

UNIVERSITY OF CONNECTICUT



**INSTITUTE OF MATERIALS SCIENCE**

## **POLYMER PROGRAM SEMINAR**

**“Electronic and Optical Devices via Additive Driven Self-Assembly and Nanoimprint Lithography: Towards Solution-Based Roll-to-Roll Nanomanufacturing”**

**Prof. James Watkins  
University of Massachusetts, Amherst**

**Friday, September 5, 2014  
11:00 AM, IMS Room 20**

Roll-to-roll (R2R) technologies offer the potential for continuous and cost-efficient production of materials and devices but their applications in nanomanufacturing have remained extremely challenging. We have outlined a strategy for nanoscale device fabrication that includes nanoparticle driven self-assembly to produce well-ordered polymer/nanoparticle hybrid materials with domain sizes ranging from less than 10 nm to more than 125 nm that can serve as active device layers and R2R nanoimprint lithography for device scale patterning at length scales greater than 50 nm. We also employ highly filled nanoparticle/polymer hybrids for applications that require tailored dielectric constant or refractive index. Finally, we have developed a new process that allows direct printing of patterned crystalline metal oxide films and composites with feature sizes of less than 100 nm. This approach is an attractive alternative to conventional subtractive processing using Si wafer-based platforms and can enable large area production of fully printed devices. Each of these methods can be scaled in our newly constructed R2R process and demonstration facility. Applications in flexible electronics, light and energy management, lighting, and sensors and will be discussed.

*\*For further information, please contact YH Chudy [yhchudy@ims.uconn.edu](mailto:yhchudy@ims.uconn.edu)*

*Polymer Program, Institute of Materials Science, University of Connecticut, Storrs, CT 06269-3136 [polymer.ims.uconn.edu](http://polymer.ims.uconn.edu)*

