Theoretical Biophysics

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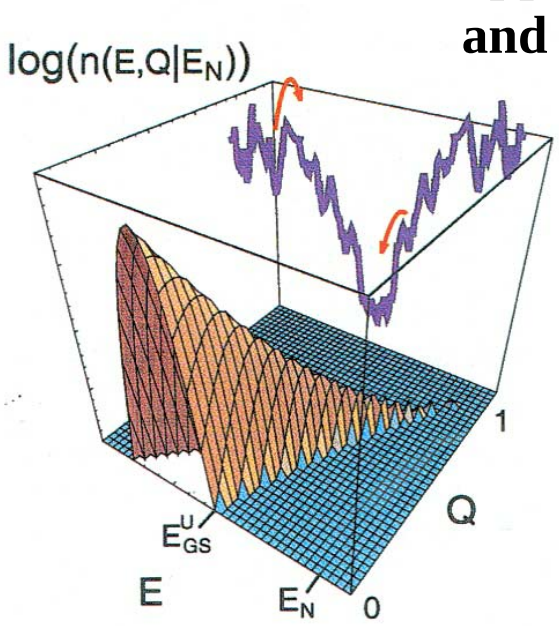
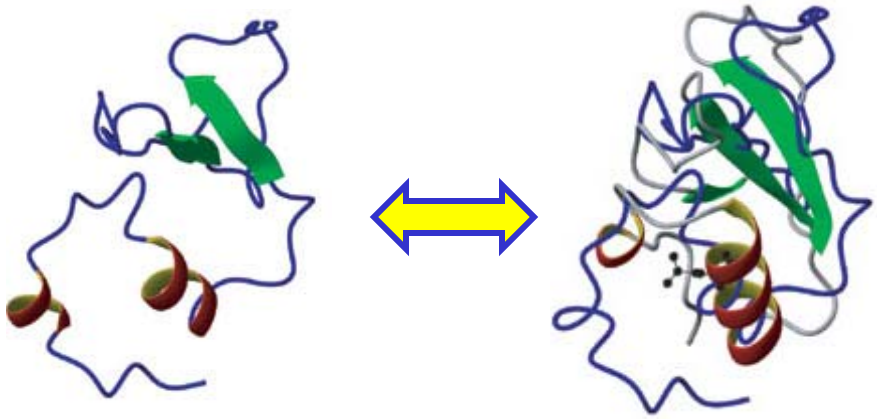
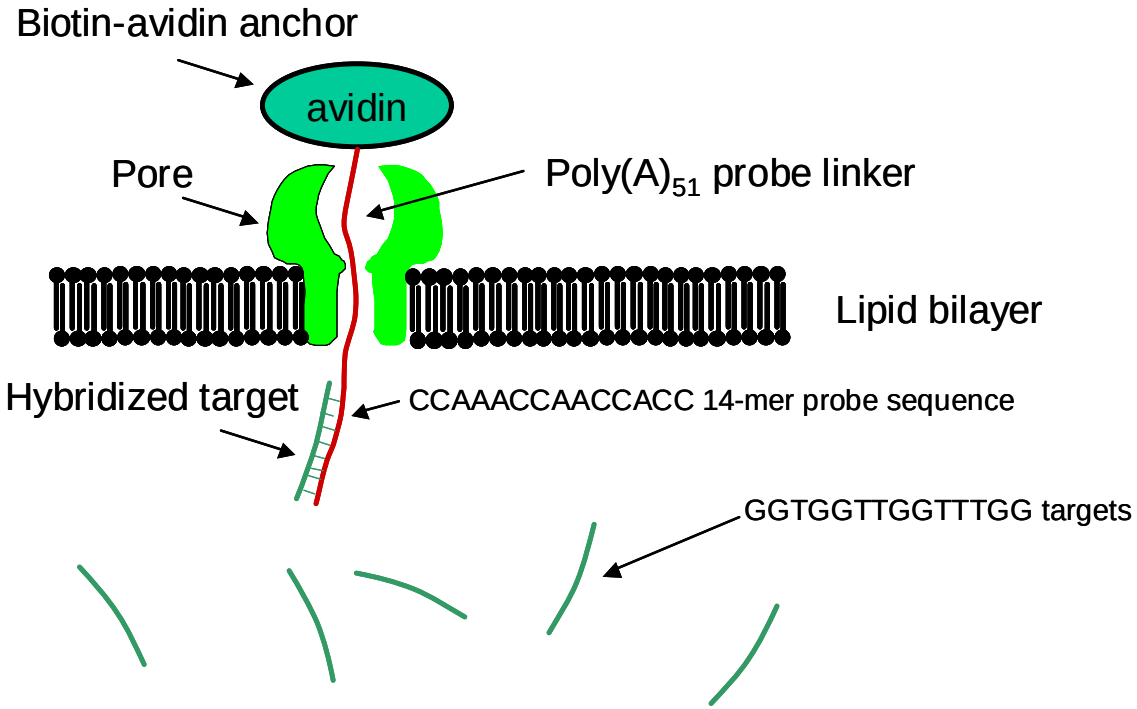
Our group investigates a range of problems in theoretical biophysics, from the study of dynamics and disorder in the theory of protein folding and function, to the physics of nanopore translocation and its potential application to DNA sequencing, to studies of pattern formation and symmetry breaking in morphogenisis.

