

Curriculum Vitae

Dr. Wei Xiong

UC San Diego

Department of Chemistry and Biochemistry

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Education:

Ph.D in Chemistry, University of Wisconsin-Madison, Research Advisor: Professor Martin T. Zanni, 2006-2011

Thesis: Development and Applications of Shaper-Based 2D IR and SFG spectroscopy

B.S. in Chemistry, Peking University, China, Research Advisor: Professor Yuan Kou, 2002-2006

Appointments:

Assistant Professor, 2014 – Present

Department of Chemistry and Biochemistry, UCSD

Postdoctoral Research Associate and Nanoparticle Team Lead, 2011 – 2014

JILA, University of Colorado-Boulder, Research Advisors: Professors Henry Kapteyn and Margaret Murnane

Ph.D. Graduate Research Assistant, 2006 – 2011

Department of Chemistry, University of Wisconsin-Madison, Research Advisor: Professor Martin Zanni

Undergraduate Research Assistant, 2004 – 2006.

Department of Chemistry, Peking University, Research Advisor: Professor Yuan Kou

Honors:

- DARPA Director's Fellow, 2017
- AFOSR Young Investigator Program Award, 2016
- DARPA Young Faculty Award, 2015
- Chinese Government Award for Outstanding Self-Financed Students Abroad, 2012
- K.V. Reddy Award in Physical Chemistry, UW-Madison, 2011
- GSFLC Traveling Grant, UW-Madison, 2010
- General Electric Fellowship, Peking University, 2006

Professional Affiliations:

Members, American Chemical Society

Research Interests:

Study complex interfaces using HD 2D SFG spectroscopy

Interface Sensitive Microscopy

Develop new capability for time resolved tabletop soft x-ray spectroscopy.

Current and Pending Grants

1. Heterodyned 2D SFG Spectromicroscopy– in situ visualization functionality origins at complex nano-assembly interfaces, DARPA(YFA), \$1,000,000.00

2. Tracking Ultrafast Charge Dynamics in Energy Materials with Atomic Specificity, AFOSR (YIP), \$360,000.00

Professional Service Activities

- **Reviewer:** Journal of Physical Chemistry, Chemical Physics, Nature Communications, Optics Letters, and Nature Physics, Angewandte Chemie, Small
- **Grant Referee:** NSF (Referee and Panelist), DOE, ACS PRF

Publications (* independent publications from UCSD)

