

## Coherent Excitation Energy Transfer in Photosynthetic Light Harvesting Systems

### Abstract:

Recent experiments have suggested that correlated fluctuations in nanostructured protein environments can give rise to long lived coherence in excitation energy transfer processes in photosynthetic systems. The results of large scale MD simulations on such systems will be used to explore the nature of these correlated environmental motions enabling us to extract model spectral densities with which we can build realistic reduced representations of these complex systems. A new iterative linearized density matrix propagation scheme will be applied to explore the coherent dynamics of these models under various conditions. The energy transfer efficiency of these chromophore antenna networks apparently relies on this long lived quantum coherence. We will use our numerical studies of these models to explore environmental effects on energy transfer efficiency particularly in hybrid bio-synthetic light harvesting photovoltaic applications.