1. Introduction to Bacterial Gene Regulation; Statistical Mechanics of Protein-DNA Interaction

2. Quantitative Studies of Bacterial Gene Regulation

3. Phenomenological Theory of Bacterial Growth Control

Terrence Hwa

Department of Physics, University of California at San Diego, La Jolla, CA 92093-0374, U.S.A.

In this series of 3 lectures, I will build up the bacterial gene regulatory system from molecular interactions and up. I will start with bacterial physiology and motivate gene regulation, with a short review of the basic molecular biology of transcriptional control. In the first lecture, I will discuss the problem of protein-DNA interaction, in particular, the search and occupation of specific DNA sites by regulatory proteins. In the second lecture, I will describe 3 different modes of gene regulation, transcriptional control, translational control, and proteolysis, touching on issues of combinatorial control, sensitivity and stochasticity. In the third lecture, I will return to the cellular level and discuss gene regulation in the context of growth control.