

Andrew J. Wilson

2320 South Brook Street, Louisville, KY, 40208
Department of Chemistry, University of Louisville
Phone: (502) 852-9279; E-mail: aj.wilson@louisville.edu
Lab website: <https://www.ajwilsonlab.org>

CURRENT POSITION

Assistant Professor

July 2020 – present

Department of Chemistry
University of Louisville, Louisville, KY

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

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

AWARDS

- National Science Foundation CAREER Award, 2024
- Ralph E. Powe Junior Faculty Enhancement Award, Oak Ridge Associated Universities, 2022
- Student Champion, University of Louisville, 2021-2022, 2023-2024, 2024-2025
- 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

PUBLICATIONS

‡undergraduate author, †contributed equally, *corresponding author

AT UNIVERSITY OF LOUISVILLE

42. M. Al-Amin[‡], J.V. Hemmer[†], **A.J. Wilson***. “Effect of temperature gradients on the selectivity of the electrocatalytic CO₂ reduction reaction,” **2025, submitted**
41. N. Karki and **A.J. Wilson***. “Modulation of selectivity in electrocatalytic CO₂ reduction with a magnetic field and imidazolium ionic liquids,” **2025, under revision**
40. M. Rahman, M. Al-Amin, A. Kaur, S. Jahan, **A.J. Wilson**, N. Ahamad. “Optimizing shell thickness of Ag@TiO₂ nanostructures by a simple top-down method to engineer effective SERS substrates and photocatalysts,” *ACS Omega* **2025**, *10*, 14940-14948
39. N. Karki, F.L. Mufoyongo, **A.J. Wilson***. “Utilizing the magnetic properties of electrodes and magnetic fields in electrocatalysis,” *Inorg. Chem. Front.* **2024**, *11*, 5414-5434
 - Invited review
38. N. Karki, I.G. Marquina, J.V. Hemmer, Y. Yu*, **A.J. Wilson***. “Suppressing competing solvent reduction in CO₂ electroreduction with a magnetic field,” *J. Phys. Chem. Lett.* **2024**, *15*, 7045-7054
37. M. Al-Amin, J.V. Hemmer, P.B. Joshi, K. Fogelman, **A.J. Wilson***. “Quantification and description of photothermal heating effects in plasmon-assisted electrochemistry,” *Commun. Chem.* **2024**, *7*, 70
 - Invited article: Collection on Plasmon-mediated Chemistry
 - 2024 Editor’s Highlights Collection

36. J.V. Hemmer, P.B. Joshi, A. Kaur, **A.J. Wilson***. “Reducing ensemble averaging for mechanistic understanding of electrocatalysis in energy conversion reactions,” *J. Phys. Chem. C* **2024**, *128*, 697-709
▪ Invited Perspective
35. C.L. Brosseau*, A. Colina*, J.V. Perales-Rondón, **A.J. Wilson***, P.B. Joshi, B. Ren*, X. Wang*. “Electrochemical Surface-Enhanced Raman Spectroscopy,” *Nat Rev Methods Primers* **2023**, *3*, 79
34. J.F. Adkins[‡], A. Kaur, M.S. Alom, H. Chandran, F. Ramezanipour, **A.J. Wilson***. “Directing the size and dispersity of Ag nanoparticles with kudzu leaf extracts,” *RSC Adv.* **2023**, *13*, 25360-25368
33. P.B. Joshi and **A.J. Wilson***. “Potential-dependent temporal dynamics of CO surface concentration in electrocatalytic CO₂ reduction,” *J. Phys. Chem. Lett.* **2023**, *14*, 5754-5759
32. J.V. Hemmer[†], P.B. Joshi[†], **A.J. Wilson***. “Tracking electrochemistry at single nanoparticles with surface-enhanced Raman scattering spectroscopy and microscopy,” *J. Vis. Exp.* **2023**, *195*, e65486
▪ Invited article: Emerging Methods for Nanoscale Electrochemistry
31. J. Lee, P.B. Joshi, **A.J. Wilson***, Y. Kim*. “Plasmon-Driven Near-Field Photopolymerization in a Gold Nanoparticle Colloid,” *J. Phys. Chem. C* **2023**, *127*, 8096-8103
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**, *38*, 100682
▪ 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 CO₂ reduction in acetonitrile enhanced by the local environment and mass transport of H₂O,” *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 CO₂ reduction on a plasmonic photocatalyst,” *Nat. Commun.* **2021**, *12*, 2612
- Editors’ Highlight in Catalysis

