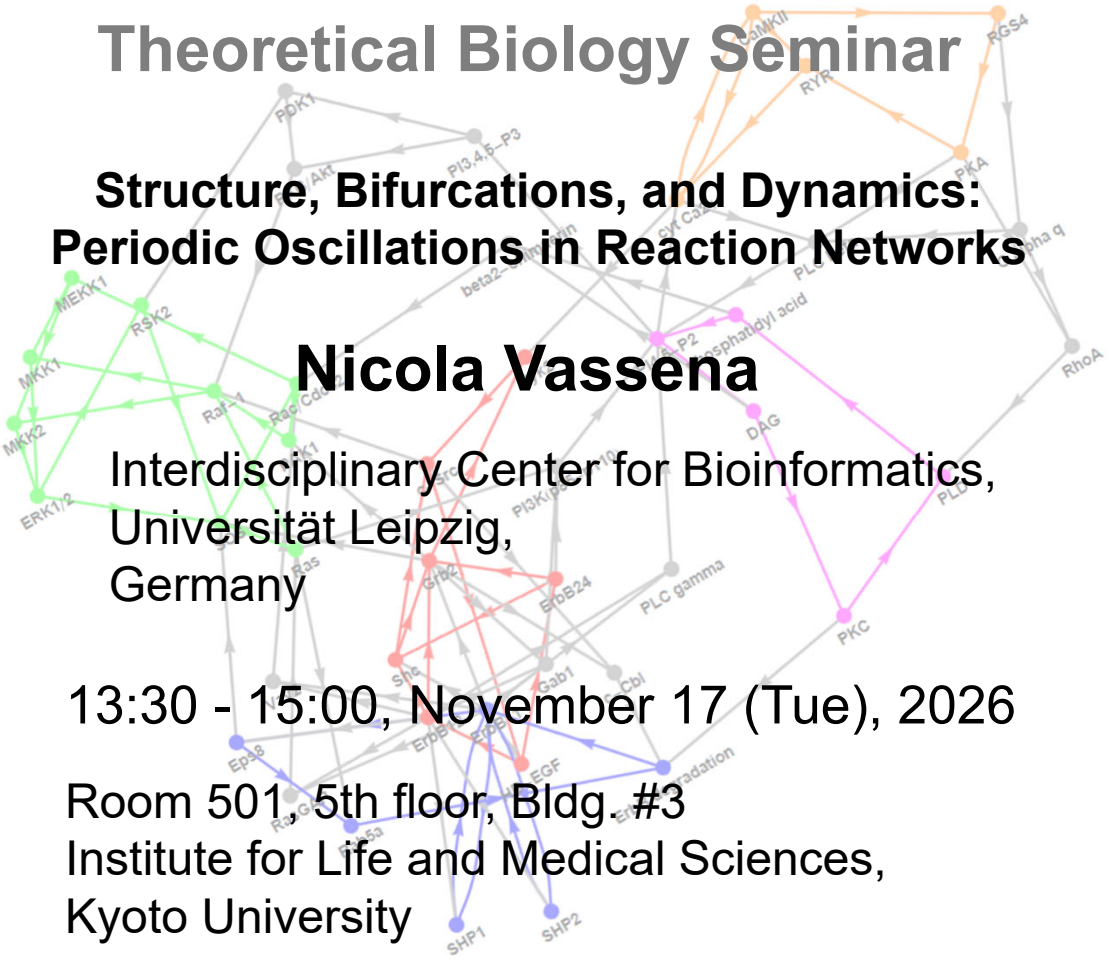
Theoretical Biology Seminar

Structure, Bifurcations, and Dynamics: Periodic Oscillations in Reaction Networks



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13:30 - 15:00, November 17 (Tue), 2026

Room 501, 5th floor, Bldg. #3
Institute for Life and Medical Sciences,
Kyoto University

I will first provide an overview of the concept of parameter-rich kinetics in reaction networks and its applications. Parameter-rich kinetics comprise a broad class of kinetic models, including Michaelis-Menten, Hill, and Generalized Mass Action kinetics, and are thus particularly well suited to biochemical contexts, such as metabolic networks. This type of kinetics allows for independent parametrization of steady-state fluxes and steady-state reactivities. In this way, “structural conclusions” based solely on reactant-reaction dependencies are brought to life by guaranteeing the possibility of their realization at a positive steady state. Applications include sensitivity and bifurcation analysis. In particular, in this setting, I will introduce the notion of oscillatory cores and present structural conditions for periodic oscillation in reaction networks. This talk is based on joint work with Peter Stadler and Alex Blokhuis.

Language: English

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