

KATHERINE A. (KALLIE) WILLETS

1901 North 13th Street • 340 Beury Hall • Department of Chemistry
Temple University • Philadelphia, Pennsylvania 19122-2585
Phone (215) 204-7990 • Fax (215) 204-1532
kwillets@temple.edu

EDUCATION

Ph.D., Chemistry June 2005
Stanford University, Stanford, CA
Advisor: W.E. Moerner
Dissertation: *Novel fluorophore systems for single-molecule imaging: photophysics, mechanism, and applications*

A.B., Chemistry June 1999
Dartmouth College, Hanover, NH
Advisor: Jane E.G. Lipson
Thesis: *The effect of pressure on the miscibility of polymer blends*

PROFESSIONAL EXPERIENCE

Associate Professor 2015-present
Robert L. Smith Early Career Professor
Department of Chemistry
Temple University, Philadelphia, PA

Associate Professor 2014-2015
Department of Chemistry
The University of Texas at Austin, Austin, TX

Assistant Professor 2007-2014
Department of Chemistry and Biochemistry
The University of Texas at Austin, Austin, TX

Postdoctoral Researcher 2005-2007
Department of Chemistry, Northwestern University, Evanston, IL
Advisor: Professor Richard P. Van Duyne

AWARDS AND HONORS

- Defense Science Study Group. 2016-2017.
- Robert L. Smith Early Career Professor, Temple University. 2015.
- Department of Energy Early Career Award. 2013.
- Preferred Professor, Mortar Board of the National College Senior Honor Society. 2009.
- University of Texas Regents Outstanding Teaching Award. 2009.
- Air Force Office of Scientific Research Young Investigator Award. 2008.
- New Faculty Summer Research Award, UT Austin. 2008.
- UT Austin Natural Sciences Foundation Advisory Council Teaching Excellence Award. 2008.
- Evelyn Laing McBain Graduate Fellowship, Stanford University, 2003.

- Elden Bennett Hartshorn Medal, Dartmouth College, June 1999.
- Paul R. Shafer & Douglas M. Bowen Award, Dartmouth College, June 1999.
- Phi Beta Kappa, 1999.

PUBLICATIONS (reverse chronological order)

- 78) K.A. Willets. "Probing nanoscale interfaces with electrochemical surface-enhanced Raman scattering." *Curr. Opin. Electrochem.* Submitted.
- 77) X. Cheng, T.P. Anthony, V. Sundaresan, A. McLeod, K.A. Willets. "Plasmon heating promotes ligand reorganization on single gold nanorods as revealed by super-resolution imaging." Submitted.
- 76) E.M. Samples, J.M. Schuck, P.B. Joshi, K.A. Willets, G.E. Dobereiner. "Synthesis and Properties of *N*-arylpyrrole-functionalized poly(1-hexene-*alt*-CO)." Submitted.
- 75) V. Sundaresan, J.W. Monaghan, K.A. Willets. "Monitoring Simultaneous Electrochemical Reactions with Single Particle Imaging." *ChemElectroChem*. DOI: 10.1002/celec.201800715 (2018).
- 74) Y. Yu, J.D. Williams, K.A. Willets. "Quantifying Photothermal Heating at Plasmonic Nanoparticles by Scanning Electrochemical Microscopy." *Faraday Discussions*. DOI 10.1039/C8FD00057C (2018).
- 73) Y. Yu, V. Sundaresan, K.A. Willets. "Hot Carriers vs. Thermal Effects: Resolving the Enhancement Mechanisms for Plasmon-Mediated Photoelectrochemical Reactions." *J. Phys. Chem. C*. 122, 5040 (2018).
- 72) V. Sundaresan, J.W. Monaghan, K.A. Willets. "Visualizing the Effect of Partial Oxide Formation on Single Silver Nanoparticle Electrodissolution." *J. Phys. Chem. C*. 122, 3138 (2018). ACS Editors' Choice.
- 71) Y. Yu, V. Sundaresan, S. Bandyopadhyay, Y. Zhang, M.A. Edwards, K. McKelvey, H.S. White, K.A. Willets. "Three-Dimensional Super-Resolution Imaging of Single Nanoparticles Delivered by Pipettes." *ACS Nano*. 11, 10529 (2017).
- 70) P.B. Joshi, T.P. Anthony, A.J. Wilson, K.A. Willets. "Imaging out-of-plane polarized emission patterns on gap mode SERS substrates: from high molecular coverage to the single molecule regime." *Faraday Discussions*. 205, 245 (2017).
- 69) K.A. Willets and J.S. Biteen. "Introduction: Super-resolution and single molecule imaging." *Chem. Rev.* 117, 7241 (2017).
- 68) V. Sundaresan, K. Marchuk, Y. Yu, E.J. Titus, A.J. Wilson, C.M. Armstrong, B. Zhang, K.A. Willets. "Visualizing and Calculating Tip-Substrate Distance in Nanoscale Scanning Electrochemical Microscopy Using 3-Dimensional Super-Resolution Optical Imaging." *Anal. Chem.* 89, 922 (2017).
- 67) K.A. Willets, A.J. Wilson, V. Sundaresan, P.B. Joshi. "Super-resolution imaging and plasmonics." *Chem. Rev.* 117, 7538 (2017).