PRIOR TO UNIVERSITY OF LOUISVILLE

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 CO₂ 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

PRESENTATIONS

AT UNIVERSITY OF LOUISVILLE

INVITED SEMINARS

15. *TBA*, University of Illinois at Urbana-Champaign, Department of Chemistry, invited seminar, Urbana, IL, Fall 2025
14. *Modulating the microenvironment at electrode–electrolyte interfaces with external fields*, Washington University in St. Louis, Department of Chemistry, invited seminar, St. Louis, MO, April 24, 2025
13. *Modulating the microenvironment at electrode–electrolyte interfaces with external fields*, University of Kentucky, Department of Chemistry, invited seminar, Lexington, KY, April 18, 2025
12. *Plasmons and magnetic fields in electrochemistry*, University of Louisville, Department of Chemistry, invited seminar, Louisville, KY, September 13, 2024
11. *Controlling concentration gradients in electrochemistry with plasmons and magnetic fields*, Temple University, Department of Chemistry, invited seminar, Philadelphia, PA, April 11, 2024
10. *Formation and dynamics of CO in CO₂ electroreduction in acetonitrile*, University of Iowa, Department of Chemistry, invited seminar, Iowa City, IA, September 28, 2023
9. *Reducing ensemble averaging for mechanistic insight in electrocatalysis*, Indiana State University, Department of Chemistry and Physics, invited seminar, Terre Haute, IN, September 5, 2023
8. *Tracking reaction intermediates in electrocatalysis with SERS microscopy*, University of Mississippi, Department of Chemistry, invited seminar, Oxford, MS, February 9, 2023
7. *Plasmons in electrocatalysis*, University of Notre Dame, Electrochemical Society Student Chapter, invited seminar, Notre Dame, IN, October 12, 2022
6. *Using plasmonics to measure and enhance electrocatalysis*, University of Iowa, Department of Chemistry, invited seminar, Iowa City, IA, March 31, 2022
5. *Using light to study and enhance electrochemistry*, University of Louisville, Society of Undergraduate Chemistry Students, invited seminar, Louisville, KY, March 7, 2022

4. *Vibrational microscopy*, Southwestern University, Department of Chemistry, invited seminar, Georgetown, TX, March 23, 2021
3. *Energy conversion and storage at the nanoscale*, University of Louisville, Society of Undergraduate Chemistry Students, invited seminar, Louisville, KY, March 15, 2021
2. *Photovoltages in plasmonic electrocatalysis*, Eastern Kentucky University, Department of Chemistry, invited seminar, Richmond, KY, February 12, 2021
1. *Accelerating electrocatalysis with plasmons*, Western Kentucky University, Department of Chemistry, invited seminar, Bowling Green, KY, September 18, 2020

INVITED CONFERENCE PRESENTATIONS

10. *Impact of temperature gradients in plasmon-assisted electrochemistry*, ECS National Meeting, invited talk, Chicago, IL, October 14, 2025
9. *Measuring concentration changes of surface intermediates in electrocatalysis with microsecond time-resolved Raman spectroscopy*, SciX Conference, invited talk, Covington, KY, October 6, 2025
8. *Electrode surface heating in plasmon-assisted electrochemistry*, ACS National Meeting, invited talk, San Diego, CA, March 26, 2025
7. *Time-resolved spectroelectrochemistry on noble metal nanostructures*, Gordon Research Seminar, Noble Metal Nanoparticles, invited keynote address, South Hadley, MA, June 15, 2024
6. *Local heating, hot charge carrier, and solvent effects in plasmon-assisted electrochemistry*, Gordon Research Conference, Electrochemistry, invited talk, Ventura, CA, January 8, 2024
5. *Measuring the temporal evolution of surface intermediates in electrocatalysis*, ECS National Meeting, invited talk, Boston, MA, May 31, 2023
4. *Tracking surface intermediates in electrocatalysis with time-resolved electrochemical SERS microscopy*, ACS National Meeting, invited talk, Indianapolis, IN, March 28, 2023
3. *Plasmon-enhanced electrochemistry in nonaqueous solvent*, SciX Conference, Surface Plasmon Resonance (Plasmonics), invited talk, Covington, KY, October 3, 2022
2. *Tracking reaction intermediates in electrocatalysis with high spatiotemporal resolution*, ACS National Meeting, invited talk, Chicago, IL, August 24, 2022
1. *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

