1056-65-1058 **Yuan He***, 200. S. W. Mudd Building, MC 4701, 500 W. 120th Street, New York, NY 10027, and **David E Keyes**. *Reconstructing physical parameters in systems of reaction-diffusion equations in electrocardiology.*

We consider distributed parameter identification problems for two electrocardiology models: the FitzHugh-Nagumo model and the bidomain model. These models describe the evolution of electrical potentials in heart tissues. The objective of these inverse problems is to reconstruct coefficients in these electrocardiology models from electrical potential measurements.

We constructed numerical reconstruction algorithms of Newton-Krylov-Schur-Schwarz type to solve the inverse problems. These iterative algorithms combine Newton's method for numerical optimization with Krylov subspace solvers for the resulting reduced Karush-Kuhn-Tucker (KKT) system. Schwarz-type methods are used to solve the partial differential equations that are involved in the inversion procedure. We implemented the algorithms on parallel processors so that we can solve the reconstruction problem in large-scale parallel environments.

We will present numerical examples for reconstructions with both time-dependent measurements and time-independent measurements. We show by numerical simulations that parameter reconstruction can be performed from measurements at various locations of the domain, including interior, boundary, and the combination. (Received September 20, 2009)