

## Andrew J. Wilson

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### CURRENT POSITION

**Assistant Professor**

July 2020 – present

Department of Chemistry  
University of Louisville, Louisville, KY

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### EDUCATION

- **The University of Texas at Austin.** Austin, TX  
Ph.D., Physical Chemistry  
Certification in Nanoscience and Nanotechnology  
December 2015
- **The University of Iowa.** Iowa City, IA  
B.S., Chemistry  
May 2010

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### PROFESSIONAL EXPERIENCE

- **Postdoctoral Research Fellow** 2016–2020  
*Springborn Postdoctoral Fellow 2016-2018*  
*Department of Chemistry, University of Illinois at Urbana-Champaign,*  
*Urbana, IL*  
Advisor: Professor Prashant K. Jain
- **Postdoctoral Research Fellow** 2015–2016  
*Department of Chemistry, Temple University,*  
*Philadelphia, PA*  
Advisor: Professor Katherine A. Willets
- **Graduate Research Fellow** 2010–2015  
*Department of Chemistry, The University of Texas at Austin,*  
*Austin, TX*  
Advisor: Professor Katherine A. Willets  
*Dissertation Title: Optical Readouts of Electrochemistry on Plasmonic Nanoparticle*  
*Electrodes*
- **Undergraduate Research Assistant** 2009–2010  
*Department of Chemistry, The University of Iowa,*  
*Iowa City, IA*  
Advisor: Professor Johna Leddy

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**PUBLICATIONS**

30. P.B. Joshi and **A.J. Wilson\***. “Understanding Electrocatalysis at Nanoscale Electrodes and Single Atoms with Operando Vibrational Spectroscopy,” *Curr. Opin. Green Sustain. Chem.* **2022**, *in press*  
\*Invited review for the Special Issue on Nanocatalysis
29. P.B. Joshi and **A.J. Wilson\***. “Plasmonically enhanced electrochemistry boosted by nonaqueous solvent,” *J. Chem. Phys.* **2022**, *156*, 241101  
\*Invited article for the JCP Special Topic on Plasmon-Driven Energy Conversion
28. D. Ogulu, P.P. Bora, M. Bihani, S. Sharma, T.N. Ansari, **A.J. Wilson**, J.B. Jasinski, F. Gallou, S. Handa. “Phosphine ligand-free bimetallic Ni(0)Pd(0) nanoparticles as catalyst for facile, general, sustainable, and highly selective 1,4-reductions in aqueous micelles,” *ACS Appl. Mater. Interfaces* **2022**, *14*, 6754-6761
27. P.B. Joshi, N. Karki, and **A.J. Wilson\***. “Electrocatalytic CO<sub>2</sub> reduction in acetonitrile enhanced by the local environment and mass transport of H<sub>2</sub>O,” *ACS Energy Lett.* **2022**, *7*, 602-609
26. T.N. Ansari, S. Sharma, S. Harza, J.B. Jasinski, **A.J. Wilson**, F. Hicks, D.K. Leahy, S. Handa. “Shielding effect of nanomicelles: Stable and catalytically active oxidizable Pd(0) nanoparticle catalyst compatible for cross-couplings of water-sensitive acid chlorides in water,” *JACS Au* **2021**, *1*, 1506-1513
25. D. Devasia, **A.J. Wilson**, J. Heo, V. Mohan, and P.K. Jain. “A rich catalog of C–C bonded species formed in CO<sub>2</sub> reduction on a plasmonic photocatalyst,” *Nat. Commun.* **2021**, *12*, 2612  
\*Editors’ Highlight in Catalysis
24. **A.J. Wilson** and P.K. Jain. “Light-induced voltages in catalysis by plasmonic nanostructures,” *Acc. Chem. Res.* **2020**, *53*, 1773-1781  
\*Among most read articles, September 2020 list
23. J. Wang, J. Heo, C. Chen, **A.J. Wilson**, and P.K. Jain. “Ammonia oxidation enhanced by photopotential generated by plasmonic excitation of a bimetallic electrocatalyst,” *Angew. Chem. Int. Ed.* **2020**, *59*, 18430-18434  
Designated as “Hot Paper”
22. **A.J. Wilson**, D. Devasia, P.K. Jain. “Nanoscale optical imaging in chemistry,” *Chem. Soc. Rev.* **2020**, *49*, 6087-6112
21. **A.J. Wilson**, V. Mohan, P.K. Jain. “Mechanistic understanding of plasmon-enhanced electrochemistry,” *J. Phys. Chem. C* **2019**, *123*, 29360-29369
20. **A.J. Wilson** and P.K. Jain. “Structural dynamics of the oxygen evolving complex of Photosystem II in water-splitting action,” *J. Am. Chem. Soc.* **2018**, *140*, 5853-5859

