Curriculum Vitae – Prof. Justin B. Sambur, Ph.D.
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Dr. Justin B. Sambur is the Monfort Professor of Chemistry at Colorado State University, specializing in analytical chemistry and materials characterization. He has published over 55 peer-reviewed articles, holds a Ph.D. in Chemistry from Colorado State University, and has delivered over 90 invited lectures at universities and scientific conferences.

Education and Training

2011-2016	NSF Postdoctoral Fellow, Cornell University Field: Chemistry Research area: Single-molecule photoelectrocatalysis Advisor: Peng Chen
2006-2011	Ph.D., Colorado State University Field: Chemistry Research area: Semiconductor electrochemistry Advisor: Bruce Parkinson
2002-2006	B.S. with Honors, Binghamton University Field: Chemistry Research area: Heterogeneous catalysis Advisor: David Doetschmann

Professional Appointments

2024-2026	Monfort Professor, Colorado State University
2022-present	Associate Professor, Department of Chemistry, Colorado State University
2016-2022	Assistant Professor, Department of Chemistry, Colorado State University
2016-present	Core Faculty, School of Materials Science and Engineering, CSU

Honors and Awards

2024	Monfort Professor, Colorado State University
2022	Alfred P. Sloan Fellow
2022	Royce Murray Young Investigator Award, Society of Electroanalytical Chemistry
2020	NSF CAREER Award
2020	DOE Early Career Award
2019	RCSA Scialog Fellow: Advanced Energy Storage
2017	Air Force Office of Scientific Research (AFOSR) Young Investigator Award
2017	Norman Edmund Inspirational Award (Edmund Optics)
2011	NSF American Competitiveness in Chemistry Postdoctoral Fellowship
2006	Walter E. Kaskin Award in Physical Chemistry (SUNY-Binghamton)

Publications –2,647 citations, h-index: 19, i10-index: 33

57. Wang, K.; Geiss, B.; Geiss, R.; Neilson, J.R.; Zak, A.; **Sambur, J.B.** "Quantifying chiral handedness of core–shell inorganic nanotubes via electron microscopy and diffraction." *Nanoscale* 2026, Advance Article.

56. Salzer, L.D.; Christensen, C.; Gervais, C.; Steeley, J.D.; Neilson, J.R.; **Sambur, J.B.** "Slow scan cyclic voltammetry of Li-ion insertion in T-Nb2O5 reveals hidden peaks and multi-electron redox." *ACS Electrochem.* 2026, *2*(4), 974–982.

55. **Sambur, J.B.**; Kaufman, A.J.; Montoya-Castillo, A.; et al. (75 co-authors). "Gerischer electrochemistry today." *ACS Energy Lett.* 2025, *10*(12), 6578–6595.

54. Lustig, D.R.; Buz, E.; Bird, O.F.; Mulvey, J.T.; Prasad, P.R.; Patterson, J.P.; Dukovic, G.; Kittilstved, K.R.; **Sambur, J.B.** "Single-molecule fluorescence microscopy reveals energy transfer active versus inactive nanocrystal/dye conjugate pairs." *Chem. Biomed. Imaging* 2025, *3*(8), 547–559.

53. Lustig, D.R.; Chen, F.; Zhang, W.; Bird, O.F.; Fajardo Jr., J.; Ardo, S.; Hu, S.; Talin, A.A.; Bala Chandran, R.; Sambur, J.B. "Models and Measurements Quantify Photon Recycling, Charge-Carrier Diffusion, and Photon Scattering Contributions to Photoluminescence in InP Nanowire Arrays" J. Phys. Chem. C., 2025, 129 (17), 8270–8283.

52. Banik, A.; Maekawa, H.; Fajardo, J.; Zutter, B.; Alcorn, F.; Kumar, S.; Watanabe, K.; Kudo, A.; Ge, N.; Talin, A.; Sambur, J.B. "Unequal {110} Facets: The Critical Role of Surface Termination in Determining Photoelectrochemical Activity of Single BiVO4 Particles" ACS Nano, 2025, 19, 6, 6250-6262.

51. Chard, A.R.; **Sambur, J.B.** "Measuring the flatband potential in 2D semiconductors: pitfalls and a possible SECCM solution." *Curr. Opin. Electrochem.* 2025, *52*, 101703.

50. Austin, R.; Sayer, T.; Farah, Y.; Montoya-Castillo, A.; Krummel, A.T.; **Sambur, J.B.** "Hiding in plain sight: the prevalence and impact of trions and Fermi polarons in transient absorption spectroscopy experiments of 2D semiconductors." *J. Chem. Phys.* 2024, *161*(19), 190901.

49. **Sambur, J.**; Brgoch, J. "Unveiling the hidden influence of defects via experiment and data science." *Chem. Mater.* 2023, *35*(18), 7351–7354.

48. Lustig, D.R.; Buz, E.; Mulvey, J.T.; Patterson, J.P.; Kittilstved, K.R.; **Sambur, J.B.** "Characterizing the ligand shell morphology of PEG-coated ZnO nanocrystals using FRET spectroscopy." *J. Phys. Chem. B* 2023, *127*(41), 8961–8973.

47. Toole, J.; **Sambur, J.B.** "Anodic dissolution rates accelerate with decreasing MoS2 nanoflake thickness." *J. Electrochem. Soc.* 2023, *170*, 116501.

