Nonlinear Science and Molecular Biology

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The aim of this tutorial talk is to review how concepts of nonlinear science can be applied to understand operation of a single biological cell. Nonequilibrium pattern formation in reactive soft matter, coherent collective dynamics in networks of communicating protein machines, noise reduction in genetic networks and other topics shall be briefly discussed.

Controlling Chemical Turbulence by Global Delayed Feedbacks

Ampitude diffusion-induced turbulence in oscillatory reaction-diffusion systems with the Benjamin-Fair instability can be suppressed by application of appropriate global delayed feedbacks. In this talk, we first present the results of an analysis based on the complex Ginzburg-Landau equation. After that, recent experiments [1] with catalytic CO oxidation on Pt surfaces shall be reported and their theoretical modelling will be discussed.

References:
[1] M. Kim, M. Bertram, M. Pollmann, A. von Oertzen, A.S. Mikhailov,
H.H. Rotermund, and G. Ertl, Science, 292 (2001) 1357.