“Ambient Imaging of Biological Samples Using Nanospray Desorption Electrospray Ionization (nano-DESI) Mass Spectrometry”

Mass spectrometry imaging (MSI) is a powerful technique for studying the localization of lipids, metabolites, and proteins in biological samples. We have developed nanospray desorption electrospray ionization (nano-DESI), an ambient ionization technique that relies on localized liquid extraction of analyte molecules from the sample into a liquid bridge formed between two glass capillaries. The extracted analytes are transferred to a mass spectrometer inlet and ionized by electrospray ionization. Nano-DESI enables quantitative imaging of biomolecules in fully hydrated samples with minimal or no sample pre-treatment. Simultaneous imaging of sample topography and chemical composition has been achieved by coupling nano-DESI MSI with shear force microscopy. This multimodal imaging approach has enabled imaging of living microbial communities with a complex topography and high-spatial-resolution imaging of tissue sections providing an unprecedented depth of chemical information in each imaging experiment. Recent developments in the nano-DESI MSI instrumentation have enabled quantitative imaging of lipids and metabolites in tissues with high sensitivity and spatial resolution down to 8-10 microns using finely pulled capillaries. Furthermore, we have developed a microfluidic nano-DESI probe, which greatly simplifies the experimental setup and demonstrates similar performance to the capillary probe. In this talk, I will introduce the technique, highlight the most important developments of nano-DESI MSI instrumentation, and discuss several applications of nano-DESI MSI.

Date: Thursday, March 4
Time: 12:05 PM (CT)
Host: Dylan Tabang