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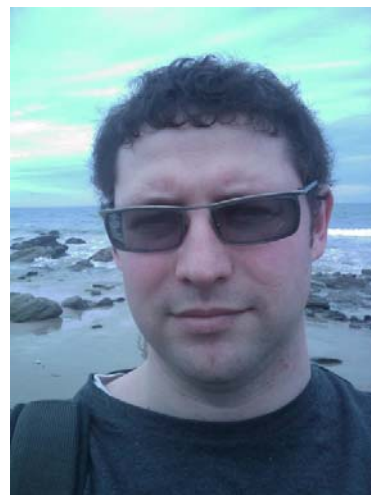


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Professor Mukamel's group interests focus on the design of novel ultrafast multidimensional coherent optical spectroscopies for probing and controlling electronic and vibrational molecular dynamics in the condensed phase; Theoretical and computational studies and applications include attosecond nonlinear x-ray spectroscopy of molecules; Many-body theory of optical and photonic materials; a time dependent reduced density matrix framework for computing electronic excitations and nonlinear optical spectroscopy of conjugated polymers, molecular nanostructures, chromophore aggregates and semiconductor and solar cell nanoparticles; Folding and dynamical fluctuations in proteins and DNA; Long range electron transfer, energy funneling, and collective nonlinear optical response of biological light harvesting complexes; Photon statistics in single molecule spectroscopy; Nonlinear dynamics and fluctuations in quantum and classical optical response.

Significant Publications:

1. "Principles of Nonlinear Optical Spectroscopy", S. Mukamel, Oxford University Press (1995).
2. "Coherent Multidimensional Optical Probes for Electron Correlations and Exciton Dynamics; from NMR to X-rays", S. Mukamel, D. Abramavicius, L. Yang, W. Zhuang, I.V. Schweigert and D. Voronine. *Acct.Chem.Res.* 42, 553-562 (2009).
3. "Coherent Multidimensional Optical Spectroscopy Excitons in Molecular Aggregates; Quasiparticle vs. Supermolecule Perspectives", D. Abramavicius, B. Palmieri, D. Voronine, F. Sanda and S. Mukamel, *Chem. Rev.* 109, 2350-2408 (2009).
4. "Coherent Multidimensional Vibrational Spectroscopy of Biomolecules; Concepts, Simulations and Challenges". W. Zhuang, T. Hayashi and S. Mukamel, *Angew. Chem. Int.Ed.* 48, 3750-3781 (2009).
5. "Superoperator Nonequilibrium Green's Function Theory of Many-body Systems; Application to Charge Transfer and Transport in Open Junctions", U. Harbola and S. Mukamel, *Physics Reports*, 465, 191-222, (2008).