging mass spectrometer, introduced globally in 2016, allows conventional TOF-SIMS (MS1) analysis and tandem MS (MS2) analysis to be achieved simultaneously and in parallel as demonstrated by the data shown in Figure 1. Secondary ions for MS1 and MS2 analysis are produced from the same area of the surface by a pulsed and digitally raster-scanned primary ion nanoprobe. Practical lateral resolution ( $\Delta l$ ) in both MS1 and MS2 images is always  $< 1 \mu\text{m}$  and is often  $\leq 100 \text{ nm}$ . The sensitivity of the new TOF-TOF imaging mass spectrometer is high such that precious and one-of-a-kind samples may be probed without erosion or degradation of the specimen; even sub-monolayer films have been characterized. Monoisotopic (1 Da) precursor selection combined with keV collision-induced dissociation (CID) enables molecular identification. The Parallel Imaging MS/MS capability has been brought to bear for straightforward molecular identification as well as multifaceted studies involving surface modification, biology, polymers, composites, and forensic / failure analysis. Discussion of MS imaging will begin with materials analysis wherein the Parallel Imaging MS/MS characteristics are readily described and understood, and then examples of biosynthesis and sub-cellular structural elucidation will be presented for discussion.

**Date: Friday, April 20, 2018**

**Time: 11:00 a.m. to 12:00 p.m.**

**Location: DM -100, MMC (Live)**

**Marine Sciences Building Room 105 (MSB-105) – BBC (via Polycom)**



**FLORIDA  
INTERNATIONAL  
UNIVERSITY**

Phone: 305-348-2605

Fax: 305-348-6700

E-mail: [chemistry@fiu.edu](mailto:chemistry@fiu.edu)

<http://chemistry.fiu.edu>