

ME DEPARTMENTAL SEMINAR

Friday, February 4, 2005

1:00pm – 2:00pm

2233 GG BROWN

**Professor Ronald Larson
Chair, Department of Chemical Engineering
University of Michigan**

“DNA and Microfluidics”

Abstract:

We extend recent single-molecule imaging methods to the study of the interactions of DNA polymers with surfaces in the presence of flow or electric fields. These interactions are of importance in the development of microfluidic devices for processing of DNA and other large molecules for genomics applications, and to learn how proteins interact with DNA in cellular processes such as DNA repair, transcription, etc. Using single-molecule optical microscopy and atomic force microscopy experiments and Brownian dynamics simulations of DNA molecules, combined with fluid mechanics analyses, we consider isolated DNA molecules near adsorbing and non-adsorbing walls in the presence of flows. In particular, we explore ways in which DNA unraveling can be optimized through manipulation of flow and electric fields, and how one can design theoretical models to explain the unraveling processes.