
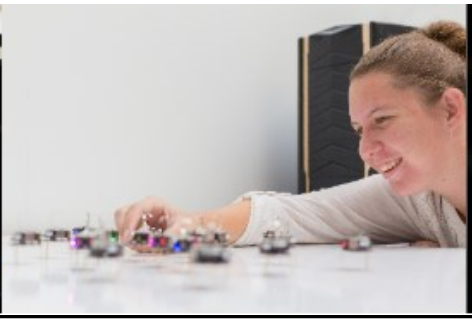


PHYSICS COLLOQUIUM:

Nonlinear Dynamics of Spontaneously Beating Heart Cells

Date: **9/13/2019**

Time: **10:30 AM**

Location: **COB2 140**

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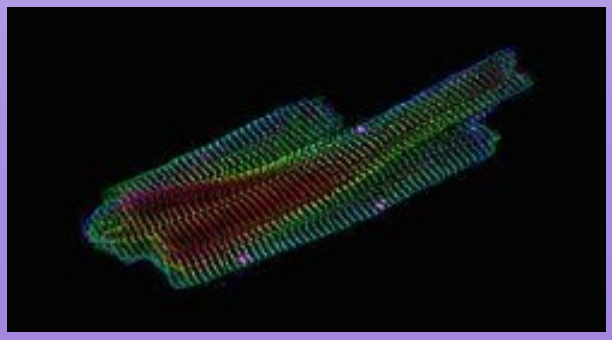
Abstract

The observation of spontaneous calcium oscillations of ~1 Hz in beating cardiac cells is typically explained by many couple chemical reactions and parameters. We show that the separation of time scales of fast processes with slower calcium diffusion in the cell results in a single, non-linear dynamical equation that characterizes these oscillations with only a few physically relevant parameters, determined from independent experiments. We further demonstrate, both experimentally* and theoretically, that a much slower time scale (a persistence time of 10's of minutes) can be extracted from analysis of the noisy dynamics of beating.

*Experiments: Ido Nitsan and Shelly Tzlil, Techion



About the Speaker

Sam Safran received his Ph.D. in Physics from MIT, followed by a postdoc at Bell Laboratories. From 1980-1990, he served as a Senior Staff member in the complex Fluids Physics group of Exxon Research and Engineering in New Jersey. Prof. Safran joined the faculty of the Weizmann Institute of Science in 1990 and is currently in the Department of Chemical and Biological Physics. He has served as Dean of the Graduate School and as Vice President of the Weizmann Institute. His current research interests are in the theory of soft and biological matter focus on the physics of mechanobiological structure, dynamics, and function and in science education in these areas. Honors include the de Gennes Award of the European Physical Journal and the Beller lectureship of the American Physical Society. He is the author of a graduate text on the physics of surfaces, interaces, and membranes, translated into Japanese and Chinese and is Editor in Chief of a new journal in biophysics education (The Biophysicist) to be published by the Biophysical Society in fall, 2019.