1075-92-166 **Joyce T. Lin*** (joyce.lin@utah.edu), University of Utah, Department of Mathematics, 155 S. 1400 E. JWB 233, Salt Lake City, UT 84112, and **James P. Keener**. *A Multiscale Model of Electrical Activity in Cardiac Tissue.* Preliminary report.

The muscular contraction of cardiac tissue that causes blood to pump through the body is driven by electrical stimulation. An accurate, efficient model of action potential propagation is necessary to study arrhythmogensis, as conduction failure has been strongly linked to ventricular arrhythmia and cardiac death.

While gap junctional proteins have traditionally been considered the primary mode of action potential propagation, experimental studies have indicated the existence of another mode. More recent experimental studies have found that cellular geometry plays an important role in propagation velocity. Existing, homogenized models cannot accurately capture the effects of cellular geometry, while more detailed, 3D models are computationally too expensive to be used as predictive tools.

We will present a new, multiscale model that incorporates the complex cellular geometry of cardiac tissue, while remaining numerically efficient. Our 1D and 2D results show field coupling that can only be captured on a microscale domain, yet strongly influences the macroscale behavior of action potential propagation. Additionally, we will explore the effects of the cellular geometry and sodium channel localization on cardiac conduction. (Received August 29, 2011)