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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, hybrid electronic and optical states. My current research focuses on (a) ultrafast excitation processes in hybrid nanomaterials, (b) nanophotonic structures for the concentration and conversion of solar energy, and (c) the visualization of nanoscale optical phenomena.

**Awards:**
2013 Argonne National Laboratory Distinguished Service Award
2005 Argonne National Laboratory Director's Award
2004 Argonne National Laboratory Pacesetter Award
1998 Presidential Early Career Award for Scientists and Engineers (PECASE)
1998 Department of Energy Young Scientist Award
1996 R&D 100 Award for development of a Photorefractive Image Processor

**Selected recent publications:**

- "Anomalous ultrafast dynamics of hot plasmonic electrons in nanostructures with hot spots," H. Harutyunyan, A. B. F. Martinson, D. Rosenmann, L. K. Khorashad, L. V. Besteiro, A. O. Govorov, G. P. Wiederrecht, *Nat. Nanotech.* DOI: 10.1038/nnano.2015.165. (2015)
- "Selective functionalization of the nanogap of a plasmonic dimer," X. Zhou, C. Deeb, S. Koshtcheev, G. P. Wiederrecht, P. Adam, J. Plain, D. Gosztola, J. Grand, N. Felidj, H. Wang, A. Vial, R. Bachelot, *ACS Photonics* **2**, 121 (2015).
- "Damping of coherent acoustic vibrations by nanosized pores in colloidal hypersonic crystals," G. Zhu, G. P. Wiederrecht, C. Ling, S. Wu, D. Banerjee, and K. Yano, *Appl. Phys. Lett.* **105**, 051903 (2014).
- "Polarization-Dependent Fluorescence on an Anisotropic Gold/Polymer Hybrid Nano-Emitter," X. Zhou, C. Deeb, R. Vincent, T. Lerond, P.-M. Adam, J. Plain, G. P.

Wiederrecht, F. Charra, C. Fiorini, G. Colas des Francs, O. Soppera, and R. Bachelot, *Appl. Phys. Lett.* **104**, 023114 (2014).

- "Energy transfer from quantum dots to metal-organic frameworks for enhanced light harvesting," S. Jin, H.-J. Son, O.K. Farha, G.P. Wiederrecht, J.T. Hupp*, J. Am. Chem. Soc.* **135**, 955 (2013).
- "Light Harvesting and Ultrafast Energy Migration in Porphyrin-Based Metal-Organic Frameworks," H.-J. Son, S. Jin, S. Patwardhan, S. Wezenberg, N.C. Jeong, M. So, C. Wilmer, A. Sarjeant, G. Schatz, R. Snurr, O. Farha, G. P. Wiederrecht, J. Hupp, *J. Am. Chem. Soc.* **135**, 862 (2013).
- "Ultrafast charge transfer from highly reductive ZnTe/CdSe type II quantum dots," S. Jin, J. Zhang, R. D. Schaller, T. Rajh, G. P. Wiederrecht, *J. Phys. Chem. Lett.* **3**, 2052 (2012).
- "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).
- "Cofactor-specific Photochemical Function Resolved by Ultrafast Spectroscopy in Photosynthetic Reaction Center Crystals," L. Huang, N. Ponomarenko, G. P. Wiederrecht, D. M. Tiede, *Proc. Natl. Acad. Sci.* **109**, 4851 (2012).
- "Kinetics of J-aggregate formation on the surface of Au nanoparticle colloids," A. Vujacic, V. Vasic, M. Dramicanin, S. P. Sovilj, N. Bibic, J. Hranisavljevic, G. P. Wiederrecht, *J. Phys. Chem. C* **116**, 4655 (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).
- "Spatial confinement of electromagnetic hot and cold spots in gold nanocubes," M. Haggui, M. Dridi, J. Plain, S. Marguet, H. Perez, G. C. Schatz, G. P. Wiederrecht, S. K. Gray, and R. Bachelot, *ACS Nano* **6**, 1299 (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).
- "Synthesis and characterization of wurtzite ZnTe nanorods with controllable aspect ratios," J. Zhang, S. Jin, H. Fry, S. Peng, E. Shevchenko, G.P. Wiederrecht, T. Rajh, *J. Am. Chem. Soc.* **133**, 15324 (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).