

CORE-CM SEMINAR
Michigan State University — Department of Chemistry

Professor Warren Beck
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**Femtosecond Nonlinear Optical Studies of Radiationless
Decay and Energy Transfer by Carotenoids in
Photosynthetic Light-Harvesting Proteins**

Carotenoids play crucial roles in photosynthesis as light-harvesting chromophores and in photoprotection mechanisms. How carotenoids can transfer energy to chlorophyll molecules in light-harvesting proteins is an important unsolved question especially because the electronic states that mediate energy transfer are dark (they lack oscillator strength to and from the electronic ground state) and have ultrashort lifetimes. We have developed a new approach using femtosecond transient-grating spectroscopy with optical heterodyne detection to approach this problem. Using a full characterization of the electric field of the third-order nonlinear optical signal, we can sensitively characterize the sequence of dark states that mediate radiationless decay of carotenoids and follow energy transfer pathways to chlorophylls. This talk focuses on our recent discovery that solvation limited torsional dynamics control the formation and decay of an intramolecular charge-transfer state in peridinin that serves as the energy-transfer donor to chlorophyll *a* in the peridinin–chlorophyll *a* protein from dinoflagellates.

Thursday, January 16, 2014

12:00 PM

Room 1400 – BPS

Professor Jim McCusker – Host

Accommodations for persons with disabilities may be requested by calling the Chemistry Department at (517) 355-9715, X191 two days prior to the event to ensure sufficient time to make arrangements. Requests received after this date will be met when possible.