

INSALATE DI MATEMATICA

presents

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*Mathematical modeling of Multielectrode Arrays with
Pluripotent Stem Cell-Derived Cardiomyocytes*



Abstract:

After their discovery, human-induced pluripotent stem cell-derived cardiomyocytes (hiPSC-CMs) are transforming cardiac research, offering patient-specific alternatives for studying heart physiology and diseases. However, their electrical behavior differs from adult heart cells, making mathematical modeling crucial for understanding their properties.

In this talk, a new in silico model, based on partial differential equations, will be presented. This model simulates the electrical activity of hiPSC-CMs and their interaction with microelectrode arrays (MEA), a non-invasive tool that records extracellular signals. The model captures key electrophysiological phenomena, from action potential propagation to conduction velocity, bridging the gap between intracellular dynamics and MEA recordings. Numerical results to illustrate the model in action and its potential applications will also be presented.

Keywords:

hiPSC-CMs & cardiac dynamics · Partial differential equations · Bidomain model · Numerical simulations

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04:30 pm (CET)



*"Obvious" is the most dangerous word in mathematics.
(Eric Temple Bell)*