CONTRIBUTED PRESENTATIONS

4. *Plasmon-enhanced electrochemistry in nonaqueous solvents*, Gordon Research Conference, Noble Metal Nanoparticles, poster, South Hadley, MA, June 16-21, 2024
3. *Probing local environments and the dynamics of electrocatalytic CO₂ reduction in acetonitrile with spatiotemporally-resolved SERS spectroscopy*, Gordon Research Conference, Electrochemistry, poster, Ventura, CA, September 11-16, 2022
2. *CO₂ Reduction in Acetonitrile Enhanced by Electrolyte-assisted Mass Transport of Water*, ACS Southeastern Regional Meeting, oral presentation, Birmingham, AL, November 10, 2021
1. *Enhancing laboratory preparation with Perusall*, University of Louisville, Seminar on Teaching for New Faculty, poster, Louisville, KY, April 7, 2021

CO-AUTHORED PRESENTATIONS

26. J.V. Hemmer, M. Al-Amin, A.J. Wilson. “*Effect of temperature gradients on the selectivity of the CO₂ electroreduction reaction*,” Tristate Catalysis Society Annual Symposium, oral presentation, Convington, KY, September 11, 2025
25. N. Karki and A.J. Wilson. “*Magnetic field effects in electrocatalytic CO₂ reduction*,” ACS National Meeting, oral presentation, Washington, DC, August 20, 2025
24. A. Loiacono, N. Karki, E. Franceschini, E. Pastor, A.J. Wilson. “*Magnetic field effect on Ni-Cu alloys and Ni as electrocatalysts for CO₂ reduction*,” 45th Meeting of the Electrochemistry Group of the Royal Spanish Society of Chemistry, oral presentation, Tenerife, Canary Islands, Spain, July 16, 2025
23. N. Karki and A.J. Wilson. “*Enhancing the mass transport of CO₂ complexed with imidazolium-based ionic liquids in electrocatalytic CO₂ reduction in the presence of an external magnetic field*,” CARD Talk, oral presentation, Louisville, KY, March 27, 2025
22. N. Karki and A.J. Wilson. “*Magnetic field effects in electrocatalytic CO₂ reduction with imidazolium-based ionic liquids complexed with CO₂*,” PittCon, poster, Boston, MA, March 4, 2025
21. N. Karki and A.J. Wilson. “*Enhancing electrocatalytic CO₂ reduction using imidazolium-based ionic liquids in the presence of an external magnetic field*,” ACS Central Regional Meeting, oral presentation, Pittsburgh, PA, November 6, 2024
20. A. Kaur and A.J. Wilson. “*Investigating the role of electrolyte cations on CO intermediate formation in electrocatalytic CO₂ reduction*,” Graduate Student Regional Research Conference, poster, Louisville, KY, March 28, 2024
 - Best Poster Presentation Award
19. A. Kaur and A.J. Wilson. “*Investigating the role of electrolyte cations on CO intermediate formation in electrocatalytic CO₂ reduction*,” Graduate Student Regional Research Conference, oral presentation, Louisville, KY, March 28, 2024

18. F. Mufoyongo and A.J. Wilson. “*Enhancing ammonium synthesis from nitrate with electrocatalysis in a magnetic field,*” Graduate Student Regional Research Conference, poster, Louisville, KY, March 28, 2024
17. F. Mufoyongo and A.J. Wilson. “*Enhancing ammonium synthesis from nitrate with electrocatalysis in a magnetic field,*” Graduate Student Regional Research Conference, oral presentation, Louisville, KY, March 28, 2024
16. M. Al-Amin, J.V. Hemmer, P.B. Joshi, K. Fogelman, A.J. Wilson. “*Understanding the origin and effect of local heating in plasmon-assisted electrochemistry,*” ACS National Meeting, oral presentation, New Orleans, LA, March 20, 2024
15. N. Karki and A.J. Wilson. “*Enhancing CO:H₂ selectivity in CO₂ electroreduction with an external magnetic field,*” ACS National Meeting, oral presentation, New Orleans, LA, March 20, 2024
14. N. Karki and A.J. Wilson. “*Enhancing CO:H₂ selectivity in CO₂ electroreduction with an external magnetic field,*” Sci-Mix, ACS National Meeting, poster, New Orleans, LA, March 18, 2024
13. N. Karki and A.J. Wilson. “*Magnetic field-induced modulation of the ratio of CO:H₂ in electrocatalytic CO₂ reduction,*” ACS Southeastern Regional Meeting, oral presentation, Durham, NC, October 26, 2023
12. J. Adkins[‡] and A.J. Wilson. “*Directing the size and dispersity of silver nanoparticles with kudzu extracts,*” Undergraduate Arts & Research Showcase, poster, Louisville, KY, April 21, 2023
11. N. Karki and A.J. Wilson. “*Tuning the selectivity of electrocatalytic CO₂ reduction with an external magnetic field,*” ACS Energy and Fuels Student Travel Award competition, poster, Indianapolis, IN, March 28, 2023
10. N. Karki and A.J. Wilson. “*Tuning the selectivity of electrocatalytic CO₂ reduction with an external magnetic field,*” ACS National Meeting, oral presentation, Indianapolis, IN, March 27, 2023
9. P.B. Joshi and A.J. Wilson. “*Improving plasmonic enhancement in electrochemistry using nonaqueous solvents,*” ACS National Meeting, poster, Indianapolis, IN, March 27, 2023
8. J. Adkins[‡] and A.J. Wilson. “*Synthesis of silver nanoparticles using kudzu extract,*” ACC Meeting of the Minds Undergraduate Research Conference, oral presentation, Blacksburg, VA, March 25, 2023
7. N. Karki and A.J. Wilson. “*Effects of an external magnetic field in electrocatalytic CO₂ reduction,*” Graduate Student Regional Research Conference, poster, Louisville, KY, March 23, 2023