- 22*. Z.Li, J. Wang, Y. Li, W. Xiong, "Solving the "Magic Angle" Challenge in Determining Molecular Orientation Heterogeneity at Interfaces", *JPCC*, 120, 20239, 2016
- 21*. Yingmin Li, Jiayi Wang, Melissa L. Clark, Clifford P. Kubiak, Wei Xiong, "Characterizing Interstate Vibrational Coherent Dynamics of Surface Adsorbed Catalysts by Fourth-order 3D SFG Spectroscopy", *Chemical Physics Letter, Frontier Cover Article*. 650, 1, 2016
20. Jennifer L. Ellis, Daniel D Hickstein, Wei Xiong, Franklin Dollar, Brett B Palm, K Ellen Keister, Kevin Michael Dorney, Chengyuan Ding, Tingting Fan, Molly B. Wilker, Kyle J. Schnitzenbaumer, Gordana Dukovic, Jose Luis Jimenez, Henry C. Kapteyn, and Margaret Murnane, Materials Properties and Solvated Electron Dynamics of Isolated Nanoparticles and Nanodroplets Probed with Ultrafast Extreme Ultraviolet Beams, *JPCL*, 7, 609, 2016 .
- 19*. Yingmin Li, Jiayi Wang, Wei Xiong, "Probing Band Gaps and Molecular Orderings of Organic Semiconductors at Buried Interfaces by Electronic Sum Frequency Generation Spectroscopy", *JPCC*, 119,28083, 2015
- 18*. Jiayi Wang, Melissa Clark, Yingmin Li, Camille Kaslan, Cliff Kubiak, Wei Xiong, "Short Range Catalyst-Surface Interactions Revealed by Heterodyne Two Dimensional Sum Frequency Generation Spectroscopy", *JPCL*, 6, 4204, 2015
17. Jennifer L Ellis, Daniel D Hickstein, Kyle J Schnitzenbaumer, Molly B Wilker, Brett B Palm, Jose L Jimenez, Gordana Dukovic, Henry C Kapteyn, Margaret M Murnane, Wei Xiong, "Solvents effects on charge transfer from quantum dots", *JACS*, 137, 3759, 2015
16. Daniel D. Hickstein, Franklin Dollar, Jennifer L. Ellis, Kyle J. Schnitzenbaumer, K. Ellen Keister, George M. Petrov, Chengyuan Ding, Brett B. Palm, Jim A. Gaffney, Mark E. Foord, Stephen B. Libby, Gordana Dukovic, Jose L. Jimenez, Henry C. Kapteyn, Margaret M. Murnane, and Wei Xiong, "Mapping nanoscale absorption of intense femtosecond laser pulses using plasma explosion imaging" , *ACS Nano*, 8, 8810. 2014
15. C. Ding, W. Xiong, T. Fan, D. D. Hickstein, T. Popmintchev, X. Zhang, M. Walls, M.M. Murnane, H.C. Kapteyn, "High flux coherent super-continuum soft X-ray source driven by a single-stage, 10mJ, Ti:sapphire amplifier-pumped OPA ", *Optical Express*, 22, 6194. 2014
14. D.D. Hickstein, F. Dollar, J. Gaffney, M. Foord, G. Petrov, B.E. Palm, K.E. Keister, J.L. Ellis, C. Ding, S. Libby, J.L. Jimenez, H.C. Kapteyn, M.M. Murnane, W. Xiong "Observation and control of shock waves in individual nanoplasmas", published online PRL, DOI: <http://dx.doi.org/10.1103/PhysRevLett.112.115004>.
Highlighted in Physics Focus
13. W. Xiong*, D. D. Hickstein, K.J. Schnitzenbaumer, J.L. Ellis, B.B. Palm, K.E. Keister, C. Ding, L. Miaja-Avila, G. Dukovic, J.L. Jimenez, M. M. Murnane, H.C. Kapteyn, " Photoelectron spectroscopy of CdSe nanocrystals in the gas phase: a direct measure of the evanescent electron wavefunction of quantum dots", *Nano Lett*, **13**, 2924, 2013.
12. W.Xiong, J.E. Laaser, R.D. Mehlenbacher, M.T. Zanni, "Adding a dimension to the infrared spectra of

- interfaces using heterodyne detected 2D sum-frequency generation (HD 2D SFG) spectroscopy," *PNAS* **108**, 20902 (2011).
11. J.E. Laaser, W. Xiong, M.T. Zanni, "Time-domain SFG spectroscopy using mid-IR pulse shaping: Practical and intrinsic advantages," *J. Phys. Chem. B*, **115**, 2536 (2011).
 10. A.M. Woys, Y.S. Lin, A.S. Reddy, W. Xiong, J.J. de Pablo, J.L. Skinner and M. T. Zanni, "2D IR Line Shapes Probe Ovispirin Peptide Conformation and Depth in Lipid Bilayers," *J. Am. Chem. Soc.* **132**, 2832 (2010).
 9. P. Paoprasert, J.E. Laaser, W. Xiong, R.A. Franking, R.J. Hamers, M.T. Zanni, J.R. Schimidt, P. Gopalan, "Bridge-Dependent Interfacial Electron Transfer from Rhenium-Bipyridine Complexes to TiO₂ Nanocrystalline Thin Films," *J. Phys. Chem. C* **114**, 9898 (2010).
 8. W. Xiong, J.E. Laaser, P. Paoprasert, R. Franking, R. J. Hamers, P. Gopalan, and M.T. Zanni, "Transient 2D IR spectroscopy of charge injection in dye-sensitized nanocrystalline thin films," *J. Am. Chem. Soc.* **131**, 18040 (2009).
 7. W. Xiong, D.B. Strasfeld, S.H. Shim, M.T. Zanni, "Automated 2D IR spectrometer mitigates the influence of high optical densities", *Vib. Spectrosc.* **50**,135 (2009). ***Special Issue for Young Investigators*.
 6. W. Xiong and M.T. Zanni, "Signal enhancement and background cancellation in collinear 2D spectroscopies", *Opt. Lett.* **33**, 1371 (2008).
 5. S.C. Hou, Y. Cao, W. Xiong, H.C. Liu, Y. Kou, "Site requirements for the oxidative coupling of methane on SiO₂-supported Mn catalysts," *Ind. Eng. Chem. Res.* **45**, 7077 (2006).
 4. S.C. Hou, W. Xiong, L.T. Liu, Y. Cao, H.C. Liu, Y. Kou, "Effect of Na₂SO₄ on structure and catalytic properties of Mn/SiO₂ for oxidative coupling of methane", *Chin.J. Catal.* **27**, 678 (2006).
 3. S.C. Hou, Y. Cao, W. Xiong, L.T. Liu, Y. Kou, "In situ XRD study on sodium salt-modified Mn/SiO₂ catalysts for the oxidative coupling of methane," *Chin. J. Catal.* **27**, 553 (2006)
 2. H. Tao, L. He, W.S. Liu, L. Xu, W. Xiong, T. Wang, Y. Kou, "Preparation, characterization and application of amino acid-based green ionic liquids," *Green Chem.* **7**, 639 (2006)
 1. L. He, G.H. Tao, W.S. Liu, W. Xiong, T. Wang, Y. Kou, "One-pot synthesis of Lewis acidic ionic liquids for Friedel-Crafts alkylation," *Chin. Chem. Lett.* **17321** (2006)

