

**UNIVERSITY OF RHODE ISLAND**  
**Department of Chemistry**  
**SEMINAR**

**Room 105 Beupre Center**  
**2:00 p.m, Friday, April 26, 2019**

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**“Synthesis and Characterization of Novel  
Materials for the Detection and Removal  
of Toxicants”**

**HOST**

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# **Synthesis and Characterization of Novel Materials for the Detection and Removal of Toxicants**

## **Abstract**

Over the course of my PhD I have developed several novel fluorescent conjugated polymer (CP) architectures for the detection of small molecule toxicants. These CPs provide a fast and simple detection system that can be used when traditional detection methods, such as gas chromatography (GC), mass spectroscopy (MS), GC-MS, and high-performance liquid chromatography (HPLC), are too expensive, time consuming, or inaccessible. The CPs were aggregated as nanoparticles to create a sensitive detection system in aqueous environment for the fluorescent detection of pesticides, herbicides, plasticizers, and polycyclic aromatic hydrocarbons (PAHs). These CP nanoparticles (CPNs) were able to detect low concentrations of toxicant (as low as 10 ppm in some cases), as well as differentiate between structurally similar toxicants. Having addressed the detection of small molecule toxicants I have also developed several novel metal-organic frameworks (MOFs) for the removal of these toxicants from aqueous environment. While all of the MOFs showed a modest ability to remove toxicants, one of the MOFs demonstrated great promise for the removal of small molecule toxicants from aqueous environment.