1093-92-364 **Bradford E. Peercy*** (bpeercy@umbc.edu). *Model Reduction to One Dimension Directs Discovery of Spontaneous Calcium Waves in a 3-D Cardiac Cell.* Preliminary report.

Calcium release in cardiac cells functions to contract heart muscle. In pathological conditions calcium can spontaneously release from any of thousands of near point source like release units and be electrogenic. Calculating long timescale (>1000ms) solutions from thousands of point sources each with a probability of release in three spatial dimensions provides a computational challenge. A model and parallel algorithm solving this set-up including multiple buffering species has been established but physiological behavior on the long time scale was elusive. We reduce the full model using dimensional analysis and perturbation theory to show the structure of the underlying solution diagram for the one-dimensional reduction. The structure translates to the full model allowing reproduction of experimentally observed calcium waves. The transition between solutions in parameter space for the full model is richer than in one dimension, and through further expansion around such a boundary, we find transverse waves leading to spiral waves. (Received August 20, 2013)