- 66) C.L. Haynes, R.R. Frontiera, K.A. Willets. "Preface of Richard P. Van Duyne Festschrift." *J. Phys. Chem C.* 120, 20483 (2016).
- 65) S. Zaleski, M.F. Cardinal, D. Chulhai, A.J. Wilson, K.A. Willets, L. Jensen, R.P. Van Duyne. "Towards Monitoring Electrochemical Reactions with Dual-wavelength SERS: Characterization of R6G Neutral Radical Species and Covalent Tethering of R6G to Silver Nanoparticles." *J. Phys. Chem. C.* 120, 24982 (2016).
- 64) S. Zaleski, A.J. Wilson, M. Mattei, X. Chen, G. Goubert, M.F. Cardinal, K.A. Willets, R.P. Van Duyne. "Investigating nanoscale electrochemistry with surface- and tip-enhanced Raman spectroscopy." *Acct. Chem. Res.* 49, 2023 (2016).
- 63) A.J. Wilson and K.A. Willets. "Unforeseen distance-dependent SERS spectro-electrochemistry from surface-tethered Nile Blue: the role of molecular orientation." *Analyst.* 141, 5144 (2016).
- 62) A.J. Wilson, N.Y. Molina, K.A. Willets. "Modification of the electrochemical properties of Nile Blue through covalent attachment to gold as revealed by electrochemistry and SERS." *J. Phys. Chem. C.* 120, 21091 (2016).
- 61) B. Xu, H. Li, H. Li, A.J. Wilson, L. Zhang, K. Chen, K.A. Willets, F. Ren, J. Grossman, S. Ren. "Chemically driven interfacial coupling in charge-transfer mediated functional superstructures." *Nano Letters.* 16, 2851 (2016).
- 60) B. Xu, Z. Luo, W. Gao, A.J. Wilson, C. He, X. Chen, G. Yuan, H.L. Dai, Y. Rao, K.A. Willets, Z. Dauter, S. Ren. "Solution-processed molecular opto-ferroic crystals." *Chemistry of Materials.* 28, 2441 (2016).
- 59) B. Xu, Z. Luo, A.J. Wilson, K. Chen, W. Gao, G. Yuan, H.D. Chopra, X. Chen, K.A. Willets, Z. Dauter, S. Ren. "Multifunctional charge-transfer single crystals through supramolecular assembly." *Advanced Materials.* 28, 5322 (2016).
- 58) A.J. Wilson and K.A. Willets. "Molecular plasmonics." Invited review. *Annual Reviews of Analytical Chemistry.* 9, 27 (2016).
- 57) K. L. Blythe and K.A. Willets. "Super-resolution imaging of fluorophore-labeled DNA bound to gold nanoparticles: a single molecule, single particle approach." Invited feature article. *J. Phys. Chem. C.* 120, 803 (2016). Journal covert art.
- 56) K.L. Blythe, E.J. Titus, K.A. Willets. "The effects of tuning fluorophore density, identity, and spacing on reconstructed images in super-resolution imaging of fluorophore-labeled gold nanorods." *J. Phys. Chem. C.* 119, 28099 (2015).
- 55) E.J. Titus, K.L. Blythe, K.A. Willets. "Monte Carlo simulations of triplet-state photophysics for super-resolution imaging of fluorophore-labeled gold nanorods." *Proc. SPIE.* 9554, 955403-1 (2015).
- 54) A.J. Wilson, K. Marchuk, K.A. Willets. "Imaging electrogenerated chemiluminescence at single gold nanowire electrodes." *Nano Lett.* 15, 6100 (2015).
- 53) K.L. Blythe, E.J. Titus, K.A. Willets. "Comparing the accuracy of reconstructed image

- size in super-resolution imaging of fluorophore-labeled gold nanorods using different fit models." *J. Phys. Chem. C.* 119, 19333 (2015).
- 52) M.L. Weber, A.J. Wilson, K.A. Willets. "Characterizing the spatial dependence of redox chemistry on plasmonic nanoparticle electrodes using correlated super-resolution surface-enhanced Raman scattering imaging and electron microscopy." *J. Phys. Chem. C.* 119, 18591 (2015).
 - 51) K.L. Blythe, E.J. Titus, K.A. Willets. "Objective-induced point spread function aberrations and their impact on super-resolution microscopy." *Anal. Chemistry.* 87, 6419 (2015).
 - 50) K.A. Willets and M.L. Weber. "Super-resolution imaging of surface-enhanced Raman scattering hot spots under electrochemical control." *Proc. SPIE.* 9467, 946710 (2015).
 - 49) C. Renault, K. Marchuk, H.S. Ahn, E.J. Titus, J. Kim, K.A. Willets, A.J. Bard. "Observation of nanometer-sized electro-active defects in insulating layers by fluorescence microscopy and electrochemistry." *Anal Chem.* 87, 5730 (2015).
 - 48) K. Marchuk and K.A. Willets. "Localized surface plasmons and hot electrons." *Chemical Physics.* Invited Perspective. 445, 95 (2014).
 - 47) A.L. Weisman, K.H. DuBay, K.A. Willets, R.A. Friesner. "A first-principles polarized Raman method for determining whether a uniform region of a sample is crystalline or isotropic." *J. Chem. Phys.* 141, 224702 (2014).
 - 46) A.J. Wilson and K.A. Willets. "Visualizing site-specific redox potentials on the surface of plasmonic nanoparticles with super-localization SERS microscopy." *Nano Lett.* 14, 939-945 (2014).
 - 45) K.A. Willets. "Super-resolution imaging of SERS hot spots." Invited tutorial review, *Chem. Soc. Rev.* 43, 3854-3864 (2014).
 - 44) K.L. Blythe, E.J. Titus and K.A. Willets. "Triplet-state mediated super-resolution imaging of fluorophore-labeled gold nanorods." *ChemPhysChem* (Invited contribution to special themed issue on super-resolution imaging and nanophotonics). 15, 784-793 (2014).
 - 43) E.J. Titus and K.A. Willets. "Super-localization surface-enhanced Raman scattering microscopy: comparing point spread function models in the ensemble and single molecule limits." *ACS Nano.* 7, 8284-8294 (2013).
 - 42) E.J. Titus and K.A. Willets. "Accuracy of super-localization imaging using Gaussian and dipole emission point-spread functions for modeling gold nanorod luminescence." *ACS Nano,* 7, 6258-6267 (2013).
 - 41) K.A. Willets. "Plasmon point spread functions: how do we model plasmon-mediated emission processes?" Invited perspective, *Frontiers of Physics,* 9, 3-16 (2014).
 - 40) K.A. Willets. "New tools for investigating electromagnetic hot spots in single-molecule SERS," Invited review, *ChemPhysChem.* 14, 3186-3195 (2013).