6. J.V. Hemmer, P.B. Joshi, A.J. Wilson. “*Measuring intermediates of electrochemical CO₂ reduction with spatially and temporally resolved SERS spectroscopy*,” Graduate Student Regional Research Conference, poster, Louisville, KY, March 23, 2023
5. Md Al Amin and A.J. Wilson. “*Isolation and quantification of photothermal heating in plasmon-enhanced electrochemistry*,” Graduate Student Regional Research Conference, poster, Louisville, KY, March 23, 2023
4. N. Karki and A.J. Wilson. “*Effects of an external magnetic field in electrocatalytic CO₂ reduction*,” Graduate Student Regional Research Conference, oral presentation, Louisville, KY, March 22, 2023
3. P.B. Joshi and A.J. Wilson. “*Plasmonics for understanding and enhancing electrochemistry in nonaqueous solvent*,” Midwest Universities Analytical Chemistry Conference, poster, Cincinnati, OH, October 28, 2022
▪ Best Poster Award
2. P.B. Joshi and A.J. Wilson. “*Engineering the local environment and mass transport of proton donors to enhance proton-coupled electrochemical reactions*,” ACS National Meeting, oral presentation, Chicago, IL, August 24, 2022
1. J. Adkins[‡] and A.J. Wilson. “*Synthesis of silver nanoparticles using plant-based extract*,” Summer Research Showcase, poster, Louisville, KY, August 5, 2022

PRIOR TO UNIVERSITY OF LOUISVILLE

INVITED SEMINARS

6. *Synergy between nanoplasmonics and electrochemistry*, Brandeis University, Department of Chemistry, invited seminar, Waltham, MA, December 9, 2019
5. *Synergy between nanoplasmonics and electrochemistry*, University of Louisville, Department of Chemistry, invited seminar, Louisville, KY, November 21, 2019
4. *Synergy between nanoplasmonics and electrochemistry*, Oak Ridge National Laboratory, invited seminar, Oak Ridge, TN, November 18, 2019
3. *Watching chemistry at the nanoscale with in situ SERS microscopy*, Sandia National Laboratories, invited seminar, Albuquerque, NM, April 15, 2019
2. *Watching chemistry at the nanoscale with SERS microscopy*, Marquette University, Department of Chemistry, invited seminar, Milwaukee, WI, January 14, 2019
1. *Watching chemistry at the nanoscale with SERS microscopy*, Mississippi State University, Department of Chemistry, invited seminar, Mississippi State, MS, November 29, 2018

CONTRIBUTED PRESENTATIONS

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, poster, Iowa City, IA, May 2009

FUNDING**AWARDED GRANTS****TOTAL: \$691,882**

4. co-PI (with Morgan Balabanoff), Kentucky Academy of Sciences, “Exploring Nanotechnology: Kentucky High School Outreach Program,” \$2,500.00 (2025)
3. PI, National Science Foundation, Division of Chemistry, Chemical Catalysis Program, “CAREER: Plasmonic enhancement of electrocatalytic oxygen reduction in nonaqueous solvents,” \$674,734.00 (2025-2030)
2. PI, Louisville Research Core Voucher Program, “Correlative mapping of reaction intermediates and catalyst structure in electrochemical CO₂ reduction,” \$4,648.00 (2024)
1. PI, Oak Ridge Associated Universities. Ralph E. Powe Junior Faculty Enhancement Award, “Uncovering intermediates in electrochemical transformations,” \$10,000.00 (2022-2023)

