1077-35-228 **John Lowengrub**, **Edriss S. Titi** and **Kun Zhao*** (kzhao@mbi.osu.edu). *Global dynamics of a diffuse interface model for solid tumor growth.*

In this talk I will report recent progress on the rigorous analysis of a diffuse interface model which arises in modeling of spinodal decomposition in binary fluid in a Hele-Shaw cell, tumor growth and cell sorting, and two phase flows in porous media. We consider the system of partial differential equations in bounded domains in 2D or 3D. The system is supplemented by initial data and no-flux boundary conditions. The first part of the results is contributed to the existence, uniqueness and regularity of solutions to the initial-boundary value problem. First, it is shown that, for large data, strong solutions are globally (locally resp.) well-posed in 2D (3D resp.). Second, it is shown that strong solutions indeed possess the same regularity as regular solutions. Moreover, it is shown that solutions enjoy the Gevrey regularity within their life-spans. In the second part, the long-time asymptotics of the solutions is studied. It is shown that, in 2D and 3D, strong solutions converge to constant equilibria exponentially as time goes to infinity provided that the initial perturbations are small. On the other hand, for large initial perturbations, it is shown that the constant states are still global attractors of the model under mild conditions on the volume of domain. (Received August 15, 2011)