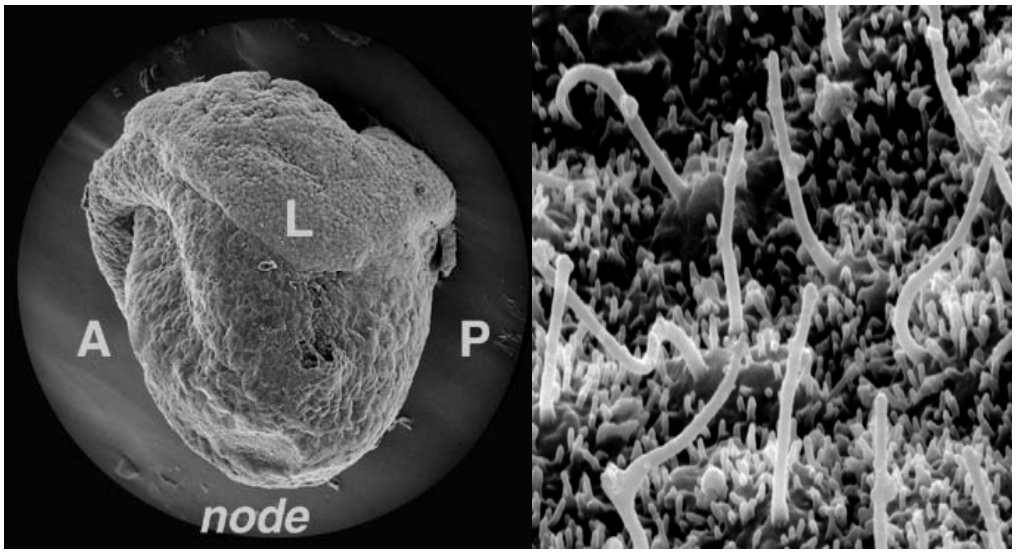
We apply principles from statistical mechanics, bio-informatics, and chemistry to deduce recipes that may predict the folded and transition state structure of a protein from its amino acid sequence.







We have an ongoing collaboration with the group of Andre Marziali at UBC where we propose and analyze nanopore translocation experiments which may allow the sequencing of single molecules of DNA



We also collaborate with the Yamamoto and Hamada group in Japan on the problem of how the homochirality of biological molecules is amplified to break left-right symmetry in a developing embryo. This addresses the question of why most people have their heart on the left side.