You are invited to a Seminar in Biophysics

By:

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on:

Electrically controlled molecular recognition harnessed to control cellular response – a step towards seamless fusion of biology with electronics

The lecture will be given on

Tuesday, November 13, at 15:00

Physics Building 202, Room 301 (3rd floor)

Abstract

Manmade electronics and living systems are foreign to each other in all aspects. They are constructed from dissimilar materials using different strategies, employ different charge carriers, and use distinctively different logics for their computation. The fusing of these two fields therefore poses major conceptual and practical challenges but at the same time holds a great promise to both electronics and healthcare. Learning a lesson from biology where functional interfaces are realized through mutual recognition of two molecules we propose and demonstrate a generic bio-electronic synapse comprising a manmade device having two states and engineered T-cells expressing receptors that bind the electronic device exclusively in its "on" state. Application of -0.6V to the device sets it to its "off" state where the cells remain unbound and inactivated. Subsequent application of +0.6V to the device sets it to its "on" state where cells recognize it and as a result trigger their immune response. The talk will cover conceptual and practical issues associated with the implementation of this first link between electronics and biology as well as details of the recognition mechanism.