PMRF-ISSS Teaching Programme

Prime Minister Research Fellowship students' teaching requirement

facilitated by the Institute of Smart Structures and Systems

Module PMRF-ISSS146/2024

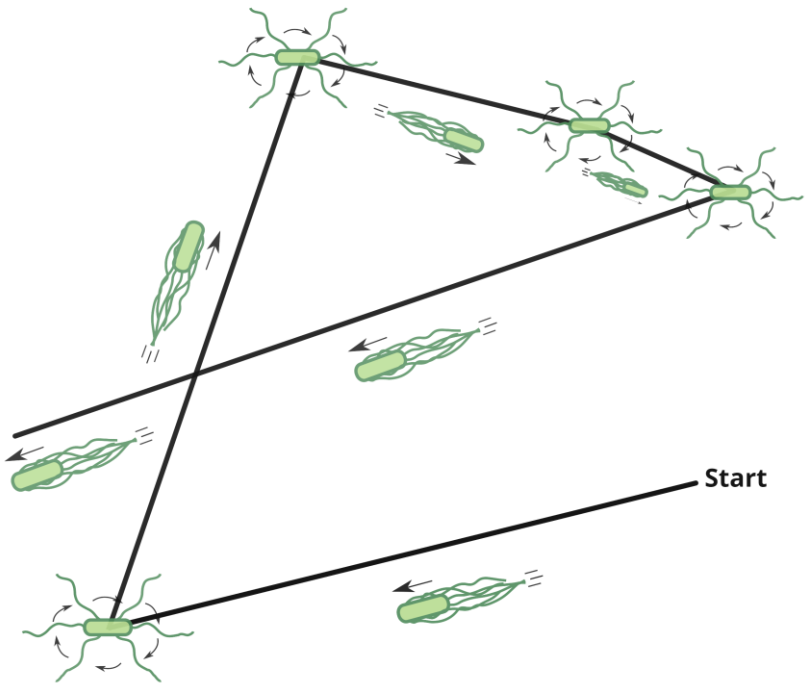
Introduction to Statistical Physics in Soft & Active Matter Systems

Name of the PMRF student

Dibyendu Mondal

Required background of the students taught

Basic idea of physics, calculus & differential equation



A schematic of Run-and-tumble dynamics shown by *E. coli* bacteria

Details of the content of the module

- Introduction

  Random motion, Correlation function, Random walk, Colloids

- Brownian Motion

  Brownian Motion of free particle, White noise, Brownian motion in a potential field, Langevin equation

- Diffusion Equation

  Fick's laws of diffusion, Diffusion in one dimension, Fokker-Planck equation,

- Active Brownian Particle(ABP)

  Introduction to ABP, Associated Langevin equation, Computational modelling

- Run and Tumble dynamics

  Introduction to swimming bacteria, Run and Tumble particle

❑ **Lectures notes** for each class will be provided along with videos, **programming implementation** and **problem solving**

Schedule of the module

Start Date: 4th October , 2024

End Date: 1st November, 2024

Schedule: Video lectures will be uploaded on every Tuesday, Wednesday, Thursday, Saturday, Sunday

Number of Lectures: 20 (approx.)

Duration of lecture: 1.5 hours each (Total ~ 30 hours)

Meeting link : Will be shared later

Link

Contact email ID: isss.forum@gmail.com

Registration link:

https://forms.gle/DwDLzezKhg8XzFaF8