

Abstract No:IV-3-1

Statistical Genetics and 3D Protein Structures

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Abstract

In this talk, I will share the story of studying statistical genetics to pursue my Ph.D. degree and my journey to study 3D protein structures. Some review of genetic linkage analysis, its mathematical modeling and sequential analysis will be provided. For the past decade, my research has focused on the image analysis of cryo-electronic microscopy (cryo-EM). Cryo-EM has become a powerful technique to solve the 3D structures of macro protein particles with high efficiency to provide crucial medical insight for the pharmaceutical industry. However, the data characteristics include strong noise, huge dimension, large sample size and high heterogeneity with unknown orientations have made analysis very challenging. A couple of self-developed algorithms employing statistical insights to face these challenges will be presented.

Keyword: statistical genetics, cryo-electronic microscopy (cryo-EM), Protein Structures