19. S. Yu, **A.J. Wilson**, J. Heo, P.K. Jain. “Plasmonic control of multi-electron transfer and C-C coupling in visible-light-driven CO<sub>2</sub> reduction on Au nanoparticles,” *Nano Lett.* **2018**, *18*, 2189-2194  
\*Featured on the April issue front cover  
\*Among most read articles, March and May 2018 list  
\*Featured in Chemistry World article “Forcing reactions with plasmons”  
\*Thomson Reuters Highly Cited (top 1%)
18. S. Yu, **A.J. Wilson**, G. Kumari, X. Zhang, P.K. Jain. “Opportunities and challenges of solar-energy-driven carbon dioxide to fuel conversion with plasmonic catalysts,” *ACS Energy Lett.* **2017**, *2*, 2058-2070  
\*Among most read articles, September 2017 list  
\*Featured in virtual issue “Plasmons for Energy Conversion”, *ACS Energy Lett.*, **2018**, *3*, 1467–1469
17. Z. Zhang, P. Li, Y. Tang, **A.J. Wilson**, K.A. Willets, M. Wuttig, R. Xiong, S. Ren. “Tunable electroresistance and electro-optic effects of transparent molecular ferroelectrics,” *Sci. Adv.* **2017**, *3* (8), e1701008  
\*News Spotlight, Nanowerk: Advancing molecular ferroelectric thin-film technologies.  
<http://www.nanowerk.com/spotlight/spotid=47909.php>
16. Y. Kim, **A.J. Wilson**, P.K. Jain. “The nature of plasmonically assisted hot electron transfer in a donor-bridge-acceptor complex,” *ACS Catal.* **2017**, *7*, 4360-4365
15. 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 Discuss.* **2017**, *205*, 245-259
14. V. Sundaresan, K. Marchuk, Y. Yu, E.J. Titus, **A.J. Wilson**, C. 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.* **2017**, *89*, 922-928
13. K.A. Willets, **A.J. Wilson**, V. Sundaresan, P.B. Joshi. “Super-resolution imaging and plasmonics,” *Chem. Rev.* **2017**, *117*, 7538–7582
12. S. Zaleski, M.F. Cardinal, D.V. Chulhai, **A.J. Wilson**, K.A. Willets, L. Jensen, R.P. Van Duyne. “Towards Monitoring Electrochemical Reactions with Dual-Wavelength SERS: Characterization of Rhodamine 6G (R6G) Neutral Radical Species and Covalent Tethering of R6G to Silver Nanoparticles,” *J. Phys. Chem. C* **2016**, *120*, 24982-24991
11. S. Zaleski, **A.J. Wilson**, M. Mattei, X. Chen, G. Goubert, M.F. Cardin, K.A. Willets, R.P. Van Duyne. “Investigating nanoscale electrochemistry with surface- and tip-enhanced Raman spectroscopy,” *Acc. Chem. Res.* **2016**, *49*, 2023-2030

10. **A.J. Wilson** and K.A. Willets. “Unforeseen distance-dependent SERS spectroelectrochemistry from surface-tethered Nile Blue: the role of molecular orientation,” *Analyst* **2016**, *141*, 5144-5151
9. **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* **2016**, *120*, 21091-21098
8. **A.J. Wilson** and K.A. Willets. “Molecular Plasmonics,” *Annu. Rev. Anal. Chem.* **2016**, *9*, 27-43
7. B. Xu, Z. Luo, **A.J. Wilson**, K. Chen, H.D. Chopra, X. Chen, K.A. Willets, Z. Dauter, S. Ren. “Multifunctional charge-transfer single crystals through supramolecular assembly,” *Adv. Mater.* **2016**, *28*, 5322-5329
6. B. Xu, Hu. Li, Ha. Li, **A.J. Wilson**, L. Zhang, K. Chen, K.A. Willets, F. Ren, J.C. Grossman, S. Ren. “Chemically driven interfacial coupling in charge-transfer mediated functional superstructures,” *Nano. Lett.* **2016**, *16*, 2851-2859
5. 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” *Chem. Mater.* **2016**, *28*, 2441-2448
4. **A.J. Wilson**, K. Marchuk, K.A. Willets. “Imaging electrogenerated chemiluminescence at single gold nanowire electrodes,” *Nano Lett.* **2015**, *15*, 6100-6115
3. M.L. Weber, **A.J. Wilson**, K.A. Willets. “Characterizing the spatial dependence of redox chemistry on plasmonic nanoparticle electrodes using correlated super-resolution SERS imaging and electron microscopy,” *J. Phys. Chem. C* **2015**, *119*, 18591-18601
2. **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.* **2014**, *14*, 939-945
1. **A.J. Wilson** and K.A. Willets. “Surface-enhanced Raman scattering (SERS) imaging using noble metal nanoparticles,” *WIREs Nanomedicine and Nanobiotechnology* **2013**, *5*, 180-189

