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**Title:**

How a Diffusive Autocrine Signal Synchronizes Nonlinear Oscillators that are Diffusely Distributed in Space?

**Abstract:**

This talk discusses how diffusely distributed nonlinear oscillators (i.e. cells or neurons) in space can be synchronized by a diffusive autocrine signal. The signal is "autocrine" since it is secreted/released by each cell and at the same time acts on each cell to exert important influences on the release of the signal. We aim at developing a theory that outline conditions under which synchronized oscillations occur in such a system. The problem becomes more interesting in case each cell, when isolated, is a conditional oscillator (i.e. a system with a potential of generating oscillations but remain quiescent at a stable steady state near a threshold of transition to oscillations). Such a theory has numerous applications ranging from the synchronization of GnRH neurons in the hypothalamus to other systems of spatially distributed cell cultures such as cultures of embryonic cardiac cells. The theory can also be applied to some cases of quorum sensing, a widely observed phenomenon in multi-cellular systems.