

## **CBIMMS Invited Seminar**

### ***“Chemistry at Nanopatterned Interfaces - Surface Modification of Imprinted Polymers”***

**Kenneth R. Carter**

IBM Almaden Research Center

San Jose, CA 95120-6099

kcarter@almaden.ibm.com

**Monday, Nov. 24, 2003**

**2:15 PM**

**203 Teer Building**

#### **ABSTRACT**

Contact molding of thin films is an important lithographic techniques and show great promise in the ability to transfer nanoscale patterns in an efficient, economic fashion. We have found that polymer networks composed of a mixture of photopolymerizable monomers (acrylates and methacrylates) can be molded and photocured, providing image transfer and we have demonstrated technologically interesting applications. The use of these nanoscopically printed materials simply as sacrificial resist layers is obvious but does not take advantage of the chemistry presented at the surface of the patterned polymer. We have been exploring polymer interfaces of the patterned networks and subsequent modification of the molded network surface functionality. We add a functional comonomer to our photopolymer resin and after molding a fraction of this incorporated functionality is present at the surface of the polymer and available for subsequent reactions.

This concept of embedded functionality has been exploited in a number of ways. Earlier this year we reported the ability to tune the size, shape and chemistry of nanopatterned surfaces by performing grafting reactions utilizing surface initiated “living” free radical polymerization techniques. More recently, we have been exploiting the surface functionality to accommodate the attachment of (1) metals layers by electroless chemical deposition, (2) semiconducting polymers and (3) bioactive materials. The synthesis, characterization and use of these new materials and related techniques are discussed.