Presentations

Invited Lectures at National and International Meetings

1. Invited Talk, "Direct Interfacial Charge Transfer", 2nd Sino-China Young Scientist Symposium on Surface Structure and Dynamics, Göttingen, Germany, May 2017
2. Invited Talk, "Adding a dimension to sum frequency generation spectroscopy", Telluride Science Research Conference in China (TSRC2) workshop on Nonlinear Optics at Interfaces, July 2017
3. Invited Talk, "2D vibrational spectroscopy at strong light-matter coupling regime", Telluride Vibrational Dynamics workshop, Aug 2017
4. "Ultrafast time resolved photoelectron spectroscopy of charge transfer between nanomaterials and organic dyes", 2014 Gordon Conference on Photoionization & Photodetachment, Galveston, TX, Feb. 26 2014
5. "Probing electron dynamics in molecules, quantum dots, and materials at the space-time limits using coherent tabletop high harmonic X-rays", 246th ACS National Meeting, Indianapolis, IN, Sep, 2013
6. "Nonlinear infrared spectroscopy of interface", SPIE NanoScience + Engineering Conference, San Diego, CA, Aug.21, 2011

Invited Lectures at Institutions

1. "Ultrafast nonlinear spectroscopy to reveal molecular structure and dynamics at interfaces" San Diego State University, Department of Chemistry, Nov. 2016
2. "Ultrafast nonlinear spectroscopy to reveal molecular structure and dynamics at interfaces" UC Riverside, Department of Chemistry, Oct. 2016

3. “Investigating surface electronic and molecular structure & dynamics by ultrafast non-linear spectroscopy” Peking University, Department of Physics, Dec., 2015
4. “Revealing the interfacial structures and dynamics of nanomaterials”, Condense Matter Physics Seminar, UCSD, Department of Physics, Oct., 2014
5. “Revealing the interfacial structures and dynamics of nanomaterials”, State Key Lab for Surface Physics, Institute of Physics, CAS, Beijing, April, 2014
6. “Table top ultrafast x-ray spectroscopy”, Andrews University, MI, Sep, 2013

