1077-92-2464 **Ying Chen*** (yingc@math.uci.edu), Department of Mathematics, University of California, Irvine, Irvine, CA 92697, and **John S. Lowengrub** (lowengrb@math.uci.edu), Department of Mathematics, University of California, Irvine, Irvine, CA 92697. *Tumor growth in complex, evolving geometries: A diffuse domain approach.*

In this talk, we present a new diffuse domain method for simulating tumor growth in complex, evolving geometries, taking into account homotype adhesion between tumor cells and heterotype adhesion between the cells and the basement membrane (or extracellular matrix). This method allows a straightforward implementation using standard software packages. Here, in order to solve the governing equations efficiently, we develop an adaptive energy-stable nonlinear multigrid finite difference method. Two and three dimensional simulations are performed where the adhesion between tumor cells and a deformable basement membrane (or extracellular matrix) is varied. The resistance of the membrane to bending is also modeled. The results demonstrate the nontrivial dependence of the growing tumor on the adhesion of cells to and flexibility of the basement membrane. This provides a model for ductal carcinoma in situ. (Received September 22, 2011)