



COLLEGE OF ENGINEERING

SEMINAR ANNOUNCEMENT

“Re-Designing Membranes: Electrospun Nanofibers for Control of Structure and Material Properties”

Presented by Dr. Laura H. Arias Chavez

Abstract

Several membrane-based technologies are emerging as potential bridges to sustainability at the water – energy nexus, with additional applications in agriculture, medicine, and other industries. However, production of high performance membranes to enable the beneficial use of these technologies still faces a variety of challenges. Suitable membranes must simultaneously achieve perm-selectivity, material stability, mechanical integrity, and fouling resistance while remaining manufacturable and relatively cheap. This talk explores the use of electrospinning for its potential in fabricating specialized nanofiber membranes that fit the needs of forward and pressure-retarded osmosis. Electrospinning forms nanofibers from a wide variety of materials, achieving fiber diameters orders of magnitude smaller than those possible with traditional mechanical means. The small fiber diameters and high porosity of the electrospun fiber mat will be exploited to advance membrane design in two ways. First, a unique hybrid structure that improves mechanical integrity without compromising transport performance is presented. Second, nanofiber structures are electrospun from block copolymers to obtain fibers having independently tailored surface and bulk properties. This work demonstrates the capability of electrospinning to enable nanoscale control over structure and material properties to surpass the limitations of conventional polymeric membrane fabrication techniques. Potential collaborations beyond these areas will also be highlighted.

About the Speaker

Laura Arias Chavez is an Assistant Professor in the Department of Chemical Engineering. Prior to appointment at Tennessee Tech, she earned her Ph.D. and M.S. in Chemical & Environmental Engineering at Yale University, where her research was supported by a “Science to Achieve Results” (STAR) fellowship from the Environmental Protection Agency. Her broader interests include green energy production, decentralized and low energy water treatment, desalination, and reclamation of energy and materials from waste streams.

Date: Monday, October 27, 2014

Time: Noon – 1:00 p.m.

Bring your own lunch; beverages and snacks to be provided.

Location: Prescott 225