

2012 Spring PHYS 7683

Physics of Bio-locomotion

Lecturer
Room/Times
Prerequisites
S/U 3 credits

Prof. Jane Wang, 517 Clark Hall, zw24@cornell.edu
TR 1:25 - 2:40pm, RCK110
intermediate mechanics, ODE, PDE

Topics:

1. Why are the atoms so small (we are so large)?

2. Bacteria

Bacteria locomotion (flagellar propulsion, hydrodynamic theory)
Chemotaxis

3. Plants

Gravitropism (slow movement by which plant growth reorients in response to gravity)
Plants' proprioception

4. Insects

3D flight dynamics
Mechanical sensor, the function of halteres
Coupling from the halteres to the wing kinematics, and to the body dynamics

5. Interaction between organisms

Prey capture dynamics
Analysis of experimental data
Physical interpretations

6. Group projects

Reading material:

Schrodinger, What is Life
Purcell, Life at Low Reynolds Number
Berg, E-Coli in Motion
Darwin, the Power of Movements in Plants