



## **Analytical Chemistry Seminar**

**Tuesday, January 25, 2022  
3:30PM, WTHR 320**

### ***“Smart Materials as Chemically Alterable Chromatographic Stationary Phases”***



**Emily Halpern**  
**Department of Chemistry, Purdue University**

#### **Abstract**

Chromatography is an essential analytical tool used for the separation of complex mixtures. Although widely used, current chromatographic methods have several limitations that result in complex, lengthy, and expensive systems. Liquid chromatography, for example, produces large amounts of organic solvent waste due to lengthy separation and cleaning times and requires extensive method development. Gas chromatography is constrained to the analysis of thermally stable compounds. In addition, two-dimensional chromatography, developed only more recently for its improved resolution, is still limited in scope as it requires two separate columns and involves complex switching mechanisms. To combat the limitations and complexities of current chromatographic techniques, “smart” materials, or stimuli responsive materials, have been developed as refined stationary phases for both liquid and gas chromatography. “Smart” material stationary phases allow for reversible and predictable modification of compound retention using changes in temperature, pH, and light. They improve separation capabilities in water mobile phases, enhance selectivity, and allow for singular column two-dimensional chromatography and fast cold-water cleaning. This seminar will present stimuli responsive polymers that have been used in separations, and the strengths and challenges that emerge with this type of column.