- 39) K.A. Willets. "Super-resolution imaging of interactions between molecules and plasmonic nanostructures," Invited perspective, *Phys. Chem. Chem. Phys.* (Special themed issue on Plasmonics and Spectroscopy) 15, 5345-5354 (2013).
- 38) A.J. Wilson and K.A. Willets. "Surface-enhanced Raman scattering (SERS) imaging using noble metal nanoparticles," Invited focus article, *WIREs Nanomedicine and Nanobiotechnology*. 5, 180-189 (2013).
- 37) E.J. Titus and K.A. Willets, "Applying super-resolution imaging techniques to problems in SERS," Invited book chapter, *Frontiers of Surface-Enhanced Raman Scattering: Single-Nanoparticles and Single Cells* (Eds. Yukihiro Ozaki, Katrin Kneipp, and Ricardo Aroca) from John Wiley & Sons, Chichester, UK. 2014.
- 36) K.L. Blythe, K.M. Mayer, M.L. Weber, K.A. Willets. "Ground state depletion microscopy for imaging interactions between gold nanowires and fluorophore-labeled ligands." *Phys. Chem. Chem. Phys.* (Invited contribution to special themed issue on optical studies of single metal nanoparticles) 15, 4136-4145 (2013).
- 35) E.J. Titus, M.L. Weber, S.M. Stranahan, K.A. Willets. "Super-resolution SERS imaging beyond the single-molecule limit: an isotope-edited approach." *Nano Lett.* 12, 5103-5110 (2012).
- 34) B. Cannon, A. Campos, Z. Lewitz, K.A. Willets, R. Russell. "Zeptomole detection of DNA nanoparticles by single-molecule fluorescence with magnetic field-directed localization." *Anal. Biochem.* 431, 40-47 (2012).
- 33) K.A. Willets. "Probing local electromagnetic field enhancements on the surface of plasmonic nanoparticles." Invited review, *Prog. Surf. Sci.* 87, 209-220 (2012).
- 32) M.L. Weber, K.A. Willets. "Nanoscale studies of plasmonic hot spots using super-resolution optical imaging." Invited review, *MRS Bulletin*, 37, 745-751 (2012).
- 31) K.A. Koen, M.L. Weber, K.M. Mayer, E. Fernandez, K.A. Willets. "Spectrally-resolved polarization anisotropy of single plasmonic nanoparticles excited by total internal reflection." *J. Phys. Chem. C.* 116, 16198-16206 (2012).
- 30) J.C. Heckel, A.L. Weisman, S.T. Schneebeli, M.L. Hall, L.J. Sherry, S.M. Stranahan, K.H. Dubay, R.A. Friesner, K.A. Willets. "Polarized Raman spectroscopy of oligothiophene crystals to determine unit cell orientation." *J. Phys. Chem. A.* 116, 6804-6816 (2012).
- 29) K.A. Willets, S.M. Stranahan, M.L. Weber. "Shedding light on surface-enhanced Raman scattering hot spots through single molecule super-resolution imaging." *J. Phys. Chem. Lett.* 3, 1286-1294 (2012). Journal cover art.
- 28) K.A. Willets, S.M. Stranahan. "Super-resolution imaging of diffusing analyte in surface-enhanced Raman scattering hot-spots," *Proc. SPIE.* 8228, 82280P (2012).
- 27) K.A. Willets, K. Mayer. "Surface-enhanced Raman scattering (SERS) characterization of metal-organic interactions." Invited book chapter. *Handbook of organic materials for*

optical and optoelectronic devices: properties and applications. (Ed. Oksana Ostroverkhova) Woodhead Publishing, Cambridge, UK. 2013.

- 26) S.M. Stranahan, E.J. Titus, K.A. Willets. "Discriminating nanoparticle dimers from higher order aggregates through wavelength-dependent SERS orientational imaging." *ACS Nano*. 6, 1806-1813 (2012).
- 25) M.L. Weber, J.P. Litz, D.J. Masiello, K.A. Willets. "Super-resolution imaging reveals a difference between SERS and luminescence centroids." *ACS Nano*. 6, 1839-1848 (2012).
**Highlighted in "In Nano," *ACS Nano*. 6, 990-992 (2012).
- 24) I. Kaplan-Ashiri, E.J. Titus, K.A. Willets. "In situ chemical functionalization of a single carbon nanotube functionalized AFM tip using a correlated optical and atomic force microscope," *Proc. Mat. Res. Soc.* 1318, 1-6 (2011).
- 23) S.M. Stranahan, E.J. Titus, K.A. Willets. "SERS orientational imaging of silver nanoparticle dimers." *J. Phys. Chem. Lett.* 2, 2711–2715 (2011).
- 22) M.L. Weber, K.A. Willets. "Correlated super-resolution optical and structural studies of surface-enhanced Raman scattering hot spots in silver colloid aggregates." *J. Phys. Chem. Lett.* 2, 1766-1770 (2011).
**Featured in *ACS Noteworthy Chemistry*, August 1, 2011.
- 21) K.A. Homan, J. Chen, A. Schiano, M. Mohamed, K.A. Willets, S. Murugesan, K.J. Stevenson, and S. Emelianov. "Silver-polymer composite stars: Synthesis and applications," *Adv. Func. Mat.* 21, 1673-1680 (2011).
- 20) I. Kaplan-Ashiri, E.J. Titus, K.A. Willets. "Subdiffraction-limited far field Raman spectroscopy of single carbon nanotubes: an unenhanced approach," *ACS Nano*. 5, 1033–1041 (2011).
- 19) S. M. Stranahan, K.A. Willets. "Super-resolution optical imaging of single-molecule SERS hot spots," *Nano Lett.* 10, 3777-3784 (2010).
**Featured in *C&E News*, August 30, 2010.
- 18) K.A. Willets. "Surface-enhanced Raman scattering (SERS) for probing internal cellular structure and dynamics," *Anal. Bioanal. Chem.* 394, 85-94 (2009).

Publications from post-doctoral, graduate, and undergraduate work

- 17) J. Bingham, K.A. Willets, N.C. Shah, D.Q. Andrews, R.P. Van Duyne. "LSPR imaging: Simultaneous single nanoparticle spectroscopy and diffusional dynamics," *J. Phys. Chem. C*. 113, 16839-16842 (2009).
- 16) S.J. Lord, N.R. Conley, H.D. Lee, S.Y. Nishimura, A.K. Pomerantz, K.A. Willets, Z. Lu, H. Wang, N. Liu, R. Samuel, R. Weber, A. Semyonov, M. He, R.J. Twieg, W.E. Moerner, "DCDHF fluorophores for single-molecule imaging in cells," *ChemPhysChem*. 10, 55-65 (2009).
- 15) R.J. Stiles*, K.A. Willets*, L.J. Sherry, J.M. Roden, R.P. Van Duyne, "Investigating tip-

nanoparticle interactions in spatially correlated total internal reflection plasmon spectroscopy and atomic force microscopy," *J. Phys. Chem. C* 112, 11696-11701 (2008) *shared first authorship.

