



**EEE Research Seminar**  
**DATE: Tuesday, November 14, 2017**  
**TIME: 10:30 A.M.**  
**LOCATION: Fu Room POTR 234**

**Dr. Marissa Tousley, Assistant Professor  
Chemical Engineering at Rose-Hulman Institute of  
Technology**



**“Using Molecular-Level Assembly to Develop Next Generation Membranes”**

**Abstract**

Membrane-based desalination and aqueous separation processes are crucial for providing clean, freshwater resources to meet our personal, agricultural, and industrial needs. Polyamide thin-film composite (TFC) membranes are the current state-of-the-art technology for these separation processes. While polyamide TFC membranes are high performing, they have intrinsic drawbacks, including the empirical nature of interfacial polymerization and the permeability-selectivity trade-off, that limit their use in certain applications and hinder our fundamental understanding of membrane transport processes. This talk will discuss two molecular-level assembly approaches that can be used to overcome these challenges related to the membrane selective layer: (i) molecular layer-by-layer assembly (mLbL) and (ii) liquid crystal self-assembly. Specifically, the use of mLbL assembly to create polyamide selective layers with tunable and homogenous chemical functionality and the use of magnetically aligned liquid crystalline templates to develop materials with narrow pore size distribution will be addressed. Engaging undergraduates and adapting these projects to be suitable for an undergraduate research environment (i.e. Rose-Hulman Institute of Technology) will also be discussed.

**Bio**

Dr. Marissa Tousley is an Assistant Professor of Chemical Engineering at Rose-Hulman Institute of Technology, a teaching-focused undergraduate institution specializing in STEM education. Her research background is in the development of novel materials for membrane-based separations. Marissa received a B.S. in Materials Science and Engineering from Alfred University and a Ph.D. in Chemical and Environmental Engineering from Yale University.