

1106-92-2455

**Robert J Rovetti\*** (rrovetti@lmu.edu), Loyola Marymount University, Los Angeles, CA.

*Simulations of a lattice model and pairwise approximation equations to predict unstable calcium release in a cardiac cell.*

The calcium release system within a single cardiac cell can be efficiently represented by a discrete-time, probabilistic lattice model with nearest-neighbor interactions. Regions within parameter space where the ensemble activity of a 10,000-node simulated lattice exhibits unstable quasi-periodic behavior (the "alternans window") correspond to physiological conditions in the cell that could lead to arrhythmia and sudden cardiac death. In simulations we explore the effect of varying geometries and spatial couplings within the lattice upon the emergence of this window. We also examine the use of the pairwise approximation (PA) method to analytically estimate the location of the alternans window by predicting the probability that a local neighborhood of  $n$  nodes will be in a particular state of activation at a particular time. The PA method requires the simultaneous solution of  $2^n$  coupled different equations; we discuss methods for reducing the computational complexity as  $n$  increases. (Received September 16, 2014)