- 14) S.J. Lord, Z. Lu, H. Wang, K.A. Willets, P.J. Schuck, H.D. Lee, S.Y. Nishimura, R.J. Twieg, W.E. Moerner, "Photophysical properties of acene DCDHF fluorophores: Long-wavelength single-molecule emitters designed for cellular imaging," *J. Phys. Chem. A* 111, 8934-8941 (2007).
- 13) H. Wang, Z. Lu, S.J. Lord, K.A. Willets, J.A. Bertke, S.D. Bunge, W. E. Moerner, R.J. Twieg, "The influence of tetrahydroquinoline rings in dicyanomethylenedihydrofuran (DCDHF) single-molecule fluorophores," *Tetrahedron* 63, 103-114 (2007).
- 12) K.A. Willets, R.P. Van Duyne, "Localized surface plasmon resonance spectroscopy and sensing," *Annu. Rev. Phys. Chem.* 58, 267-297 (2007).
- 11) S.Y. Nishimura, S.J. Lord, L.O. Klein, K.A. Willets, M. He, Z. Lu, R.J. Twieg, W.E. Moerner, "Diffusion of lipid-like single-molecule fluorophores in the cell membrane," *J. Phys. Chem. B* 110, 8151-8157 (2006).
- 10) K.A. Willets, W.P. Hall, L.J. Sherry, X. Zhang, J. Zhao, R.P. Van Duyne, "Nanoscale localized surface plasmon resonance biosensors," *Nanobiotechnology II*. Eds. C.A. Mirkin and C.M. Niemeyer. Weinheim: Wiley-VCH, 2006.
- 9) R.J. Twieg, H. Wang, Z. Lu, S.Y. Kim, S.J. Lord, S.Y. Nishimura, P.J. Schuck, K.A. Willets, W.E. Moerner, "Synthesis, properties and applications of dicyanomethylenedihydrofuran (DCDHF) single-molecule fluorophores," *Nonlinear Optics, Quantum Optics* 34, 241-246 (2005).
- 8) P.J. Schuck, K.A. Willets, D.P. Fromm, R.J. Twieg, W.E. Moerner, "A novel fluorophore for two-photon-excited single-molecule fluorescence," *Chem. Phys.* 318, 7-11 (2005).
- 7) K.A. Willets, S.Y. Nishimura, P.J. Schuck, R.J. Twieg, W.E. Moerner, "Nonlinear optical chromophores as nanoscale emitters for single-molecule spectroscopy," *Accs. Chem. Res.* 38, 549-556 (2005).
- 6) K.A. Willets, P.R. Callis, and W.E. Moerner, "Experimental and theoretical investigations of environmentally sensitive single-molecule fluorophores," *J. Phys. Chem. B* 108, 10465-10473 (2004).
- 5) K.A. Willets, R.J. Twieg, W.E. Moerner, "Single molecule magic," *OE Magazine* 4,13-15 (2004).
- 4) K.A. Willets, O. Ostroverkhova, S. Hess, M. He, R.J. Twieg, W.E. Moerner, "Novel fluorophores for single-molecule imaging," *Proc. SPIE* 5222, 150-157 (2003).
- 3) K.A. Willets, O. Ostroverkhova, M. He, R.J. Twieg, and W.E. Moerner, "Novel fluorophores for single-molecule imaging," *J. Am. Chem. Soc.* 125, 1174-1175 (2003).
- 2) J.E.G. Lipson, M. Tambasco, K.A. Willets, and J.S. Higgins, "Correlations between the effects of pressure and molecular weight on polymer blend miscibility," *Macromolecules*

36, 2977-2984 (2003).

- 1) N.B. Bowden, K.A. Willets, W.E. Moerner, and R.M. Waymouth, "Synthesis of fluorescently-labeled polymers and their use in single-molecule imaging," *Macromolecules* 35, 8122-8125 (2002).

INVITED SEMINARS

Colorado State University, Department of Chemistry. Fort Collins, CO. November 14, 2018.
Columbia University, MRSEC. New York, NY. October 16, 2018.
Imperial College, Department of Physics. London, UK. June 25, 2018.
Purdue University, Department of Chemistry. Lafayette, IN. April 18, 2018.
MIT, Modern Optics and Spectroscopy Seminar. Cambridge, MA. February 20, 2018.
Boston College, Department of Chemistry. Boston, MA. October 26, 2017.
Gettysburg College, Department of Chemistry. Gettysburg, PA. October 5, 2017. *PUI*.
University of British Columbia, Lectures in Modern Chemistry seminar. Vancouver, Canada. March 14, 2017.
University of Pennsylvania, Department of Chemistry. Philadelphia, PA. January 26, 2017.
Duke University, Fitzpatrick Institute for Photonics. Durham, NC. November 16, 2016.
Seoul National University, Department of Chemistry. Seoul, South Korea. July 13, 2016.
Korea Research Institute of Chemical Technology, Daejeon, South Korea. July 12, 2016.
Washington University, Department of Chemistry. St. Louis, MO. April 7, 2016.
Queens College, Department of Physics. Queens, NY. February 29, 2016.
Bryn Mawr College, Department of Chemistry. Bryn Mawr, PA. February 19, 2016.
Lebanon Valley College, Department of Chemistry. Annville, PA. November 3, 2015. *PUI*.
Albright College, Department of Chemistry. Reading, PA. October 29, 2015. *PUI*.
Rutgers University-Newark, Department of Chemistry. Newark, NJ. October 16, 2015.
Drexel University, Department of Chemistry. October 8, 2015.
University of Arkansas, Department of Chemistry. Fayetteville, AK. October 5, 2015.
University of California-Merced, Department of Chemistry. Merced, CA. March 13, 2015.
University of Minnesota Twin Cities, Student-hosted seminar, Department of Chemistry. Minneapolis, MN. October 28, 2014.
Boston University, Department of Chemistry. Boston, MA. September 8, 2014.
University of California, Santa Cruz. Department of Chemistry. Santa Cruz, CA. February 5, 2014.
University of Chicago, Department of Chemistry. Chicago, IL. January 21, 2014.
University of Pittsburgh, Department of Chemistry. Pittsburgh, PA. December 11, 2013.
Temple University, Department of Chemistry. Philadelphia, PA. December 9, 2013.