Contributed Talks and Posters

1. Talk, “Ultrafast Direct Interfacial Charge Transfer”, International Conference of Time Resolved Vibrational Spectroscopy (TRVS), Cambridge, UK, July, 2017
2. Talk, “Measuring orientation heterogeneity of heterogeneous catalysts using HD 2D SFG spectroscopy”, the 253rd ACS National Meeting, San Francisco, CA, Apr, 2017
3. Talk, “Direct charge transfer at organic semiconductor/metal interfaces”, the 253rd ACS National Meeting, San Francisco, CA, Apr, 2017
4. Talk, Wei Xiong, “Two Dimensional Sum Frequency Generation Spectroscopy of Catalysts on a Surface”, 20th International Conference on Ultrafast Phenomena, Santa Fe, NM, Jul. 2016
5. Poster, Jiayi Wang, Zhiguo Li, Yingmin Li, Wei Xiong “Molecular Monolayers on Solid Surfaces Investigated by HD 2D SFG Spectroscopy” Gordon Conference on Vibrational Spectroscopy, New England, MA, Jul. 2016
6. Talk, Wei Xiong, “Surface sensitive two dimensional vibrational spectroscopy for catalysts/electrode interfaces”, International Conference on Coherent Multidimensional Spectroscopy, Groningen, the Netherlands, Jun. 2016
7. Talk, Wei Xiong, “Surface sensitive two dimensional vibrational spectroscopy for complex interfaces”, ACS National meeting, San Diego, Mar. 2016
8. Poster, Jiayi Wang, Yingmin Li, Camille L. Kaslan, Melissa Clark, Clifford P. Kubiak, Wei Xiong, “Structural and Vibrational Dynamics Changes of Molecular Monolayer on Solid Surfaces Revealed by HD 2D SFG Spectroscopy” Gordon Conference on Dynamics at Surfaces, Newport, RI, Aug. 2015
9. Talk, Jiayi Wang, Yingmin Li, Camille L. Kaslan, Melissa Clark, Clifford P. Kubiak, Wei Xiong, “Structural and Vibrational Dynamics Changes of Molecular Monolayer on Solid Surfaces Revealed by HD 2D SFG Spectroscopy” International Conference of Time Resolved Vibrational Spectroscopy (TRVS), Madison, WI, June, 2015
10. Talk, Wei Xiong, “Investigating time dependent molecular conformation and electron transfer dynamics at interfaces”, New Laser Scientist Conference, Tuscon, AZ, Oct., 2014
11. Poster, Jennifer L. Ellis, Daniel D. Hickstein, Kyle J. Schnitzenbaumer, Molly B. Wilker, Brett B. Palm, Jose L. Jimenez, Gordana Dukovic, Henry C. Kapteyn, Margaret M. Murnane, Wei Xiong “Ultrafast dynamics of CdSe nanocrystals revealed by gas-phase time-resolved photoelectron spectroscopy”, Ultrafast Phenomena, Okinawa, Japan, July, 2014
12. Poster, Jennifer L. Ellis, Daniel D. Hickstein, Kyle J. Schnitzenbaumer, Molly B. Wilker, Brett B. Palm, Jose L. Jimenez, Gordana Dukovic, Henry C. Kapteyn, Margaret M. Murnane, Wei Xiong “Solvent effects on charge transfer dynamics of CdSe”, International Conference on Quantum Dots, Milan, Italy, May, 2014
13. Hot topic talk, Wei Xiong, Jennifer L. Ellis, Daniel D. Hickstein, Kyle J. Schnitzenbaumer, Brett B. Palm, Jose L. Jimenez, Gordana Dukovic, Henry C. Kapteyn, Margaret M. Murnane “Photoelectron spectroscopy (PES) of CdSe nanoparticles in the gas phase: A measurement of the evanescent electron

- wavefunction”, 2013 Gordon Research Conference on Gaseous Ions, Galveston, TX, Feb. 2013
14. Poster, Wei Xiong, Jennifer E. Laaser, Randy D. Mehlenbacher, Martin T. Zanni, “Time and frequency domain heterodyned sum frequency generation spectroscopy”, Poster, 5th International Conference on Coherent Multidimensional Spectroscopy, Minneapolis, MN, Aug.18, 2010
 15. Talk, Wei Xiong, Jennifer E. Laaser, Peerasak Paoprasert, Ryan A. Franking, Robert J. Hamers, Padma Gopalan, Martin T. Zanni “Transient 2D IR spectroscopy of charge injection at organic-inorganic interfaces”, Contributed talk, 17th International Conference on Ultrafast Phenomena, Snowmass, CO, Jul.20, 2010
 16. Talk, Wei Xiong, Martin T. Zanni “Automated 3D IR by pulse shaper”, Post-symposium of 4th International Conference on Coherent Multidimensional Spectroscopy, Kyoto, Japan, Aug.27, 2008
 17. Poster, Wei Xiong, Martin T. Zanni “Collinear Multidimensional Infrared Spectroscopy ”, 4th International Conference on Coherent Multidimensional Spectroscopy, Kyoto, Japan, Aug.31, 2008