46. Almaraz, R.; Sayer, T.; Toole, J.; Austin, R.; Farah, Y.; Trainor, N.; Redwing, J.M.; Krummel, A.; Montoya-Castillo, A.; **Sambur, J.B.** "Quantifying interfacial energetics of 2D semiconductor electrodes using in situ spectroelectrochemistry and many-body theory." *Energy Environ. Sci.* 2023, *16*, 4522–4529.

45. Sayer, T.,; Farah, Y.R.; Austin, R.; **Sambur, J.B.**; Krummel, A.T.; Montoya-Castillo, A.; "Trion formation resolves observed peak shifts in the optical spectra of transition metal dichalcogenides" *Nano Lett.* 2023, 23, 6035−6041.

44. Austin, R.; Farah, Y.R.; Sayer, T.; Luther, B.M.; Montoya-Castillo, A.; Krummel, A.T.; **Sambur, J.B.** "Hot carrier extraction from 2D semiconductor photoelectrodes." *Proc. Natl. Acad. Sci. U.S.A.* 2023, *120*(15), e2220333120.

43. Lustig, D.R.; Nilsson, Z.N.; Mulvey, J.T.; Zang, W.; Pan, X.; Patterson, J.P.; **Sambur, J.B.** "Toward imaging defect-mediated energy transfer between single nanocrystal donors and single molecule acceptors." *Chem. Biomed. Imaging* 2023, *1*(2), 168–178.

42. Salzer, L.D.; Diamond, B.; Nieto, K.; Evans, R.C.; Prieto, A.L.; **Sambur, J.B.** "Structure–property relationships in high-rate anode materials based on niobium tungsten oxide shear structures." *ACS Appl. Energy Mater.* 2023, *6*(3), 1685–1691.

41. Van Erdewyk, M.; Lorenz, D.B.; **Sambur, J.B.** "Answering old questions with new techniques: understanding performance-limiting factors in transition metal dichalcogenide photoelectrochemical solar cells." *Curr. Opin. Electrochem.* 2023, *37*, 101173.

40. Van Erdewyk, M.; **Sambur, J.B.;** "Molecular Reaction Imaging of a Surface Recombination Process Explains Performance Variation Among Smooth MoS_2 Photoelectrodes" *J. Electrochem. Soc*., 2022, 169 096519.

39. Marquez, S.; Varra, T.; Christensen, C.; Rajasekharan, O.; Dojan, C.; Hobbs, J.; Otten, R.A.; Salzer, L.; Schuttlefield Christus, J.D.; **Sambur, J.B.** "LBIC imaging of solar cells: an introduction to scanning probe-based imaging techniques." *J. Chem. Educ.* 2023, *100*(2), 1011–1016.

38. Van Erdewyk, M.; **Sambur, J.B.** "Single nanoflake photoelectrochemistry reveals intrananoflake doping heterogeneity that explains ensemble-level photoelectrochemical behavior." *ACS Appl. Mater. Interfaces* 2022, *14*(20), 22737–22746. *Invited contribution to Early Career Forum.*

37. Evans, R.C.; Austin, R.; Miller, R.C.; Preston, A.; Nilsson, Z.N.; Ma, K.; **Sambur, J.B.** "Surface-facet-dependent electrochromic properties of WO3 nanorod thin films: implications for smart windows." *ACS Appl. Nano Mater.* 2021, *4*(4), 3750–3759.

36. Cashen, C.; R. C. Evans; Nilsson, Z.; **Sambur, J.B.**; "Local substrate heterogeneity influences electrochemical activity of TEM grid-supported battery particles" 2021, *Frontiers In Chemistry,* 9, 651248.

35. Nilsson, Z.; Beck, L.M.; **Sambur, J.B.**; "Ensemble-level energy transfer measurements can reveal the spatial distribution of defect sites in semiconductor nanocrystals" *J. Chem. Phys.* 2021, 154, 054704. *Emerging Investigator Issue.*

34. Nilsson, Z.N.; Van Erdewyk, M.; Wang, L.; **Sambur, J.B.** "Molecular reaction imaging of single-entity photoelectrodes." *ACS Energy Lett.* 2020, *5*(5), 1474–1486. *Invited Perspective Article*.

33. Wang, L.; Nilsson, Z.N.; Tahir, M.; Chen, H.; **Sambur, J.B.** "Influence of the substrate on the optical and photo-electrochemical properties of monolayer MoS_2." *ACS Appl. Mater. Interfaces* 2020, *12*(13), 15034–15042.

32. Varra, T.; Simpson, A.; Roesler, B.; Nilsson, Z.N.; Ryan, D.; Van Erdewyk, M.; Schuttlefield Christus, J.D.; **Sambur, J.B.** "A homemade smart phone microscope for single-particle fluorescence microscopy." *J. Chem. Educ.* 2020, *97*(2), 471–478.

31. Evans, R.C.; Nilsson, Z.N.; Balch, B.; Wang, L.; Neilson, J.R.; Weinberger, C.R.; **Sambur, J.B.** "Quantifying capacitive-like and battery-like charge storage contributions using single-nanoparticle electro-optical imaging." *ChemElectroChem* 2020, *7*(3), 753–760.

30. Wang, L.; Tahir, M.; Chen, H.; **Sambur, J.B.** "Probing charge carrier transport and recombination pathways in monolayer MoS_2/WS_2 heterojunction photoelectrodes." *Nano Lett.* 2019, *19*(12), 9084–9094.