Michigan State University, Department of Chemistry. E. Lansing, MI. December 6, 2013.
Oregon State University, Department of Physics. Corvallis, OR. November 4, 2013.
University of California, Irvine. Chemistry at the Space-Time Limit (CaSTL) seminar. Irvine, CA. October 21, 2013.
Indiana University, Department of Chemistry. Bloomington, IN. October 15, 2013.
University of Rochester, Department of Chemistry. Rochester, NY. September 30, 2013.
Princeton University, Department of Chemistry. Princeton, NJ. April 9, 2013.
University of Wisconsin, Department of Chemistry. Madison, WI. October 30, 2012.
University of Illinois, Department of Chemistry. Urbana-Champaign, IL. September 13, 2012.
Cornell University, Department of Chemistry. Ithaca, NY. April 26, 2012.
Stanford University, Department of Chemistry. Stanford, CA. April 16, 2012.
Southern Methodist University, Department of Chemistry. Dallas, TX. February 24, 2012.
University of Washington, Department of Chemistry. Seattle, WA. February 14, 2012.
Rice University, Department of Chemistry. Houston, TX. December 7, 2011.
Massachusetts Institute of Technology, Department of Chemistry. Cambridge, MA. October 25, 2011.
St. Edwards University, Department of Chemistry. Austin, TX. October 6, 2011. *PUI*.
Notre Dame University, Department of Chemistry. South Bend, IN. September 29, 2011.
Clemson University, Department of Chemistry. Clemson, SC. April 7, 2011.
Baylor University, Department of Chemistry. Waco, TX. November 21, 2008.
University of Northern Iowa, Cedar Falls, IA. June 10, 2008.
Agilent Technologies, Santa Clara, CA. April 15, 2008.
Becton-Dickinson, Durham, NC. September 13, 2007.

CONFERENCES AND MEETINGS

Title TBD. Invited oral. 258th ACS National Meeting. San Diego, CA. August 25-29, 2019.
Title TBD. Invited oral. Telluride Workshop on Emerging Methods in Single Molecule Spectroscopy. Telluride, CO. June 25-29, 2019.
Title TBD. Invited oral. 4th International Conference on Surface Enhanced Spectroscopies. London, Ontario. June 17-21, 2019.
Visualizing dynamic reorganization of surface-bound ligands on gold nanorods. Invited oral. MRS 2018 Fall Meeting. Boston, MA. November 27, 2018.
Optical Methods for Studying Nanoscale Electrochemical Phenomena. Keynote Lecture. 69th Annual Meeting of the International Society of Electrochemistry. Bologna, Italy. September 3, 2018.

Super-resolution imaging of plasmonic nanostructures. Invited oral. Single Molecule Approaches to Biology Gordon Research Conference. West Dover, VT. July 18, 2018.

Hot carrier vs. thermal effects in plasmon-mediated photochemical reactions. Contributed Poster. Plasmonics and Nanophotonics Gordon Research Conference. Sunday River, ME. July 12, 2018.

Quantifying Photothermal Heating at Plasmonic Nanoparticles by Scanning Electrochemical Microscopy. Invited oral. Electrochemistry at Nano-interfaces: Faraday Discussion. Bath, UK. June 26, 2018.

Hot carrier vs. thermal effects in plasmon-mediated photochemical reactions. Invited oral, presented at 5th International Conference on Frontiers in Plasmonics. Nanjing, China. April 21, 2018.

Isolating local heating and hot carrier effects in plasmon-mediated photoelectrochemical reactions. Invited oral. 48th Winter Colloquium on the Physics of Quantum Electronics (PQE), Snowbird, UT. January 9, 2018.

Imaging out-of-plane polarized emission patterns on gap mode SERS substrates: from high molecular coverage to the single molecule regime. Invited oral. Surface-enhanced Raman scattering (SERS) Faraday Discussion. Glasgow, UK. August 31, 2017.

Coupled optical and electrochemical measurements for studying nanostructured materials. Invited oral. 254th ACS National Meeting. Washington, DC. August 23, 2017.

Super-resolution imaging of hybrid organic-plasmonic nanostructures. Invited oral. 254th ACS National Meeting. Washington, DC. August 21, 2017.

Imaging dynamic surface chemistry on plasmonic nanoparticles. Invited oral. 254th ACS National Meeting. Washington, DC. August 20, 2017.

Examining local heating and hot carrier generation in plasmon-mediated electrochemical reactions. Invited oral. Plasmonically Powered Processes Gordon Research Conference. Hong Kong. June 27, 2017.

Super-resolution imaging of plasmonic nanostructures: from ligand binding to plasmon coupling. Invited oral. Pittcon, Chicago, IL. March 8, 2017.

Optical readouts of nanoscale electrochemistry. Invited oral. Pittcon, Chicago, IL. March 7, 2017.

Measuring electrochemical reactions on single nanoparticles: combining optical and electrochemical nanoscopy. Invited oral. 47th Winter Colloquium on the Physics of Quantum Electronics (PQE), Snowbird, UT. January 9, 2017.

SERS spectroelectrochemistry on nanoscale electrodes. Invited oral. 252nd ACS National Meeting. Philadelphia, PA. August 25, 2016.

Super-resolution imaging of plasmonic nanostructures: from ligand binding to plasmon coupling. Invited oral. 252nd ACS National Meeting. Philadelphia, PA. August 24, 2016.

Super-resolution imaging of plasmonic nanostructures. Invited oral. NanoKorea. Goyang, South Korea. July 14, 2016.

Using Single-Molecule Spectroscopy to Study Plasmon-Molecule Interactions. Invited oral. Noble Metal Nanoparticles Gordon Research Conference. South Hadley, MA. June 20, 2016.

Super-resolution imaging of fluorophore-labeled DNA assembled on gold nanoparticles. Invited oral. FNANO (Foundations of Nanoscience), 13th Annual Conference, Snowbird, UT. April 12, 2016.

Super-resolution fluorescence imaging of active biosensors. Invited oral. Plasmonics and its Applications Workshop. Renewable and Sustainable Energy Institute. University of Colorado, Boulder. Boulder, CO. March 22, 2016.

Super-resolution imaging in plasmonics. Invited oral. Plasmonics and its Applications Workshop. Renewable and Sustainable Energy Institute. University of Colorado, Boulder. Boulder, CO. March 21, 2016.

Plasmonic nanostructures as nanoscale electrodes. Invited oral. 251st ACS National Meeting. San Diego, CA. March 14, 2016.

