

UNIVERSITY OF RHODE ISLAND
Department of Chemistry
SEMINAR

3:00 PM, Monday, November 14, 2022
Room 105 – Beaupre Center

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Mass Spectrometry Imaging of
Nanomaterial Delivery Systems and their
Biochemical Effects

HOST

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Nanomaterial (NM)-based delivery systems are attractive for drug treatments due to their ability to deliver a wide range of therapies such as siRNA, proteins, and small molecule drugs. While NM-based drug delivery systems have great potential, there is a need for tools to map their biodistributions and their biochemical effects to most effectively use these systems. To meet this need, we are developing and applying mass spectrometry (MS) imaging techniques.

In my presentation, I will discuss three complementary MS-based imaging tools that we have developed and used to monitor the sub-organ distributions of metal-based and polymeric NMs in tissues. One of these techniques, laser desorption/ionization (LDI)-MS, selectively determines the spatial distributions of NMs in the tissues, providing new insight into how NM surface properties dictate their biodistributions. A second technique, laser ablation inductively-coupled plasma (LA-ICP)-MS imaging, provides quantitative information about NM distributions, and when combined with LDI-MS imaging, the two techniques together can provide site-specific information about NM stability *in vivo*. A third method, MALDI-MS imaging, provides site-specific information about the biochemical effects of the presence of the NMs. Altogether, these tools provide new chemical and biochemical insight that are helping improve the development of NM delivery systems.