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## AWARDS

- Ralph E. Powe Junior Faculty Enhancement Award, Oak Ridge Associated Universities, 2022
- Student Champion, University of Louisville, 2022
- Springborn Postdoctoral Fellowship, University of Illinois at Urbana-Champaign, 2016-2018

- Fall 2015 Nano Portfolio Program Student Presentations Best Presentation Award, The University of Texas at Austin, 2015
- Professional Development Award/Travel Award, The University of Texas at Austin, 2014
- Jeff Byers Memorial Graduate Award in Chemistry and Chemical Engineering, The University of Texas at Austin, 2013-2014
- Faraday Teaching Award, The University of Texas at Austin, 2010-2011
- Analytical Chemistry Award, The University of Iowa, 2009

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## PRESENTATIONS

33. *TBA*, Indiana State University, Department of Chemistry and Physics, invited seminar, Terre Haute, IN, Fall 2023
32. *TBA*, University of Mississippi, Department of Chemistry, invited seminar, Oxford, MS, February 9, 2023
31. *TBA*, Electrochemical Society Student Chapter of Notre Dame, invited virtual seminar, Notre Dame, IN, October 12, 2022
30. *Plasmon-enhanced electrochemistry in nonaqueous solvent*, SciX Conference, Surface Plasmon Resonance (Plasmonics), invited talk, Covington, KY, October 3, 2022
29. *Probing local environments and the dynamics of electrocatalytic CO<sub>2</sub> reduction in acetonitrile with spatiotemporally-resolved SERS spectroscopy*, Gordon Research Conference, Electrochemistry, poster, Ventura, CA, September 11-16, 2022
28. *Tracking reaction intermediates in electrocatalysis with high spatiotemporal resolution*, ACS National Meeting, invited talk, Chicago, IL, August 24, 2022
27. *Using plasmonics to measure and enhance electrocatalysis*, University of Iowa, Department of Chemistry, invited virtual seminar, Iowa City, IA, March 31, 2022
26. *Using light to study and enhance electrochemistry*, University of Louisville, Society of Undergraduate Chemistry Students, invited virtual talk, Louisville, KY, March 7, 2022
25. *CO<sub>2</sub> Reduction in Acetonitrile Enhanced by Electrolyte-assisted Mass Transport of Water*, ACS Southeastern Regional Meeting, oral presentation, Birmingham, AL, November 10, 2021
24. *Enhancing laboratory preparation with Perusall*, University of Louisville, Seminar on Teaching for New Faculty, poster, Louisville, KY, April 7, 2021
23. *Vibrational microscopy*, Southwestern University, Dept. of Chemistry, invited virtual talk, Georgetown, TX, March 23, 2021
22. *Energy conversion and storage at the nanoscale*, University of Louisville, Society of Undergraduate Chemistry Students, invited virtual talk, Louisville, KY, March 15, 2021

