Gary Wiederrecht

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Research Summary:

Our group objective is to achieve control of optical energy and its conversion on the nanometer scale by combining the properties of metal, organic, semiconductor, and dielectric materials to create new, combined states of light and matter. My current research focuses on (a) ultrafast excitation processes of plasmons and their interactions with organic molecular excitations, (b) new microscopies with spatial resolution below the diffraction limit, and (c) nanophotonic structures for the concentration and conversion of solar energy.

Selected Recent Publications:

"Visualizing charge movement near organic heterostructures with ultrafast time resolution via an induced Stark shift," G. P. Wiederrecht, N. C. Giebink, J. Hranisavljevic, D. Rosenmann, A.B.F. Martinson, R. D. Schaller, and M. R. Wasielewski, *Appl. Phys. Lett.* **100**, 113304 (2012).

"Reduced Heterogeneity of Electron Transfer into Polycrystalline TiO_2 Films: Site-Specific Kinetics Revealed by Single Particle Spectroscopy," S. Jin, A. B. F. Martinson, and G. P. Wiederrecht, *J. Phys. Chem. C* **116**, 3097 (2012).

"Resonance-shifting to circumvent reabsorption loss in luminescent solar concentrators," N. C. Giebink, G. P. Wiederrecht, and M. R. Wasielewski, *Nature Photon.* **5**, 694 (2011).

"Planar dye-sensitized photovoltaics through cavity mode enhancement," A. B. F. Martinson, N. C. Giebink, G. P. Wiederrecht, D. Rosenmann, and M. R. Wasielewski, *Energy Environ. Sci.* **4**, 2980 (2011).

"Designed ultrafast optical nonlinearity in a plasmonic nanorod metamaterial enhanced by nonlocality," G. A. Wurtz, R. Pollard, W. Hendren, G. P. Wiederrecht, D. J. Gosztola, V. A. Podolskiy, and A. V. Zayats, *Nature Nanotech.* **6**, 107 (2011).

"Self-consistent model of light-induced molecular motion around metallic nanostructures," M. Juan, J. Plain, R. Bachelot, P. Royer, S. K. Gray, G. P. Wiederrecht, *J. Phys. Chem. Lett.* **1**, 2228 (2010).