Kevin Burrage
University of Oxford, United Kingdom

New Insights into the Electrophysiology of the Human Heart through Nonlocal Modeling

The bidomain model has been a widely used mathematical framework (based on reaction-diffusion equations) for modelling the propagation of an electrical signal in cardiac tissue for nearly 40 years. It has been proven to be successful in many situations yet it is based on certain assumptions that may not hold. In this presentation we discuss these issues and propose a novel non-standard approach to modelling this electrical propagation based on nonlocal models. This model is less intuitive than the standard approach, but it seems to explain some aspects that are beyond the standard approach. We also discuss issues on the nature of models, how models are validated, and whether a good model has to be biophysically detailed or phenomenological in nature.