Visualizing electrochemical reactions on plasmonic nanoparticle electrodes. Invited oral. 46th Winter Colloquium on the Physics of Quantum Electronics (PQE), Snowbird, UT. January 4, 2016.

Super-resolution imaging of fluorescently-labeled ligands bound to plasmonic nanostructures. Invited oral. PacifiChem. Honolulu, HI. December 17, 2015.

Electrochemical reactions on plasmonic nanoparticle electrodes. Invited oral. PacifiChem. Honolulu, HI. December 15, 2015.

Plasmon-molecule interactions in super resolution imaging. Invited oral. Plasmonic nanogaps and circuits workshop. Kavli Institute for Theoretical Physics China at the Chinese Academy of Sciences. Beijing, China. October 22, 2015.

Plasmonic nanostructures as nano-electrodes. Invited oral. Plasmonic nanogaps and circuits workshop. Kavli Institute for Theoretical Physics China at the Chinese Academy of Sciences. Beijing, China. October 20, 2015.

Super-resolution imaging of fluorescently-tagged ligands on gold nanoparticle surfaces. Invited oral. 250th ACS National Meeting. Boston, MA. August 17, 2015.

Super-resolution imaging of plasmonic nanostructures. Invited oral. SPIE Optics and Photonics. San Diego, CA. August 9, 2015.

Super-resolution imaging of plasmonic nanostructures. Invited oral. Advances in Structural and Chemical Imaging (ASCI) Symposium, Washington State University, Pullman, WA. May 20, 2015.

Super-resolution imaging and SERS. Invited oral. SPIE DSS15 Micro-Nanotechnology Sensors, Systems, and Applications Conference. Baltimore, MD. April 21, 2015.

Super-resolution imaging of hybrid organic-plasmonic nanostructures. Invited keynote. Materials Research Society Spring Meeting. San Francisco, CA. April 9, 2015.

Super-resolution imaging of plasmonic nanostructures. Invited oral. 249th ACS National Meeting, Denver, CO. March 24, 2015.

Optical readouts of electrochemical behavior. Invited oral. AFOSR MURI review meeting, Northwestern University, Evanston, IL. January 19, 2015.

Super-resolution imaging of hybrid organic-plasmonic nanostructures. Invited oral. Light-driven Processes in Bio-inspired Materials workshop, Rice University, Houston, TX. December 15, 2014.

Super-resolution imaging for monitoring electrochemical reactions on plasmonic nanoparticle electrodes. Invited oral. SciX, Reno, NV. September 30, 2014.

Super-resolution imaging and surface-enhanced spectroscopy. Invited oral. NFO-13 (13th International Conference on Near-Field Optics, Nanophotonics, and Related Techniques), Snowbird, UT. September 2, 2014.

Surface-enhanced Raman scattering: the importance of the molecule. Invited oral. 248th ACS National Meeting, San Francisco, CA. August 14, 2014.

Super-resolution surface-enhanced Raman scattering (SERS) imaging for monitoring electrochemical reactions on plasmonic nanoparticle electrodes. Invited oral. 248th ACS National Meeting, San Francisco, CA. August 13, 2014.

Super-resolution imaging of fluorophore-labeled DNA assembled on gold nanoparticles. Invited oral, keynote speaker. FNANO (Foundations of Nanoscience), 11th Annual Conference, Snowbird, UT. April 16, 2014.

Optically Imaging Electrochemical Reactions on Plasmonic Nanoparticle Electrodes. Invited oral. 2014 Center for Electrochemistry Annual Workshop on Electrochemistry, Austin, TX. February 9, 2014.

Super-resolution imaging of plasmonic nanostructures. Invited oral. 44th Winter Colloquium on the Physics of Quantum Electronics (PQE), Snowbird, UT. January 8, 2014.

Super-resolution imaging of hybrid organic-plasmonic nanostructures. Contributed oral. Materials Research Society Fall Meeting, Boston, MA. December 3, 2013.

Super-resolution imaging of plasmonic nanostructures. Invited oral. ARO Workshop on Surface Plasmons, Metamaterials, and Catalysis, Rice University, Houston, TX. October 23, 2013.

Super-resolution SERS imaging. Invited oral. SciX. Milwaukee, WI. October 1, 2013.

Super-resolution imaging of plasmonic nanostructures. Invited oral. Progress in Electromagnetics Research Symposium (PIERS), Stockholm, Sweden, August 14, 2013.

Super-resolution imaging of plasmonic nanostructures. Invited oral. 245th ACS National Meeting, New Orleans, Louisiana, April 7, 2013.

Imaging SERS hot spots with super-resolution microscopy of multiple analytes. Invited oral. SciX (formerly FACCS), Kansas City, MO. October 4, 2012.

Super-resolution imaging in SERS: do we really know where the hot spot is? Invited oral. Noble Metal Nanoparticles Gordon Research Conference, Mt. Holyoke College, South Hadley, MA. June 17, 2012. (Talk canceled due to illness).

Super-resolution imaging of plasmonic nanoparticle hot spots. Invited oral, presented at 2nd International Conference on Frontiers in Plasmonics. Sichuan University, Chengdu, Sichuan, China. April 11, 2012.

Single molecules and metal nanoparticle hot spots. Invited oral, PittCon, Orlando, FL. March 13, 2012.

Super-resolution imaging of diffusing analyte in surface-enhanced Raman scattering (SERS) hot spots. Contributed oral, presented at SPIE Photonics West, San Francisco, CA. January 22, 2012.

Super-resolution imaging of single molecule SERS hot spots. Invited oral, presented at American Chemical Society, Southwest Regional Meeting, Austin, TX. November 11, 2011.

Super-resolution imaging of plasmonically-enhanced hot spots. Invited oral, presented at 242nd American Chemical Society National Meeting, Division of Physical Chemistry, Denver, CO, August 28, 2011.

Super-resolution Imaging of Single Molecule SERS Hot Spots. Invited oral, presented at Pittcon, Atlanta, GA, March 13, 2011.

Super-resolution imaging of plasmonically-enhanced hot spots. Invited oral, AFOSR Molecular Dynamics Contractor's Meeting, Pasadena, CA. May 17, 2011.

Sub-diffraction limited imaging of plasmonic hot spots. Invited oral, presented at 240th American Chemical Society National Meeting, Division of Analytical Chemistry, Boston, MA, August 23, 2010.

