

## **Seminar**

### **Motility, aggregation and slow dynamics in living and soft matter: summary of past research and future directions**

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In the first part of the talk I will present a brief overview of my past research that consists of several problems from different fields. I will first summarize my works, and their importance, in the field of glassy dynamics and nonequilibrium physics, and then, give a brief overview of several problems that I have worked on in the field of biological physics: active glasses, left-right symmetry breaking in animals, gradients of proteins, phase separation in biology, and wound healing. In the second part, I will discuss my future research plan. The proposed research has one component that develops new theoretical frameworks with an aim to understand the basic physical principles underlying diverse equilibrium as well as nonequilibrium systems and another that applies such frameworks to the properties and dynamics of biological systems. I will broadly divide the problems that I would like to understand in near future in four different parts: (i) self-consistent hydrodynamic theory for dense biological systems, or, active glasses, (ii) dynamics of wound healing and that of an epithelial monolayer, (iii) phase separation in biological systems and fibrillar aggregation of amyloid  $\beta$  proteins, (iv) phase transition in systems with broad interfaces and its application to glassy dynamics. I will briefly introduce the problems, discuss their importance and my ideas of how to proceed to understand these problems.

***Friday, Jul 20<sup>th</sup> 2018***

***4:00 PM (Tea/Coffee at 3:30 PM)***

***Seminar Hall, TIFR-H***