29. Wang, L.; Schmid, M.; **Sambur, J.B.** "Single nanoparticle photoelectrochemistry: what is next?" *J. Chem. Phys.* 2019, *151*(18), 180901.

28. Evans, R.C.; Nilsson, Z.N.; **Sambur, J.B.** "High-throughput single-nanoparticle-level imaging of electrochemical ion insertion reactions." *Anal. Chem.* 2019, *91*(23), 14983–14991.

27. Evans, R.C.; Ellingworth, A.; Cashen, C.J.; Weinberger, C.R.; **Sambur, J.B.** "Influence of single-nanoparticle electrochromic dynamics on the durability and speed of smart windows." *Proc. Natl. Acad. Sci. U.S.A.* 2019, *116*(26), 12666–12671.

26. Wang, L.; Schmid, M.; Nilsson, Z.N.; Tahir, M.; Chen, H.; **Sambur, J.B.** "Laser annealing improves the photoelectrochemical activity of ultrathin $MoSe_2$ photoelectrodes." *ACS Appl. Mater. Interfaces* 2019, *11*(21), 19207–19217.

25. Wang, L.; **Sambur, J.B.** "Efficient ultrathin liquid junction photovoltaics based on transition metal dichalcogenides." *Nano Lett.* 2019, *19*(5), 2960–2967.

24. **Sambur, J.B.**; Shepherd, D.P.; Hesari, M.; Van Erdewyk, M.; Choudhary, E.; Chen, P. "Correlated single-molecule reaction imaging and photocurrent measurements reveal underlying rate processes in photoelectrochemical water splitting." *J. Electrochem. Soc.* 2019, *166*(5), H3286–H3293.

23. Chen, J.; Bailey, C.; Hong, Y.; Wang, L.; Cai, Z.; Shen, L.; Hou, B.; Wang, Y.; Shi, H.; **Sambur, J.B.;** Ren, W.; Pop, Eric; Cronin, S. "Plasmon-Resonant Enhancement of Photocatalysis on Monolayer WSe_2", *ACS Photonics.* **2019**. 6 (3), pp 787-792.

22. Isenberg, A.E.; Todt, M.A.; Wang, L.; **Sambur, J.B.** "Role of photogenerated iodine on the energy-conversion properties of MoSe2 nanoflake liquid junction photovoltaics." *ACS Appl. Mater. Interfaces* 2018, *10*(33), 27780–27786.

21. Todt, M.A.; Isenberg, A.E.; Nanayakkara, S.U.; Miller, E.M.; **Sambur, J.B.** "Single-nanoflake photo-electrochemistry reveals champion and spectator flakes in exfoliated $MoSe_2$ films." *J. Phys. Chem. C* 2018, *122*(12), 6539–6545.

20. Klunder, K.J., Nilsson, Z., **Sambur, J.B.**, Henry, C.S.; "Patternable Solvent-Processed Thermoplastic Graphite Electrodes" *J. Am. Chem. Soc.*, **2017**, *139*, 12623–12631.

19. Hesari, M.; **Sambur, J.B.**; Mao, X.; Jung, W.; Chen, P. "Quantifying photocurrent loss of a single particle–particle interface in nanostructured photoelectrodes." *Nano Lett.* 2019, *19*(2), 958–962.

18. Guanqun, C., Zhou, N., Chen, B., **Sambur, J.B.**, Choudhary, E., Chen, P.; "Bimetallic Effect of Single Nanocatalysts Visualized by Super-Resolution Catalysis Imaging" *ACS Cent. Sci.,* 2017, 3 (11), 1189–1197.

17. **Sambur, J.B.**; Chen, P. "Distinguishing direct and indirect photoelectrocatalytic oxidation mechanisms using quantitative single-molecule reaction imaging and photocurrent measurements." *J. Phys. Chem. C* 2016, *120*(37), 20668–20676.

16. **Sambur, J.B.**; Chen, T.Y.; Choudhary, E.; Chen, G.; Nissen, E.J.; Thomas, E.M.; Zou, N.; Chen, P. "Sub-particle reaction and photocurrent mapping to optimize catalyst-modified photoanodes." *Nature* 2016, *530*(7588), 77–80.

15. **Sambur, J.B.**; Parkinson, B.A. "Size selective photoetching of CdSe quantum dot sensitizers on single-crystal TiO_2." *ACS Appl. Mater. Interfaces* 2015, *6*(24), 21916–21920.

14. **Sambur, J.B.**; Chen, P. "Approaches to single-nanoparticle catalysis." *Annu. Rev. Phys. Chem.* 2014, *65*, 395–422.

13. Shepherd, D.P.; **Sambur, J.B.**; Liang, Y.; Parkinson, B.A.; Van Orden, A. "In situ studies of photoluminescence quenching and photocurrent yield in quantum dot sensitized single crystal TiO_2 and ZnO electrodes." *J. Phys. Chem. C* 2012, *116*(39), 21069–21076.

12. Schuttlefield, J.D.; **Sambur, J.B.**; Gelwicks, M.; Eggleston, C.M.; Parkinson, B.A. "Photooxidation of chloride by oxide minerals: implications for perchlorate on Mars." *J. Am. Chem. Soc.* 2011, *133*(44), 17521–17523.