High resolution molecular imaging of plasmonic hot spots. Poster, presented at Plasmonics Gordon Research Conference, Waterville, ME, June 13-18, 2010.

Point spread function fitting reveals intensity-correlated centroid diffusion in single molecule SERS hot spots. Poster, AFOSR Molecular Dynamics Contractor's Meeting, Arlington, VA. May 26, 2010.

Towards quantitative characterization of surface-enhanced Raman scattering (SERS) hot spots. Invited oral, DARPA SERS S&T Fundamentals Semi-Annual Meeting, Minneapolis, MN, April 29, 2010.

Towards quantitative characterization of surface-enhanced Raman scattering (SERS) hot spots. Invited oral, DARPA SERS S&T Fundamentals Semi-Annual Meeting, Minneapolis, MN, October 28 - 29, 2009.

FUNDING

Current funding

PI:

Source: DOE

Title: Plasmon-mediated electrochemical reactions: the influence of nanoparticle structure

Period: 07/15/2013 – 07/14/2018

Amount: \$750,000

Source: NSF

Title: Understanding plasmon-enhanced electromagnetic hot spots for surface-enhanced spectroscopies

Period: 08/15/2014 – 8/14/2018

Amount: \$285,805

Co-PI:

Source: AFOSR MURI

Title: Electrochemical Imaging and Mechanistic Studies on the Nanometer Scale

Role: Co-PI

Period: 01/15/2014 – 01/14/2019

Amount: \$7,500,000 (\$556,393 KAW)

Source: NSF

Title: DMREF: Collaborative Research: Nanoscale Temperature Manipulation via Plasmonic Fano Interferences

Role: Co-PI

Period: 08/15/2017 – 07/31/2020

Amount: \$440,050

Previous funding

PI:

Source: NSF

Title: Probing the location, number, and function of surface-bound antibodies on plasmonic nanoparticle biosensors using super-resolution fluorescence imaging

Period: 07/01/2014 – 6/30/2017

Amount: \$301,008

Source: Welch Foundation

Title: Visualizing competitive ligand binding on the surface of plasmonic nanoparticles with super-resolution fluorescence imaging

Period: 06/01/2014 – 05/31/2017

Amount: \$225,000

Funding suspended 1/15/2015 upon departure from state of Texas

Source: Welch Foundation

Title: Characterizing site-specific ligand binding on metal nanoparticle conjugates by high resolution far-field optical microscopy

Role: PI

Period: 06/01/11 – 05/31/14

Amount: \$170,000

Source: AFOSR

Title: Mapping local shape dependent electromagnetic field enhancements in single metallic nanoparticles using stochastic optical reconstruction microscopy (STORM)

Role: PI

Period: 05/01/09 – 11/30/11

Amount: \$300,000

Source: DARPA

Title: Quantitative characterization of SERS hot spots

Role: PI

Period: 07/01/09 - 06/30/11

Amount: \$199,909

Source: Welch Foundation

Title: Understanding the physical origin of photobleaching in single-molecule fluorescent dyes

Role: PI

Period: 06/01/08 - 05/31/11

Amount: \$150,000

Source: University of Texas Research Grant

Title: Development of functionalized atomic force microscopy probes for scanning surface enhanced Raman microscopy

Role: PI

Period: 09/01/11 – 8/31/12

Amount: \$6,000

Co-PI:

Source: NSF

Title: CCI Phase I: Center for Molecular Tools for Conjugated Polymer Analysis and Optimization

Role: Co-PI (PI: Barbara (deceased), Bielawski, UT Austin)

Period: 9/01/09 – 8/31/12

Amount: \$1,500,000 (~\$250,000 KAW)

SERVICE

Temple University

- CST space committee. 2018 – present.
- Graduate orientation discussion leader. 2017 – present.
- Department space committee, chair. 2017 – present.
- Faculty advisor DREAM (Directing through Recreation, Education, Adventure, and Mentoring) Program, Temple University. 2016 – present.
- Build and maintain chemistry department website. 2015 – present.
- Helped create a New Faculty Orientation Handbook
- Temple Materials Institute, Executive Committee
- Co-organizer, Temple Materials Institute Research Symposium, March 1, 2016.
- New building space committee, 2015 – 2016.
- Panelist, Professional development: early career researchers, July 24, 2015.
- College of Science and Technology Merit Committee, 2015-2017.
- Department website committee, 2015 - present.
- Graduate recruiting committee, 2015. 2018.
- Faculty search committee, 2014 – 2015, 2015 – 2016.

UT Austin

- Department of chemistry safety committee, 2014.
- College of Natural Sciences CNS101 Advisory committee, 2014.
- College of Natural Sciences Teaching Awards Committee, 2013 – 2014.
- Course and curriculum committee, 2014.
- Curriculum reform task force, January 2012 – 2014.
- Freshman women in natural sciences (WINS) guest lecture, annual, 2009-2013.
- Student ACS guest lecture, 2007, 2012.
- Analytical graduate student orientation, September 2011.
- Director of Graduate Portfolio Program in Nanoscience and Nanotechnology, June 2010 – October 2011. Events include:
 - NanoNight poster session (annual)
 - Portfolio seminar program (8-12 seminars per year)
 - Student travel awards (9 per year)
 - NanoLunch discussion series (1-2 per semester)
 - Development workshops (grant writing, tech transfer)
- STEM Graduate studies committee, 2010 – present.
- Department of Chemistry, diversity committee, Sept. 2011 – present.
- TMI-CNM seminar committee, 2010 – 2011.
- Atomic and Molecular Imaging IGERT executive committee, 2010-2011.
- ExploreUT volunteer, 2010, 2011.
- Summer Nanoscience Academy, “Nanoparticles and Color” activity, annual, 2009-2011.
- Organized CNM Nanoparticle Optics Mini-Symposium, March 2009.
- Welch Summer Scholar (rising high school senior) advisor, 2009, 2011.
- Lab advisor for UTeach Master’s in chemistry education course, 2009.
- UT Honors Colloquium, 2008, 2009, 2011, 2014.
- Analytical/physical chemistry seminar coordinator, 2008-2010.
- Analytical division coordinator, 2008-2009.
- Chair, Committee on Improving Graduate Recruiting, fall 2008.
- REU student host, summer 2008, 2011, 2014.
- Center for Nano- and Molecular Science faculty search committee, 2007-2008.
- Physical chemistry faculty search committee, 2007-2008.
- Analytical chemistry graduate admissions committee, 2008, 2010, 2011.

