



Lecture Series in Nanoscience and Nanotechnology

Sponsored by the Center for High-Rate Nanomanufacturing

Patterning Technologies for Nanofabrication: Top Down and Bottom Up

Presented by
Dr. Gregory M. Wallraff
IBM Almaden Research Center

Where & When

Snell Library 90
Northeastern University
Friday, November 6, 2009
10:00AM-11:00AM

Abstract

Semiconductor lithography is facing tremendous challenges as device feature sizes shrink below 30 nanometers. These "top down" patterning techniques are facing the fundamental limitations from both imaging physics and photoresist chemistry. As a consequence there is an interest in merging the self-assembly "bottom-up" techniques being developed in many laboratories with "top down" microfabrication technology. In this approach conventional lithography would be used to create templates for the self assembly of nanostructures with sub-lithographic features having the addressability and registration required for integration into functional devices.

In this presentation I will describe the current status of semiconductor lithography and discuss next generation technology. Next I will describe templated self assembly of artificial DNA nanostructures (DNA origami¹) on lithographically patterned substrates. AFM imaging results will be described on both planar chemically patterned surfaces and topographically patterned surfaces fabricated using either electron-beam or optical photoresist based lithography. The placement of individual triangular DNA nanostructures with excellent site selectivity and alignment will be demonstrated.

1. P.W.K. Rothmund, Nature 2006 440, 297-302

Bio

Gregory Wallraff joined the IBM Almaden Research Center in 1987. Since then he has been involved in the development of photoresists for optical and ebeam lithography most recently with an emphasis on 193 nm immersion and EUV lithography technologies.

Please RSVP to Kristen Eaton at keaton@coe.neu.edu or 617-373-6012