## *"The Challenge of Nano: Making Patterns on the Size Scale of Molecules"*

**While there has been dramatic progress in developing photoresists that permit sub-50 nm patterning, there remain significant challenges in going well below that size. Block copolymers offer a means to resolve this impasse, but like any other resist system they have distinct limitations. We have been investigating several block copolymers, that have in common a functional, polar block and a readily scissionable block due to their potential for patterning by both bottom-up self-assembly and top-down lithography. A polar block such as poly(4-hydroxystyrene) block is capable of undergoing all the photoresist chemistry of advanced photoresists. We have recently shown we can control the self-assembly process by solvent annealing, and by choice of solvent. In addition to self-assembly, approaches using molecular glass and nanoparticle photoresists will also be described. The systemshave the advantage of the ability to form arbitrarily shaped patterns in contrast to self-assembled materials and show prospects of sub-20 nm structure formation. New tools for thermal processing such as laser spike annealing enable thermal excursions above 500 °C in microsecond time regions and will be discussed.**

# MATERIALS SEMINAR

**PRESENTED BY**


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## THURSDAY, FEB. 2
## 12:15 P.M., ROOM 1315