



# INSTITUTE SEMINAR

**13 March 2015**

**11:30 a.m.**

**Fermion**

**Speaker:**

**Gautam I. Menon**

*The Institute of Mathematical Sciences, Chennai*

**Title:**

**Active Matter**

**Abstract:**

In recent years, there has been a quiet revolution in our ability to model, both qualitatively and quantitatively, a number of bio-physical processes in living cells. The ideas motivating these break-throughs have their roots in non-equilibrium statistical mechanics and soft matter physics. I will describe how these ideas have developed historically, culminating in what is now the fast-developing field of "active matter". I will then summarize recent theoretical work from my group which uses active matter-based ideas to model the properties of chromosomes contained in the nuclei of cells. Our work addresses several long-standing questions in the field, among them questions of why chromosomes appear to be positioned non-randomly, why chromosomes form individual "territories" in the nucleus (an observation first made over a hundred years ago), why chromosomes might reposition when the DNA they contain is damaged, and how one might hope to construct a predictive model for chromosome positioning in different cell types. This talk is aimed at a physics audience and I will try to avoid jargon wherever possible. I hope to illustrate, through examples, why biology continues to fascinate physicists and how the interaction of biology and physics at a quantitative level enriches both fields.

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