



**TIFR Centre for Interdisciplinary Sciences,
Narsingi, Hyderabad 500075**

Seminar

Can we program a cell like an engineer programs a device?

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Abstract: The molecular connectivity between genes and proteins inside a cell shows a good degree of resemblance with complex electrical circuits. This inspires the possibility of engineering a cell similar to an engineering device. In this talk, we discuss our effort to reprogram cellular function with mathematically predictable output, by adapting engineering principle in the realm of molecular biology. We have created a set of synthetic genetic devices that functions as cellular ‘antivirus software’ by controlling the virus attack to the bacteria. The other set shows a range of device properties that can be tuned externally without any genetic alteration. We also discuss the importance of quantitative cellular contexts in designing such systems. A design based approach to engineer cell demands a quantitative understanding of the system to be engineered. Here, we discuss our recent effort in network level understanding of the secretion pathway of yeast *Pichia pastoris*, which is a promising host for producing affordable biologic drugs. The work shows how underlying complexity of global gene expression emerges when integrating a ‘cell on a chip’ technology with temporal transcriptomics data. This understanding may guide us to engineer the secretion systems for efficient production of biologic drugs. The talk indicates toward the possibility of design based cellular programming.

Date: Friday, February 1st 2013

Time: 11:30 AM (Tea/Coffee at 11:15 AM)

Venue: Conference Hall, TCIS

All are cordially invited