

CHEMICAL ENGINEERING

SEMINAR SERIES



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Alberta Innovates Industry Chair for Solar Energy
Editor-In-Chief AICHe *Chemistry of Materials*

Polymers and Patterns: Directed Self-Assembly for Nanolithography

ABSTRACT: Nanopatterned surfaces are of central importance to a variety of areas and applications, such as computer chip architectures, tissue interfacing, biosensors, light management and plasmonics, among others. Typically, the various approaches to nanopatterning of surfaces, including silicon, are broken into two major classes: top-down methods such as photolithography, e-beam lithography and scanning force microscopy variants, and bottom-up synthetic techniques, including self-assembly. Since lithography is the single most expensive step in computer chip manufacturing, the use of self-assembled block copolymers (BCPs) templates on surfaces is being seriously considered by the semiconductor industry to pattern sub-20 nm features on a semiconductor surface; the IndustryTechnology Roadmap for Semiconductors (ITRS) terms this approach “directed self-assembly”, or DSA. Here, we will describe the remarkable versatility of using BCPs, polymers that contain sufficient chemical information to form highly ordered templates over large areas. These templates, which range from arrays of parallel lines, to dots, to much more complex Moir_ superlattice patterns, can be converted into functional materials, such as metal nanostructures, molecules-on-silicon, and plasmonic stamps.

RECEPTION 3:30 • LECTURE 4:00 – 5:00
PHYSICS ASTRONOMY BLDG. PAA A 110



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BIOGRAPHY: Jillian Buriak holds the Canada Research Chair of Nanomaterials for Energy, and the Alberta Innovates Industry Chair for Solar Energy. She is presently Editor-in-Chief of the American Chemical Society journal, Chemistry of Materials. Buriak received an A.B. from Harvard University in 1990, and a Ph.D. from the Université Louis Pasteur in Strasbourg, France, in 1995. After an NSERC postdoctoral appointment at The Scripps Research Institute in La Jolla, California, Buriak started her independent faculty career at Purdue University in 1997, being promoted to associate professor, with tenure, in 2001. In 2003 she joined the University of Alberta and the National Institute for Nanotechnology as a full professor and Canada Research Chair. Buriak is a Fellow of the American Association for the Advancement of Science, the Royal Society of Chemistry (UK), and the Royal Society of Canada. Recent awards include the Arthur Doolittle Award from the Polymer Materials Science and Engineering Division (PMSE) of the American Chemical Society (ACS), the Rio Tinto Alcan Award of the Canadian Society for Chemistry (CSC), the Burghausen Award from the City of Burghausen, Germany, the E. W. R. Steacie Award from the CSC, and others. Before joining Chemistry of Materials, Buriak was on the Board of Reviewing Editors (BoRE) at Science from 2003 to 2008, was an Associate Editor at ACS Nano from 2009 to 2013.

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