11. **Sambur, J.B.**; Averill, C.M.; Bradley, C.; Schuttlefield, J.; Lee, S.H.; Reynolds, J.R.; Schanze, K.S.; Parkinson, B.A. "Interfacial morphology and photoelectrochemistry of conjugated polyelectrolytes adsorbed on single crystal TiO_2." *Langmuir* 2011, *27*(19), 11906–11916.
10. Riha, S.C.; Fredrick, S.J.; **Sambur, J.B.**; Liu, Y.; Prieto, A.L.; Parkinson, B.A. "Photoelectrochemical characterization of nanocrystalline thin-film Cu_2ZnSnS_4 photocathodes." *ACS Appl. Mater. Interfaces* 2011, *3*(1), 58–66.
9. **Sambur, J.B.**; Novet, T.; Parkinson, B.A. "Multiple exciton collection in a sensitized photovoltaic system." *Science* 2010, *330*(6000), 63–66.
8. **Sambur, J.B.**; Parkinson, B.A. "CdSe/ZnS core/shell quantum dot sensitization of low index TiO2 single crystal surfaces." *J. Am. Chem. Soc.* 2010, *132*(7), 2130–2131.
7. Manandhar, K.; **Sambur, J.B.**; Parkinson, B.A. "Morphologies, structures, and interfacial electronic structure of perylene on Au(111)." *J. Appl. Phys.* 2010, *107*(6), 063716.
6. **Sambur, J.B.**; Riha, S.C.; Choi, D.; Parkinson, B.A. "Influence of surface chemistry on the binding and electronic coupling of CdSe quantum dots to single crystal TiO_2 surfaces." *Langmuir* 2010, *26*(7), 4839–4847.
5. Jaeckel, B.; **Sambur, J.B.**; Parkinson, B.A. "A photoemission study of the morphology and barrier heights of the interface between chrysene and inert substrates." *J. Phys. Chem. C* 2009, *113*(5), 1837–1849.
4. Jaeckel, B.; **Sambur, J.B.**; Parkinson, B.A. "The influence of metal work function on the barrier heights of metal/pentacene junctions." *J. Appl. Phys.* 2008, *103*(6), 063719.
3. **Sambur, J. B.**; Doetschman, D. C.; Yang, S. W.; Schulte, J. T.; Jones, B. R.; DeCoste, J. B. "Multiple effects of the presence of water on the nucleophilic substitution reactions of NaX Faujasite zeolite with dimethyl methylphosphonate (DMMP)" *Micropor. Mesopor. Mat.* 2008, 112, 116-124.
2. Jaeckel, B.; **Sambur, J.B.**; Parkinson, B.A. "Ubiquitous pentacene monolayer on metals deposited onto pentacene films." *Langmuir* 2007, *23*(23), 11366–11368.
1. Yang, S.W.; Doetschman, D.C.; Schulte, J.T.; **Sambur, J.B.**; Kanyi, C.W.; Fox, J.D.; Kowenje, C.O.; Jones, B.R.; Sharma, N.D. "Sodium X-type faujasite zeolite decomposition of dimethyl methylphosphonate (DMMP) to methylphosphonate: Nucleophilic zeolite reactions I" *Micropor. Mesopor. Mat.* 2006, *92*, 56-60.

Presentations

Invited University or National Laboratory Seminars (Since August 2016)

48. Mar 2026 – IIT-Bangalore Chemistry Department, Bangalore, India
47. Mar 2026 – IIT-Guwahati Department of Chemical Engineering, Guwahati, India
46. Mar 2026 – IIT-Guwahati SPARC IIT-CSU Graduate Recruiting Workshop, Guwahati, India
45. Mar 2026 – Indian Institute of Science–Bombay, Mumbai, India
44. Feb 2026 – Pennsylvania State University, State College, PA
43. Oct 2025 – CU-Boulder, Boulder, CO
42. Mar 2025 – University of Pennsylvania, Philadelphia, PA
41. Sep 2024 – EPFL Chemical Engineering and Energy Seminars, Lausanne, Switzerland
40. Sep 2024 – Laboratoire de Chimie et Biologie des Métaux CNRS–CEA, Grenoble, France
39. Sep 2024 – University of Rochester, Rochester, NY

38. Sep 2024 – SUNY-Buffalo, Buffalo, NY
37. Sep 2024 – Rochester Institute of Technology, Rochester, NY
36. Sep 2024 – University of Rochester, Rochester, NY
35. Apr 2024 – University of Arkansas, Fayetteville, AR
34. Sep 2023 – University of Milan, Milan, Italy
33. Sep 2023 – UNC–Greeley, Greeley, CO
32. Feb 2023 – CSU Powerhouse Energy Institute, Fort Collins, CO
31. Feb 2023 – University of Minnesota, Minneapolis, MN (Student Invited Speaker)
30. Feb 2023 – Michigan State University, East Lansing, MI
29. Jan 2023 – Binghamton University, Binghamton, NY
28. Oct 2022 – University of Washington, Seattle, WA
27. Apr 2022 – CU-Boulder, Boulder, CO
26. Apr 2022 – Cornell University, Ithaca, NY
25. Dec 2021 – University of Wisconsin–Oshkosh, Oshkosh, WI
24. Sep 2021 – University of Houston, Houston, TX
23. Sep 2021 – UNC–Greeley, Greeley, CO
22. Sep 2021 – Indiana University, Bloomington, IN
21. Apr 2021 – University of Texas–Austin, Austin, TX
20. Mar 2021 – Pennsylvania State University, State College, PA
19. Mar 2021 – Missouri University of Science & Technology, Rolla, MO
18. Feb 2021 – University of Arizona, Tucson, AZ
17. Feb 2021 – University of Wisconsin–Madison, Madison, WI
16. Dec 2020 – UMass Amherst, Amherst, MA
15. Nov 2020 – UNC Chapel Hill, Chapel Hill, NC
14. Oct 2020 – Rutgers University, Piscataway, NJ
13. Feb 2020 – Arizona State University, Tempe, AZ
12. Feb 2020 – Washington University–St. Louis, St. Louis, MO
11. Dec 2019 – University of Oregon, Eugene, OR
10. Oct 2019 – University of Wyoming, Laramie, WY
9. Sep 2019 – Temple University, Philadelphia, PA
8. Mar 2019 – TU-Darmstadt, Darmstadt, Germany
7. Jan 2019 – Metro State University, Denver, CO
6. Oct 2018 – University of Colorado–Denver, Denver, CO
5. Oct 2017 – University of New Hampshire, Durham, NH
4. Feb 2017 – CSU Department of Physics, Fort Collins, CO
3. Dec 2016 – National Renewable Energy Laboratory, Golden, CO
2. Oct 2016 – University of Northern Colorado–Greeley, Greeley, CO
1. Sep 2016 – CSU Chem & Bio Eng., Fort Collins, CO

