
Applied Mathematics Seminar



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Using mathematical modelling to describe sub-cellular calcium dynamics in ER-PM junctions

Calcium is a universal signalling messenger and the store operated calcium entry signalling pathway has been shown to be important for cell functions such as gene expression. Experimental biologists have proposed that the organisation of calcium channels and pumps involved in this signalling pathway is important for the generation of local calcium signals and cell function. However, the local calcium signals cannot be imaged using current experimental techniques so this hypothesis is difficult to test experimentally. My PhD research focused on developing a mathematical model of store operated calcium entry to investigate the relationship between channel organisation and local calcium signals.

In this talk, I will present the mathematical model I developed during my PhD and show some published results demonstrating how the organisation of channels creates distinct calcium signals. I will also present results from an ongoing collaboration with experimental biologists in Pennsylvania State University which investigate the relationship between channel organisation and refilling of calcium stores.

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