STUDENT GRANTS

TOTAL: \$9,025

7. 2025 Undergraduate Mentored Research Award. Students: Johann Hemmer and Colin Ackerman, Spring 2025, \$1500.00
6. ACS Energy and Fuels Division. Student: Nawaraj Karki, Spring 2024, \$2000.00
5. Graduate Student Council Travel Award, University of Louisville. Student: Md. Al-Amin, Spring 2024, \$350.00
4. Graduate Student Council Travel Award, University of Louisville. Student: Nawaraj Karki, Fall 2023, \$350.00
3. Graduate Student Council Travel Award, University of Louisville. Student: Nawaraj Karki, Spring 2023, \$350.00
2. 2022 Summer Research Opportunity Program, Office of Undergraduate Research and Creative Activity. Student: Jaley Adkins, \$500.00 (\$3,500.00 to student)
1. EVPRI’s Undergraduate Research Scholar Grant, “Light-guided synthesis of chiral metal nanostructures.” Student: Hoang Gia An Tran, 2021 – 2022, \$475.00

PENDING GRANTS

1. PI, NSF CMI, 31 October 2024, “Mapping electrochemical activation energies onto catalysts with Raman microscopy,” \$391,634.00

TEACHING EXPERIENCE

University of Louisville

- | | |
|---|----------|
| ▪ Chem 201 , General Chemistry I | S26 |
| ▪ Chem 391/392/491/492 , Undergraduate Research – CUE | S21–F25 |
| ▪ Chem 426 , Instrumental and Statistical Analysis Laboratory – WR | F22–F25 |
| ▪ Chem 527 , Introduction to Separations and Spectroscopy – WR | F20, F21 |
| ▪ Chem 620 , Optical Spectrochemical Methods of Analysis | S22, F24 |
-

- **Chem 625**, Advanced Analytical Chemistry F22, S24
- **Chem 691/692**, Research S21–F25

Temple University

- **Chem 8300**, Optical Spectroscopy and Microscopy S16

University of Texas at Austin

- **Chemistry 302**, Principles of Chemistry II Su12
- **Chemistry 376K**, Advanced Analytical Chemistry S11
- **Chemistry 455**, Fundamentals of Analytical Chemistry S13, S12
- **Chemistry 456**, Analytical Chemistry F11, S12, F12
- **Chemistry 456**, Analytical Chemistry Laboratory F10

RESEARCH MENTORING**Current****Graduate students**

- Md Al Amin, November 2020 – present
 - Graduate Student Council Travel Award, S24
- Nawaraj Karki, January 2021 – present
 - Graduate Student Council Travel Award, S23 & F23
 - Outstanding Chemistry Student Award, Louisville ACS Local Section, 2023
 - Chemistry Graduate Students Association, President, 2023-2024
 - ACS, Energy and Fuels Division Travel Award, S24
 - Dorothy Gibson Memorial Fellowship, 2024-2025
- Johann Hemmer, December 2022 – present
 - Most Auspicious First Year Award, UofL Chemistry Department, 2023
 - Chemistry Graduate Students Association, Vice President, 2023-2024
 - Best Laboratory Graduate Teaching Assistant Award, 2024
 - Undergraduate Mentored Research Award, 2025
- Amandeep Kaur, May 2023 – present
 - 2024 GSRRC best poster presentation award
 - Chemistry Graduate Students Association, President, 2024-2025
 - Award for Character and Endeavor, 2025
- Fredrick Mufoyongo, May 2023 – present
 - Chemistry Graduate Students Association, Treasurer, 2024-2025
- Amanda Borden, January 2024 – present
- Astha Jain, November 2024 – present
 - Chemistry Graduate Students Association, Secretary, 2025-2026

Undergraduate students

- Colin Ackerman, January 2024 – present
 - Undergraduate Mentored Research Award, 2025
- Eliana Purcell, January 2025 – present

Alumni**Postdoctoral scholar**

- Dr. Padmanabh B. Joshi, May 2021 – July 2023
 - 2022 Midwest Universities Analytical Chemistry Conference best poster award

Graduate students

- Antonella Loiacono, February 2025 – May 2025 (visiting Ph.D. scholar)