Conference Presentations (Since August 2016)

*invited talk

63. Jun 2026 – DOE Solar Photochemistry PI Meeting, Washington, DC *
62. May 2026 – Gordon Research Conference: Solar Fuels, Discussion Leader, Lucca, Italy *
61. Mar 2026 – 2D Materials Workshop, Growth and Manipulation of Two-Dimensional Materials for Next-Generation Applications, IIT-Guwahati, India *
    Zooming in: nanoscale imaging and spectroscopy of 2D semiconductor photoelectrodes
60. Aug 2025 – DOE EFRC-Hub-CMS-CCS Principal Investigators' Meeting, Washington, DC *
    Ensembles of photosynthetic nanoreactors
59. Aug 2025 – ACS Fall National Meeting, Washington, D.C., Division of Inorganic Chemistry, Session: Solid-State Inorganic Chemistry *
    Structural disorder and Mo substitution enable multi-electron redox in niobium tungsten oxide Wadsley-Roth crystallographic shear compounds
58. Aug 2025 – ACS Fall National Meeting, Washington, D.C., Division of Physical Chemistry, Session: Molecular Level Understanding of Structure and Dynamics at Electrochemical Interfaces *
    Bandgap renormalization dictates current-voltage behavior of 2D semiconductor electrodes
57. Jun 2025 – 56th Heyrovsky Discussions on 2D Materials, Třešť, Czech Republic *
    Bandgap renormalization dictates current-voltage behavior of 2D semiconductor electrodes
56. May 2025 – 247th ECS Meeting, Montréal, Canada, Advances in Materials
    Structural disorder and Mo substitution enable multi-electron redox in niobium tungsten oxide Wadsley-Roth crystallographic shear compounds
55. May 2025 – 247th ECS Meeting, Montréal, Canada, L07: New Horizons in Spectroelectrochemistry and Photoelectrochemistry *
    Hot carrier extraction from monolayer MoS2 photoelectrodes revealed by in situ transient absorption spectroscopy
54. May 2025 – 247th ECS Meeting, Montréal, Canada, I02: Renewable Fuels via Artificial Photosynthesis or Photocatalysis *
    Unequal {110} facets: the critical role of surface termination in determining photoelectrochemical activity of single BiVO4 particles
53. May 2025 – 247th ECS Meeting, Montréal, Canada, B06: 2D Layered Materials from Fundamental Science to Applications *
    Bandgap renormalization drives band edge movement at 2D semiconductor/electrolyte interfaces
52. Apr 2025 – Monfort Symposium, Fort Collins, CO *
    Creating new clean energy technologies at CSU
51. Apr 2025 – Bard Electrochemistry Workshop, Austin, TX *
    Bandgap renormalization dictates current-voltage behavior of 2D semiconductor electrodes
50. Mar 2025 – ACS Spring Meeting, San Diego, CA, Division of Inorganic Chemistry, Session: Sustainable Energy and Environment
    Structural disorder and Mo substitution enable multi-electron redox in niobium tungsten oxide Wadsley-Roth crystallographic shear compounds
49. Mar 2025 – ACS Spring Meeting, San Diego, CA, Division of Catalysis Science and Technology, Session: Photoelectrocatalytic Fuel Formation *
    In situ spectroscopy and nanoscale imaging of single BiVO4 nanoreactors
48. Mar 2025 – ACS Spring Meeting, San Diego, CA, Division of Energy and Fuels, Session: Materials for Photocatalysis & Photoelectrocatalysis *

Charge equilibration at semiconductor–redox electrolyte interfaces drives band edge movement via the band gap renormalization effect

47. Sep 2024 – Keynote Speaker, Catalysis, Chemical Engineering and Technology (CCET), Paris, France *
In Situ Spectroscopy and Nanoscale Imaging of Electrochemical Energy Conversion and Storage Systems

46. Sep 2024 – Invited Poster, DOE Science Summit for Energy Earthshot Innovation, Rockville, MD *
Green hydrogen urgently needs bottom-up codesign of photosynthetic nanoreactor ensembles

45. Aug 2024 – 2024 ACS Fall National Meeting, Denver, CO, Division of Physical Chemistry, Methods & Applications of Single-Molecule Detection *
Single molecule, single particle-level imaging of surface defect sites in semiconductor nanocrystal photocatalysts

