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**James Sneyd\*** ([sneyd@math.auckland.ac.nz](mailto:sneyd@math.auckland.ac.nz)). *The Dynamics of Calcium: Oscillations and Waves, Experiments and Theory.*

Oscillations in the cytoplasmic concentration of calcium is one of the most ubiquitous cellular signalling mechanisms, being used to control a wide variety of cellular processes, including muscular contraction, fluid transport, gene expression and cell differentiation. In cells that are large enough, these oscillations can form periodic waves, or even spiral waves, of increased calcium concentration.

Because of such complex dynamics, over the past 20 years mathematical modelling has played an important role in the study of calcium signalling. I shall present an overview of the field, as well as a more in-depth look at a small number of particular questions. In particular, I shall look at the properties of isolated and periodic waves of calcium, the importance of homogenisation and microdomains, the role of Markov Chain Monte Carlo approaches to fitting single-channel data, and the possible importance of homoclinic bifurcations for understanding some of the most recent experimental results. Each of these topics will require a detailed consideration of experimental data, thus illustrating the close interplay between theoretical and experimental approaches. (Received September 19, 2014)