BIOLOGICAL FRAMEWORKS FOR ENGINEERS

Session #8 [nm: Decoding Protein and Protein Functions]

General Objectives:

- ✓ Introduction to purifying, detecting, and characterizing proteins,
- ✓ Identify and discuss physics involved in protein studies

Central Framework:

✓ One-by-one approaches to study proteins do not provide insights into a global picture of what is happening inside a cell, tissue, or entire organism, but advances in inactivating gene expression is helping to understand how proteins function in complex biochemical pathways and regulatory networks.

Session Outline:

- I. Purifying Proteins
 - a. Centrifugation

b. Gel Electrophoresis

c. Chromatography

- II. Detecting Proteins a. Western Blot
 - b. Mass Spectrometry

- III. Characterizing Proteins a. X-ray Crystallography
 - b. Cyroelectron Microscopy
 - c. Nuclear Magnetic Resonance Spectroscopy
- IV. Understanding Protein Functions a. Pharmacological inhibitors
 - b. Recombinant DNA
 - c. Knockout mice
 - d. RNA interference