44. Aug 2024 – 2024 ACS Fall National Meeting, Denver, CO, Division of Analytical Chemistry, Advances in Electrochemistry *
2D semiconductor electrochemistry: energy level alignment and hot carrier extraction

43. Aug 2024 – 2nd Gerischer Electrochemistry Today, Fort Collins, CO *
Introduction to 2D Materials Session

42. Aug 2024 – Colorado Center for Advanced Ceramics, Golden, CO *
In situ spectroscopy and nanoscale imaging of electrochemical energy conversion and storage systems

41. May 2024 – 2024 Spring ECS Meeting, San Francisco, CA, B06 Symposium *
Photoelectrochemistry of monolayer 2D semiconductors: quantifying band gap renormalization effects and hot carrier extraction

40. Jan 2024 – Gordon Research Conference: Solar Fuels, Ventura, CA *
2D semiconductor photocatalysts for solar fuels generation

39. Sep 2023 – Keynote Speaker, Global Summit on Nanotechnology and Materials Science (GSNMS), Rome, Italy *
Hot carrier extraction from monolayer MoS2 photoelectrodes

38. Aug 2023 – SPIE Meeting, 2D Materials Symposium, San Diego, CA *
Energy level alignment and hot carrier extraction from MoS2 photoelectrodes

37. Jun 2023 – NanoSeries 2023, 2nd Annual Global Nanotechnology Conference, ICMM-CSIC Materials Science Institute, Madrid, Spain *
Energy level alignment and hot carrier extraction at monolayer MoS2/electrolyte interfaces

36. May 2023 – Spring 2023 ECS National Meeting, Boston, MA, Batteries and Energy Storage
Lithium-ion diffusivity increases with block size in niobium tungsten oxide shear structures

35. May 2023 – Spring 2023 ECS National Meeting, Boston, MA, Session: Physical and Analytical Electrochemistry, Electrocatalysis, and Photoelectrochemistry *
Molecular reaction imaging of charge transport in MoS2 nanoflake photoelectrodes

34. May 2023 – Spring 2023 ECS National Meeting, Boston, MA, Session: Carbon Nanostructures and Devices *
Photoelectrochemistry of monolayer 2D semiconductors: quantifying band gap renormalization effects and hot carrier extraction

33. Apr 2023 – Spring MRS Meeting, NM02, San Francisco, CA *
Energy level alignment and hot carrier extraction at monolayer MoS2/electrolyte interfaces

32. Mar 2023 – Pittcon, Grahame Award Symposium in Honor of Keith Stevenson, Philadelphia, PA *
In situ spectroscopy and nanoscale imaging of electrochemical energy conversion and storage systems

31. Jan 2023 – Rocky Mountain Solid State Chemistry Workshop, Boulder, CO
Lithium-ion diffusivity increases with block size in niobium tungsten oxide shear structures

30. Sep 2022 – Gordon Research Conference: Electrochemistry, Ventura, CA *
Energy level alignment and hot carrier extraction at monolayer MoS2/electrolyte interfaces

29. Aug 2022 – Fall ACS National Meeting, Chicago, IL, Session: Chemistry of Materials — Materials for Energy & Catalytic Applications
Lithium-ion diffusivity increases with block size in niobium tungsten oxide shear structures

28. Aug 2022 – Fall ACS National Meeting, Chicago, IL, Session: Nanostructured Colloids for Ultrasensitive Detection & Electrocatalysts *
Localizing defect sites on semiconductor nanocrystals using single molecule fluorescence microscopy

27. Aug 2022 – Fall ACS National Meeting, Chicago, IL, Session: Spectroscopy, Imaging, & Dynamics of Energy Related Materials *
Energy level alignment in monolayer semiconductor electrochemical cells

26. May 2022 – Spring ECS National Meeting, Vancouver, BC, Session B06: 2D Layered Materials *
Energy level alignment at monolayer MoS2/electrolyte interfaces

25. Mar 2022 – ACS Spring Meeting, San Diego, CA, Session: Charge & Energy Transfer at the Nanoscale *
Molecular reaction imaging of charge transport in MoS2 nanoflake photoelectrodes

24. Mar 2022 – Pittcon Murray Award Presentation (virtual) *
Nanoscale imaging of energy conversion and storage systems

23. Jan 2022 – ISN2A – 5th International Caparica Symposium on Nanoparticles/Nanomaterials and Applications, Caparica, Portugal *
Nanoscale imaging of 2D semiconductor photoelectrochemical cells

22. Dec 2021 – Pacifichem (virtual) *
Nanoscale imaging of energy conversion and storage systems

21. Jun 2021 – Probing Chemical Reactions by Single-Molecule Spectroscopy Workshop (virtual) *
Localizing defect sites on semiconductor nanocrystals using single molecule fluorescence microscopy

20. Jun 2021 – DOE Solar Photochemistry PI Meeting (virtual) *
Understanding ultrathin semiconductors as electrode materials

19. May 2021 – 239th ECS National Meeting (virtual), Carbon Nanostructures and Devices *
Scanning photo electrochemical microscopy reveals doping heterogeneity in exfoliated MoS2 nanosheets

18. May 2021 – 239th ECS National Meeting (virtual), Session: Physical and Analytical Electrochemistry, Electrocatalysis, and Photoelectrochemistry *
Single nanosheet photoelectrochemistry: probing charge recombination and transport pathways in monolayer transition metal dichalcogenide photoelectrodes

