1035-92-1080 **Timothy A Lucas*** (lucas@math.duke.edu), Mathematics Department, Duke University, Box 90320, Durham, NC. *Numerical Methods for an Immunology Model Using Reaction-Diffusion Equations with Stochastic Source Terms.*

When immune cells detect foreign molecules, they secrete soluble factors that attract other immune cells to the site of the infection. I am currently studying numerical solutions to a model of this behavior proposed by Kepler. In the model, the soluble factors are governed by a system of reaction-diffusion equations with sources that are centered on the cells. The motion of the model cells is stochastic, but biased toward the gradient of the soluble factors. To solve the reaction-diffusion-stochastic system numerically, I propose a first order split scheme. This allows us to make use of known first order schemes for solving the diffusion, the reaction and the stochastic differential equations separately. The three-dimensional domain is discretized using finite elements and the diffusion is solved using a backward Euler scheme combined with multigrid. The reaction is solved using a simple semi-implicit first order scheme. The stochastic differential equations are given by a Langevin process which can be simulated exactly. (Received September 19, 2007)