21. *Photovoltages in plasmonic electrocatalysis*, Eastern Kentucky University, Dept. of Chemistry, invited virtual seminar, Richmond, KY, February 12, 2021
20. *Boosting electrocatalytic activity with plasmonic electrodes*, BK 21 Four International Symposium: Materials for Solar Energy Harvesting & Utilization, Yeungnam University, invited virtual oral presentation, Gyeongsan, South Korea, January 21, 2021
19. *Accelerating electrocatalysis with plasmons*, Western Kentucky University, Dept. of Chemistry, invited virtual seminar, Bowling Green, KY, September 18, 2020
18. *Synergy between nanoplasmonics and electrochemistry*, Brandeis University, Dept. of Chemistry, invited seminar, Waltham, MA, December 9, 2019
17. *Synergy between nanoplasmonics and electrochemistry*, University of Louisville, Dept. of Chemistry, invited seminar, Louisville, KY, November 21, 2019
16. *Synergy between nanoplasmonics and electrochemistry*, Oak Ridge National Laboratory, invited seminar, Oak Ridge, TN, November 18, 2019
15. *Watching chemistry at the nanoscale with in situ SERS microscopy*, Sandia National Laboratories, invited seminar, Albuquerque, NM, April 15, 2019
14. *Watching chemistry at the nanoscale with SERS microscopy*, Marquette University, Dept. of Chemistry, invited seminar, Milwaukee, WI, January 14, 2019
13. *Watching chemistry at the nanoscale with SERS microscopy*, Mississippi State University, Dept. of Chemistry, invited seminar, Mississippi State, MS, November 29, 2018
12. *Photosynthesis in Photosystem II-Plasmonic Hybrid Photocatalysts*, Gordon Research Conference, Renewable Energy: Solar Fuels, poster, Ventura, CA, January 28-February 2, 2017
11. *Structural Analysis of the Oxygen Evolving Complex Using Low Frequency SERS*, International Symposium on Molecular Spectroscopy, oral presentation, Champaign-Urbana, IL, June 21, 2017
10. *Probing Nanoelectrochemistry with Optical Microscopy*, ACS National Meeting, oral presentation, Philadelphia, PA, August 23, 2016
9. *Optical Readouts of Nanoelectrochemistry on Plasmonic Electrodes*, Philadelphia Electrochemical Society Symposium, poster, Drexel University, Philadelphia, PA, April 28, 2016
8. *Spectroelectrochemical Microscopy on Plasmonic Nanoparticle Electrodes*, MRS Spring Meeting, poster, Phoenix, AZ, March 28-April 1, 2016
7. *Plasmon-assisted Electrochemistry*, Temple Materials Institute Inaugural Meeting, poster, Philadelphia, PA, March 1, 2016

6. *Optical Readouts of Electrochemistry on Plasmonic Nanoparticle Electrodes*, Nano Portfolio Program, oral presentation, The University of Texas at Austin, Austin, TX, December 2015 (won oral presentation competition)
5. *Electrochemistry on Plasmonic Nanoparticle Electrodes*, ACS National Meeting, oral presentation, Denver, CO, March 22-26, 2015
4. *Plasmon-mediated electrochemical reactions*, Gordon Research Conference: Plasmonics, poster, Newry, ME, July 6-11, 2014
3. *Visualizing Site-Specific Redox Potentials on the Surface of Plasmonic Nanoparticles*, Nano Night annual poster session, Center for Nano- and Molecular Science, The University of Texas at Austin, Austin, TX, March 26, 2014
2. *Visualizing Site-Specific Redox Potentials on the Surface of Plasmonic Nanoparticles*, 2014 CEC Annual Workshop on Electrochemistry, poster, Austin, TX, February 8-9, 2014
1. *Electron transfer rates of Cobalt (III) tris(1,10-phenanthroline)*, Analytical Chemistry Award, acceptance poster, Iowa City, IA, May 2009

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## SERVICE & OUTREACH

- Electrochemical Society Mid-America Section Chair, Fall 2021 – present
  - Outreach event, Next Generation Electrochemistry (NGenE) workshop, University of Illinois, Chicago, June 6, 2022
  - Reception, ACS Fall 22 National Meeting, Chicago, IL
- Lab Fees Committee, Department of Chemistry, University of Louisville, Fall 2021 – present
- Department Teaching Evaluation Program, University of Louisville, AY21-22
- Director of Undergraduate Research, Department of Chemistry, University of Louisville, Spring 2021 – present
- Graduate Admissions Committee, Department of Chemistry, University of Louisville, Fall 2020 – present
- Invited peer reviewer: *Department of Energy (Basic Energy Sciences), ACS Energy Letters, Science Advances, ACS Catalysis, Journal of Catalysis, Nature Communications, Nano Letters, Nature Reviews Chemistry, Advanced Materials, ACS Photonics, ACS Nano, ACS Applied Materials & Interfaces, Journal of Physical Chemistry, Journal of Chemical Physics, ACS Sustainable Chemistry & Engineering, MRS Communications, Laser & Photonics Reviews, Sensors, Nanomaterials, Catalysts, Leverhulme Trust (UK), Micromachines*
- Guest lecturer, “Nanomaterials, microscopy, and chemistry,” Fairdale High School, Louisville, KY, March 25, 2022
- Invited talk, Multicultural Association of Pre-Health Students, University of Louisville, March 21, 2022
- Invited talk, Society of Undergraduate Chemistry Students, University of Louisville, March 7, 2022