17. Mar 2021 – STEMM Research Showcase, STEM Arrive Session, Colorado State University, Fort Collins, CO *

Nanoscale imaging of energy conversion and storage systems

16. Aug 2020 – 260th ACS National Meeting (Broadcast), Division of Physical Chemistry *
Quantifying charge storage contributions at electrochemical interfaces using single nanoparticle electro-optical imaging
15. Aug 2020 – 260th ACS National Meeting (Broadcast), Division of Physical Chemistry *
Probing charge separation, recombination, and transport in ultrathin semiconductor photoelectrodes
14. May 2020 – AFOSR Molecular Dynamics and Theoretical Chemistry Program Review (virtual) *
Nanoscale imaging of 2D semiconductors in photoelectrochemical cells
13. Jan 2020 – 51st Society of Western Analytical Professors Meeting, Fort Collins, CO
Nanoscale imaging of energy conversion and storage systems
12. Oct 2019 – Scialog: Advanced Energy Storage, Tucson, AZ *
Nanoscale imaging of electrochemical and materials chemistry dynamics
11. Aug 2019 – Fall ACS National Meeting, San Diego, CA
Influence of single nanoparticle electrochromic dynamics on the speed and durability of smart windows
10. May 2019 – Spring ECS National Meeting, Dallas, TX
Single nanoparticle electrochromism reveals heterogeneous charge storage rates and ion trapping sites in pseudocapacitive smart windows
9. Apr 2019 – Spring MRS National Meeting, Session CP06.09: Smart Materials for Functional Devices, Phoenix, AZ
Single nanoparticle electrochromism reveals heterogeneous coloration rates and ion trapping sites in smart windows
8. Mar 2019 – Probing Chemical Reactions by Single-Molecule Spectroscopy Workshop, Höchst im Odenwald, Germany
Single nanosheet photoelectrochemistry of liquid junction solar cells
7. Jan 2019 – 50th Society of Western Analytical Professors Meeting
Nanoscale imaging of smart windows and ultrathin photovoltaics
6. Aug 2018 – Gerischer Symposium, Boulder, CO *
Single-molecule, single-particle studies of photoelectrochemical cells
5. May 2018 – Spring ECS National Meeting, Session: Physical and Analytical Electrochemistry, Electrocatalysis, and Photoelectrochemistry, Seattle, WA
Single nanosheet photoelectrochemistry
4. Apr 2018 – 2018 MRS Spring National Meeting, EN18: Multiscale Designing and Constructing Photocatalytic Materials for Solar Fuels, Phoenix, AZ
Single nanosheet photoelectrochemistry
3. Jan 2018 – 49th Society of Western Analytical Professors Meeting, University of Arizona, Tucson, AZ *
Single nanoflake photoelectrochemistry
2. Oct 2017 – ACS Rocky Mountain Meeting, Young Talent in CO Symposium, Boulder, CO *
Single nanosheet photoelectrochemistry of liquid junction solar cells
1. Jun 2017 – Telluride Summer Research Conference Solar Solutions Workshop, Telluride, CO *
Nanoscale characterization of ultrathin liquid junction photovoltaics: towards identifying champion nanosheets

Teaching Experience

Semester/Year	Course No./Title	Cr. Hrs.	Total Students
S24, S23, S22, S19	CHEM537 - Electrochemical Methods	3	44
S26, F24, F23, F22, F21, S21, F19, S19	MSE 502C - Materials Microscopy	1	58
F20	CHEM 111 - General Chemistry I	3	203
S26, F24, S24, S23, S22, S20	MSE502D - Materials Spectroscopy	1	18
F19, F18, F17	CHEM335 - Introduction to Analytical Chemistry	3	123
2016	CHEM530F - Advanced Topics in Chemical Analysis	1	23
2016	CHEM550C - Nanomaterials	1	22
2016	CHEM550A - Hard Materials	1	21
S26	MSE502C Online	1	3
S26	MSE502D Online	1	3
		Total	**518**

Professional Activities

Editorial Boards

2022-2027 Board of Directors, Society of Electroanalytical Chemistry

2024-present ACS Electrochemistry, Editorial Advisory Board

2023- present ACS Chemical and Biomedical Imaging, Early Career Advisory Board

Advisory Boards

2026-present External Advisory Board Member, NSF Center for Single-Entity Nanochemistry and Nanocrystal Design

2025-present External Advisory Board Member, DOE Solar Fuels Hub - Liquid Sunlight Alliance

Conference & Workshop Organization.

8. *Chair*, Aug 6-8, 2024, 2nd Gerischer Electrochemistry Meeting, Fort Collins, CO
7. *Co-Organizer*, Mar 10-14, MRS Spring 2023 National Meeting, "*Symposium NM02—2D Materials for Electrochemical Applications—Leading the Charge Through Thermodynamic and Kinetic Knowledge Gaps"*, San Francisco, CA
6. *Co-Organizer,* Aug 21-25, ACS Fall 2022 National Meeting, CATL Division Symposium titled "*High spatial resolution analysis of catalytic systems"*, Chicago, IL.
5. *Co-Chair,* Aug 7, 2022, Stille Symposium in Tribute to C. Michael Elliott, Fort Collins, CO
4. *Co-Organizer,* Mar 20-24, ACS Spring 2022 National Meeting, CATL Division Symposium titled "*High spatial resolution analysis of catalytic systems"*, San Diego, CA.