Undergraduate students

- Kyle Barnett, January 2021 – April 2021
- Virginia Noe, August 2021 – December 2021
 - 2022 Summer Research Opportunity Program (declined)
- Hoang Gia An Tran, June 2021 – April 2022
 - Awarded an EVPRI Undergraduate Research Scholar Grant, 8/9/2021-8/10/2022
 - University Fellow, University of Louisville Graduate School, 2022
- Jaley Adkins, January 2022 – May 2023
 - 2022 Summer Research Opportunity Program
 - 2023 ACC Meeting of the Minds Conference
- Ayan Abdi, January 2023 – December 2023
 - 2023 Summer Research Opportunity Program (declined)
- Jacob Long, January 2024 – April 2024
- Sam Shircliff, January 2024 – April 2024

High school students

- Luna Asbell, May 2024 – August 2024

SERVICE

15. Director of Undergraduate Studies, Department of Chemistry, University of Louisville, July 2025 – present
14. Member, Assistant Professor -Term Search Committee, Department of Chemistry, University of Louisville, July 2025
13. Chair, Instrument Specialist Search Committee, Department of Chemistry, University of Louisville, TBD
12. International Editorial Board, *Advances in Industrial and Engineering Chemistry*, Fall 2024 – present
11. Director, Graduate Admissions, Recruitment, and Appeals, Department of Chemistry, University of Louisville, Fall 2024 – Fall 2025
10. Past Chair, Electrochemical Society Mid-America Section, 2023 – 2025
9. Chair, Electrochemical Society Mid-America Section, 2021 – 2023
8. Member, Lab Fees Committee, Department of Chemistry, University of Louisville, Fall 2021 – 2024
7. Chemistry Representative, Department Teaching Evaluation Program, College of Arts & Sciences, University of Louisville, AY21-22
6. Director, Undergraduate Research, Department of Chemistry, University of Louisville, Spring 2021 – Spring 2024

5. Member, Graduate Admissions Committee, Department of Chemistry, University of Louisville, Fall 2020 – Fall 2025
4. Member, Stockroom Manager Search Committee, Department of Chemistry, University of Louisville, Fall 2020
3. Committee member of 29 Ph.D./M.S. students, 2020 – present
2. Reviewer Board, *Nanomaterials*, 2020 – 2024
1. Invited peer reviewer: *National Science Foundation*, *Department of Energy*, *American Chemical Society Petroleum Research Fund*, *Journal of the American Chemical Society*, *Angewandte Chemie*, *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*, *Analytical Chemistry*, *Current Opinion in Electrochemistry*, *ACS Sustainable Chemistry & Engineering*, *MRS Communications*, *Laser & Photonics Reviews*, *Sensors*, *Nanomaterials*, *Catalysts*, *Leverhulme Trust (UK)*, *Micromachines*

PROFESSIONAL SOCIETIES

- Electrochemical Society (ECS)
- American Chemical Society (ACS)
- The Society for Electroanalytical Chemistry (SEAC)
- Kentucky Academy of Sciences (KAS)

OUTREACH

AT UNIVERSITY OF LOUISVILLE

- Outreach experiment coordinator, “Synthesis and optical characterization of Ag nanospheres and nanorods,” Fairdale High School, Louisville, KY, October 30, 2024
- Judge, Science Fair, Fairdale High School, Louisville, KY, May 17, 2024
- Poster session coordinator, Fairdale High School, Louisville, KY, February 2, 2024
- Outreach experiment coordinator, “Synthesis and optical characterization of Ag and Au nanoparticles,” Fairdale High School, Louisville, KY, October 25, 2023
- Judge, Science Fair, Fairdale High School, Louisville, KY, May 23, 2023
- The Cardinal Edge, “Pasta, Pizza, and Profs,” University of Louisville, March 21, 2023
- First-Gen Cards Networking Luncheon, University of Louisville, February 28, 2023
- Invited talk, University of Louisville, Society of Undergraduate Chemistry Students, Louisville, KY, February 6, 2023
- Invited talk, Undergraduate Research Forum, Alpha Epsilon Delta, University of Louisville, December 1, 2022
- Outreach experiment coordinator, “Synthesis and optical characterization of Ag nanoparticles,” Fairdale High School, Louisville, KY, November 17, 2022
- Louis Stokes Alliance for Minority Participation, Speed Networking for Pre-Professional and Graduate Students, University of Louisville, September 27, 2022

- 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
- 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
- Judge, Graduate Student Regional Research Conference, University of Louisville, Louisville, KY, March 11, 2021
- 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

PRIOR TO UNIVERSITY OF LOUISVILLE

- 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
 - 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