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A Three-Dimensional Model of Calcium Clearance in a Cardiac Myocyte  
During Excitation-Contraction Coupling

Date: Thursday, April 20

Time: 11:00 A.M. EST

Location: Clark 110

Podcast available after seminar

#### Abstract

I shall describe a minimal, spatial model of calcium transients in a cardiac myocyte underlying E-C coupling. Calcium and buffer dynamics in the cytosol and the sarcoplasmic reticulum are described by reaction-diffusion systems solved on a three-dimensional compartmental geometry that is taken to approximate the sarcomere. The model incorporates fluxes due to L-type calcium channels, serca pumps, ryanodine receptors and sodium-calcium exchange. In particular, we introduce a bidomain formulation of the network SR and cytosol that can be regarded as a coarse-graining over the reticular geometry of the network; I shall point out how this bidomain model is formally derived using homogenization theory. The model reproduces various macroscopic fluxes that are consistent with experimental data.