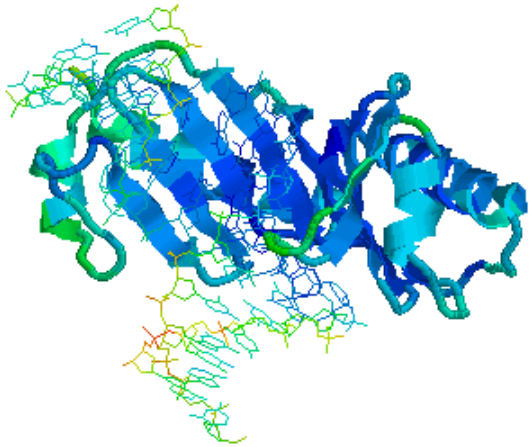
Physics 262: Topics in Biophysics

Instructor: G. Zocchi

Topics include:

- Molecular interactions
- Entropic elasticity of polymers
- DNA electrophoresis
- PCR & DNA computing
- Genetic regulation:
  the λ-phage in E.coli
- Models of evolution



A protein (TATA-box-binding protein) bound to DNA

Textbook: the relevant parts from a book in preparation [Physics in Molecular Biology, by K. Sneppen and G. Zocchi] will be distributed in class.
Lectures: 1.5 hours twice a week, days TBA, in IPAM room 1180.

This class aims at building an understanding of the physics of biological systems in the context of statistical mechanics. At the molecular scale, these systems are governed by interactions comparable to the thermal energy kT; therefore interactions may be dominated by entropy instead of energy. At the scale of the cell, the full information content of DNA becomes visible in the regulation mechanisms which appear when proteins interact with DNA and each other. Some of the topics we will cover to illustrate these ideas are listed above.
The course will consist partly of lectures and partly of presentations of papers by the students.