3. *Co-Chair*, May 31 2021, 239th ECS National Meeting, Grahame Award Symposium, Chicago, IL

2. *Co-Organizer,* Aug 25-29, ACS Fall 2019 National Meeting, PHYS Division Symposium titled "*Getting to the Bottom: Optical and Electron Imaging of Reactive Chemical Systems"*, Orlando, FL.

1. *Chair*, Jan 16-17 2020, 51st Society for Western Analytical Professors Meeting, Ft. Collins, CO.

Professional Affiliations

2.	2025-2026	American Chemical Society
1.	2020 – present	Society of Electroanalytical Chemistry

Journal Referee Services

101. Mar. 2026, Nano Letters
100. Feb. 2026, Electrochimica Acta
99. Feb. 2026, J. Chem. Ed.
98. Jan. 2026, J. Am. Chem. Soc
97. Dec. 2025, Langmuir
96. Apr. 2025, Advanced Materials Interfaces
95. Apr. 2025, ACS Catalysis
94. Apr. 2025, Analytical Chemistry
93. Apr. 2025, Small
92. Jan. 2025, Chemical & Biomedical Imaging
91. Dec. 2024, Small
90. Nov. 2024, Nature Communications
89. Dec. 2023, J. Phys. Chem.
88. Oct. 2023, J. Chem Ed.
87. Aug. 2023, J. Amer. Chem. Soc.
86. June 2023, Chemical & Biomedical Imaging
85. June 2023, ACS Appl Mater & Inter
84. May 2023, J Chem Ed.
83. Mar. 2023, J. Physc. Chem.
82. Feb. 2023, Chemistry of Materials
81. Nov. 2022, Angewandte Chemie
80. Sept. 2022, Nature Communications
79. Aug. 2022, Angewandte Chemie
78. July 2022, ACS Appl Energy Mater
77. Apr. 2022, J. Phys. Chem.
76. Apr. 2022, J. Am. Chem. Soc.
75. Mar. 2022, ChemElectroChem
74. Feb. 2022, ACS Nano
73. Feb. 2022, Nature Communications
72. Jan. 2022, J. Am. Chem. Soc.
71. Dec. 2021, Nature Materials
70. Oct. 2021, J. Electrochem. Soc.
69. Oct. 2021, ACS Energy Letters
68. Aug 2021, Nanoscale
67. Aug 2021, Analytica Chimica Acta
66. Aug 2021, J. Am. Chem. Soc.

65. Aug 2021, Science Advances
64. July 2021, Frontiers in Chemistry
63. July 2021, J. Mater. Chem. A.
62. July 2021, J. Chem. Ed.
61. June 2021, J. Phys Chem.
60. June 2021, ACS Applied Energy Materials
59. June 2021, J. Appl. Phys
58. June 2021, Electrochemical Science Advances
57. May 2021, Analytical Chemistry
56. May 2021, Angewandte Chemie International Edition
55. May 2021, J. Phys. Chem.
54. Apr. 2021, Adv. Func. Materials
53. Apr. 2021, Material Today Physics
52. Mar. 2021, Advanced Electronic Materials
51. Mar. 2021, Nature Communications
50. Mar 2021, J. Materials Research
49. Mar 2021, Nano Letters
48. Mar. 2021, Chem. Comm.
47. Feb. 2021, ChemElectroChem
46. Jan. 2021, ACS Applied Materials & Interfaces
45. Jan. 2021, ACS Applied Electronic Materials
44. Jan. 2021, J. Am. Chem. Soc.
43. Nov. 2020, J. Am. Chem. Soc.
42. Nov. 2020, Nanomaterials
41. Oct. 2020, Nature Materials
40. Oct. 2020, J. Am. Chem. Soc.
39. July 2020, ACS Nano
38. July 2020, Chem. Comm.
37. June 2020, Adv. Func. Materials
36. May 2020, J. Phys. Chem. Lett.
35. May 2020, ACS Nano
34. Apr. 2020, Materials
33. Apr. 2020, Materials Chemistry and Physics
32. Mar. 2020, Dalton Transactions
31. Mar. 2020, New Journal of Physics
30. Feb. 2020, Analytica Chimica Acta
29. Feb. 2020, J. Am. Chem. Soc.
28. Jan. 2020, Nano Letters
27. Dec. 2019, ChemElectroChem
26. Dec. 2019, Chem. Comm.
25. Sept. 2019, ChemElectroChem.
24. Aug. 2019, ACS Nano
23. Aug. 2019, J. Am. Chem. Soc.
22. Aug. 2019, Small Methods
21. July 2019, J. Mater. Chem. A.
20. July 2019, Joule
19. June 2019, Langmuir
18. June 2019, J. Am. Chem. Soc.
17. May 2019, ChemElectroChem
16. Apr. 2019, Science Advances
15. Apr 2019, Science Advances

14. Feb. 2019, J. Mater. Chem. A
13. Nov. 2018, Angewandte Chemie
12. Sept. 2018, J. Am. Chem. Soc.
11. Aug. 2018, J. Am. Chem. Soc.
10. July 2018, ACS Nano
9. July 2018, Nature Energy
8. June 2018, Angewandte Chemie
7. Mar. 2018, ACS Applied Materials & Interfaces
6. Dec. 2017, ACS Energy Letters
5. Oct. 2017, Nature Energy
4. Sept. 2017, ACS Applied Materials & Interfaces
3. Aug. 2017, Electrochimica Acta
2. Feb. 2017, ACS Catalysis
1. Jan. 2017, Nature Nanotechnology