- Senate of College Councils Undergraduate Research Award faculty reviewer, 2007, 2008.
- Dean's honored graduates speaker selection committee, 2008, 2009.

External service

- Discussion leader, Gordon Research Conference "Noble Metal Nanoparticles." June 21, 2018.
- "Adventures in Silver" outreach activity with Freire Charter School. June 5-6, 2018.
- Member of Features Panel, *Analytical Chemistry*. 2018-2020.
- Co-organizer of symposium at Spring 2018 ACS Meeting on "Energy and Charge Transfer at Nanoscale Interfaces" with Libai Huang (Purdue) and Sean Roberts (UT Austin)
- Mentor/panelist at Noble Metal Nanoparticles Gordon Research Seminar, June 18-19, 2016.
- Poster judge at Noble Metal Nanoparticles Gordon Research Conference, June 19-24, 2016.
- Co-editor of *Chem. Rev.* special issue on super-resolution imaging
- Co-editor of *J. Phys. Chem. C* special issue: Richard Van Duyne Festschrift
- Co-organizer of symposium at Spring 2015 ACS Meeting on "Probing Nano-Plasmonic Phenomena at the Single Molecule, Single Electron, and Single Photon Level" with Stephan Link (Rice) and David Masiello (U. Washington).
- Discussion leader, Gordon Research Conference "Plasmonics." July 6-11, 2014.
- Career Day speaker, T.A. Brown Elementary School, Austin, TX. May 19, 2014.
- GirlStart Conference in STEM, workshop leader, "Chemistry in Action!" April 12, 2014.
- Physical chemistry poster session judge, 242nd National ACS Meeting, August 31, 2011.
- GirlStart Conference in STEM, workshop leader, "Exploring the Nanoworld: How do we "see" what we cannot see?" March 26, 2011.
- Discussion leader, Gordon Research Conference "Noble Metal Nanoparticles." June 20-25, 2010.
- Symposium Chair, ACS National Meeting, Division of Analytical Chemistry. August 22-26, 2010, Boston, MA.
- Austin Independent School District 5th grade teacher workshop, science expert
- Girlstart Technology Advisory Board
- Grant reviews: DOE, NSF, ARO, Molecular Foundry, CUNY system
- Journal reviews: PNAS, Nature Nanotechnology, Nature Communications, Accounts of Chemical Research, Nano Letters, JACS, ACS Nano, Journal of Physical Chemistry Letters, Analytical Chemistry, Journal of Physical Chemistry C, Optics Express, Langmuir, Chemistry of Materials, Small

PERSONNEL

Current personnel:

Postdoctoral researchers

- Yun Yu

Graduate students

- Taryn Anthony (First Summer Research Initiative Award, 2015, 2016)
- Vignesh Sundaresan
- Natalia Molina (Temple Presidential Fellowship, First Summer Research Initiative Award 2016)
- Joe Monaghan
- Phillip Reinhardt

Undergraduate students

- Jeff Williams
- Spencer Yeager
- Gia Phan
- Bonnie Haggerty

Previous personnel:

Postdoctoral researchers

- Ifat Kaplan-Ashiri (2008-2011), Staff scientist, Weizmann Institute of Science, Rehovot, Israel
- Leif Sherry (2009-2011), deceased
- Kathryn Mayer (2010-2012), Assistant Professor, Department of Physics, University of Texas San Antonio
- John Heckel (2011-2012), Corrosion specialist, Nalco, Sugarland, TX
- Kyle Marchuk (2013-2015), Microscopy specialist, University of California, San Francisco
- Sabyasachi Bandyopadhyay (2016-2017), postdoc, University of Pennsylvania
- Xiaoyu Cheng (2016-2018), Zhejiang University, College of Optical Science and Engineering
- Padmanabh Joshi (2015-2018)

Graduate students

- Andrew Wilson (Ph.D. 2016), postdoc, University of Illinois Urbana-Champaign
- Karole Blythe (Ph.D. 2016), Interdisciplinary scientist/chemist, Office of Quality Operations, Bureau of Engraving and Printing, Washington, DC
- Eric Titus (Ph.D. 2015), Principal Python Machine Learning Engineer, Capitol One, Washington, DC
- Maggie Weber (Ph.D. May 2015), Wacker Polysilicon, Charleston, TN
- Sarah Stranahan (Ph.D. June 2012), Cerilliant, Round Rock, TX
- Elizabeth Vokac (Masters, December 2012)
- Katherine Koen (Ph.D. May 2015, co-advised with David Vanden Bout)

Undergraduate students (17 total, 9 under-represented minorities, 12 female)

- Antonio Campos (2007-2009), Ph.D. in Chemistry, University of Minnesota
- Zachary Lewitz (2008-2009), current Pharm.D. student at University of Texas at Austin
- Rachel Shaver (2008-2010), M.S. Chemistry, MIT. current high school teacher, Baytown, TX
- Sara Chamberlin (2009-2010), current Chemistry Ph.D. candidate at University of Chicago. NDSEG Fellowship.
- Estefania Fernandez (2011-2012), current M.D./Ph.D candidate, Washington University
- Glennis Massey (2011-2012), HCV Testing, Austin, TX
- Callie Mitchell (2011-2013), Scott and White, Round Rock, TX
- Andrea Wheat (2011)
- Tyler McDonnel (2011)
- Kayla Love (REU student, 2011)
- Zainab Saihati (2011-2012), current chemistry Ph.D candidate, CalTech
- Jennifer Linares (2012-2013)
- Yutichai Mueanngern (2012-2013), current chemistry Ph.D. candidate at Ohio State
- Taylor Hernandez (2014), current chemistry Ph.D. candidate at Rice University. NSF Graduate Research Fellowship.
- Neda Shirazi (2014), current chemistry Ph.D. candidate at University of New Mexico
- Zijian Hao (2015-2016), current chemistry Ph.D candidate at University of Pittsburgh
- Alexandria Martinez (REU student, 2016)

- Aaron McLeod (2016-2018), starting Ph.D. program in chemistry fall 2018, UCSD
- Allison Cutri (2016-2018), starting Ph.D. program in chemistry fall 2018, Notre Dame

High school students

- Rachel Jagielski
- Mishi Bushan
- Rhianna Velasquez