



DEPARTMENT OF
Chemistry
UNIVERSITY OF WISCONSIN-MADISON

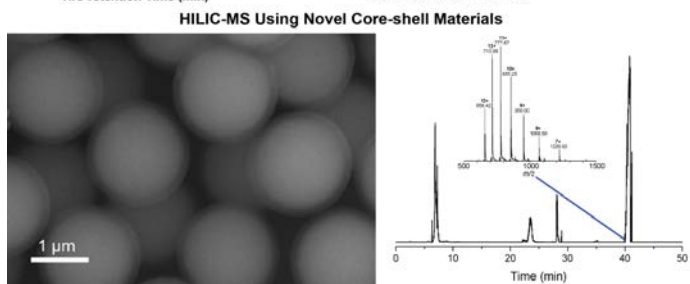
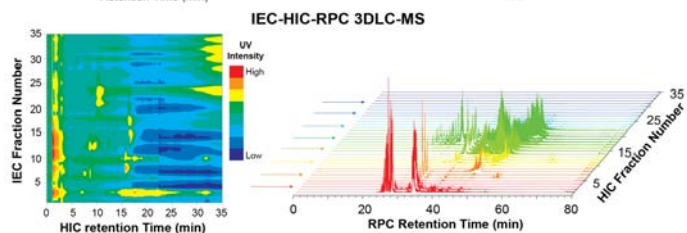
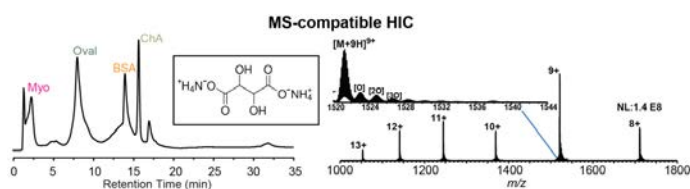
Ph.D. Dissertation Defense

Lichen Xiu

Song Jin Research Group

“Development of new materials and chromatographic methods for top-down proteomics”

Abstract: Despite recent advances in mass spectrometry (MS)-based top-down proteomics, separation of intact proteins remains challenging. To address the complexity of the proteome, novel materials and chromatographic methods have been developed in this work. Initially, we have identified ammonium tartrate as a MS-compatible salt for hydrophobic interaction chromatography (HIC) with comparable separation performance, and achieved effective high-resolution intact protein separation by coupling HIC and reverse phase chromatography (RPC). Furthermore, we have developed a novel three-dimensional liquid chromatography (3DLC) platform by coupling ion exchange chromatography (IEC) with HIC and RPC, and demonstrated a significant 13-fold enhancement of protein identification via top-down proteomics compared to conventional IEC-RPC 2DLC. Lastly, we have studied the synthesis of uniform 1.8 μm core-shell mesoporous silica particles with tunable pore sizes varying from 5 nm to 30 nm, and achieved a hydrophilic surface modification with gluconamide; the novel material was evaluated on (hydrophilic interaction chromatography) HILIC separation and online HILIC-MS, showing a great potential for improvement in separation for top-down proteomics.



Wednesday, May 30, 2018
1:00 pm
Room 9341 Chemistry