- Chemistry representative, Cardinal Preview Day, University of Louisville, October 16, 2021
- Panelist, Undergraduate Research Forum, Alpha Epsilon Delta, University of Louisville, September 16, 2021
- Seminar, “Undergraduate Research in Chemistry,” University of Louisville, August 25, 2021
- Invited talk, Society of Undergraduate Chemistry Students, University of Louisville, March 15, 2021
- Stockroom Manager Search Committee, Department of Chemistry, University of Louisville, Fall 2020
- Seminar on Teaching for New Faculty, University of Louisville, Louisville, KY, AY20-21
- High School STEM Teacher-University Researcher Network, Collaborative initiative between the National Science Teachers Association, the Tri-Services (Army, Navy, Air Force), and UofL’s College of Education and Human Development, October 8, 2020, virtual event
- Reviewer Board, *Nanomaterials*, 2020 – present
- Parkland Community College research shadow mentor, Younger Chemists Committee, East Central Illinois ACS Local Section, Urbana, IL, July 30, 2018
- Post-doc career panelist, Younger Chemists Committee, East Central Illinois ACS Local Section, Urbana, IL, May 15, 2018
- Committee member, Physical Chemistry Seminars, UIUC, 2017-2018
- Station leader, Women’s Chemist Committee Day Camp, “Nanochemistry,” Urbana, IL, June 24 & July 8, 2017
- Light/Matter Interactions at the Nano-Bio Interface, workshop participant, University of Illinois at Urbana-Champaign, IL, November 28-29, 2016
- Chemistry After Dark, “Probing Nanoelectrochemistry with Optical Microscopy,” Temple University, Philadelphia, PA, August 26, 2016, oral presentation
- Welch Summer Scholar Program, “Metal Nanoparticles and Color”, Austin, TX, July 3, 2014, oral presentation
- GirlStart Conference in STEM,
  - “Chemistry in Action”, Austin, TX, March 26, 2014
  - “Exploring the Nanoworld: How do we “see’ what we cannot see?”, Austin, TX, March 26, 2011
- Explore UT volunteer, Superabsorbent polymer demonstration, K-12, Austin, TX, 2011
- Judge
  - Graduate Student Regional Research Conference, University of Louisville, Louisville, KY, March 11, 2021
  - East Central Illinois ACS Undergraduate Research Conference, Urbana, IL, October 14, 2017
  - Rao Prize Competition, International Symposium on Molecular Spectroscopy, UIUC, Urbana, IL, 2017
  - Undergraduate Research Symposium, UIUC, Urbana, IL, April 27, 2017
  - Undergraduate Research Symposium, Temple University: College of Science & Technology, Philadelphia, PA, September 16, 2016



- Undergraduate Research Symposium, Temple University: College of Science & Technology, Philadelphia, PA, September 17, 2015
- “Safety Madness”, UT Austin, 2014

## TEACHING EXPERIENCE

### *University of Louisville*

- **Chem 625**, Advanced Analytical Chemistry Fall 2022
- **Chem 426**, Instrumental and Statistical Analysis Laboratory – WR Fall 2022
- **Chem 620**, Optical Spectrochemical Methods of Analysis Spring 2022
- **Chem 527**, Introduction to Separations and Spectroscopy – WR Fall 2020, 2021

### *Temple University*

- **Chem 8300**, Optical Spectroscopy and Microscopy Spring 2016  
Guest lecturer

### *University of Texas at Austin*

- **Chemistry 455**, Fundamentals of Analytical Chemistry Spring 2013, 2012
- **Chemistry 456**, Analytical Chemistry Fall 2012, 2011; Spring 2012
- **Chemistry 302**, Principles of Chemistry II Summer 2012
- **Chemistry 376K**, Advanced Analytical Chemistry Spring 2011
- **Chemistry 456**, Analytical Chemistry Laboratory Fall 2010

## RESEARCH PERSONNEL

### Postdoctoral researchers

Dr. Padmanabh B. Joshi, May 2021 – present

### Graduate students

Md Al Amin, November 2020 – present

Nawaraj Karki, January 2021 – present

### Undergraduate students

Jaley Adkins, January 2022 – present

\*2022 Summer Research Opportunity Program

### Alumni

- Kyle Barnett, January 2021 – April 2021 (undergraduate researcher)
- Virginia Noe, August 2021 – December 2021 (undergraduate researcher)  
\*2022 Summer Research Opportunity Program (declined)
- Hoang Gia An Tran, June 2021 – April 2022 (undergraduate researcher)  
\*Awarded an EVPRI Undergraduate Research Scholar Grant 8/9/2021-8/10/2022  
\*University Fellow, University of Louisville Graduate School, 2022