

# EMILY A. SPRAGUE-KLEIN

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## RESEARCH & TEACHING INTERESTS

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Developing novel methods and nanoscale systems to elucidate chemical reaction dynamics with high temporal, spatial, and energy resolution, with broad impact across interdisciplinary fields including light-harvesting, energy conversion and storage, plasmon-driven and bio-inspired catalysis, and sustainability. Fundamental physical chemistry and chemical physics insights into societally important problems in energy and critical materials.

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## ACADEMIC APPOINTMENTS

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### **Brown University**

#### **Department of Chemistry**

*Assistant Professor*, Physical Chemistry, tenure track

July 2022

### **Northwestern University/Argonne National Laboratory**

2019 - 2022

Division of Chemical Sciences & Engineering

*Postdoctoral Appointee*, Chemical Physics & Biophysics

Advisors: Prof. Lin X. Chen and Dr. David M. Tiede

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## EDUCATION

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### **Northwestern University**, Ph.D. Applied Physics

2018

Advisors: Prof. Richard Van Duyne, Prof. George C. Schatz

*Dissertation topic:* Single Particle Surface-enhanced Pump-Probe Raman

Spectroscopy for the Direct Observation of Plasmon-Driven Chemistry

### **Kellogg School of Management, Northwestern University**

2016

Management for Scientists and Engineers, Graduate Certificate

### **University of Illinois at Urbana-Champaign**, B.S. Engineering Physics (professional physics track)

2012

Mathematics minor, Advisors: Prof. Alexey Bezryadin and Prof. Aaron Lindenberg

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## HONORS & AWARDS

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**2026** Brown University Division of Research Seed Award

**2025** Early Career Board, *Nano Letters*

**2025** Mellon Sawyer Seminar Keynote Lecture Award

**2025** Library of Congress K-12 Professional Development Seminar on Environmental Challenges

**2024** *Nanoscale* Emerging Investigators Award, RSC

**2024** *Physical Chemistry Chemical Physics* Emerging Investigators Award, RSC

**2021** Emerging Materials Award, Department of Energy

**2014 - 2017** National Science Foundation Graduate Research Fellowship, National Science Foundation

**2014** National Defense Science & Engineering Graduate Fellowship, Department of Defense

**2012** Ryan Fellowship, Northwestern University

**2012** Laura B. Eisenstein Award, Department of Physics, University of Illinois at Urbana-Champaign

**2011** Excellence in Physics Award, Department of Physics, University of Illinois at Urbana-Champaign

**2008 - 2012** James Scholar, University of Illinois at Urbana-Champaign

**2008 - 2012** Dean's List, University of Illinois at Urbana-Champaign,  
**2010 - 2010** SULI researcher, Stanford Linear Accelerator Laboratory, Menlo Park, California  
**2009 - 2009** SULI researcher, Lawrence-Berkeley National Laboratory, Berkeley, California  
**2009 - 2010** National Finalist in the Science & Energy Research Challenge, Department of Energy  
**2007** National Merit Scholar, National Merit Scholarship Corporation  
**2007** Early College Scholars Program, Washington University in St. Louis

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## SCIENTIFIC RESEARCH PUBLICATIONS

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[IF =54.2] **E. Sprague-Klein\***, Daniel M. Mittleman "Starting an ultrafast spectroscopy lab," *Nature Reviews Methods Primers*, 2026, <https://doi.org/10.1038/s43586-026-00524-0> (in press).

[IF =5.8] N. Warren, E. Donahue, U. Yunusa, A. Pattammattel, B. Ma, **E. Sprague-Klein\***, "Temperature Dependent Characterization of Nanoscale Copper-Carbon Interface," *Materials Advances*, 2025, 6, 9427-9436. Outstanding Paper Award, runner-up. New Principal Investigators: A Spotlight on Recent Appointees, 2025 Materials Advances Most Popular Articles, Popular Advances and Materials Advances Covers.

[IF = 2.8] L. Gimeno, **E. A. Sprague-Klein**, B.T. Phelan, T.N. Haddock, N. Oppé, M. Beyler, C. David, E. Blat, E. Levillain, O. Aleveque, C. Gurlaouen\*, L. X. Chen\*, Y. Pellegrin\*, "Encumbering the copper(I)-diimine coordination sphere with a benzyl group: impact on the stability and photoredox properties," *Journal of Physical Chemistry A*, 2026, 130, 4, 879–889.

[IF = 6.58] E. Donahue, T. Malina, E. Smith, J. Psencik, **E. Sprague-Klein\***, "Photophysics of Artificial Light-Harvesting Nanoantenna," *Communications Chemistry*, 2025, 8, 263.

[IF = 3.676] P. Srivastava, N. Warren, A. Willemsen, A. Pattammattel, **E. Sprague-Klein\***, "Plasmon Dynamics Driven by Aggregation of Tris(2,2'-bipyridine)ruthenium(II)-Functionalized Gold Nanoparticles Probed by XANES and Transient Absorption Spectroscopy," *Journal of Physical Chemistry C*, 2025, 129 (29), 13337-13348. Naomi Halas and Peter Nordlander Festschrift. Featured as the Back Cover Article.

[IF = 3.133] N. Warren, A. Saul, K. Orme, E. Donahue, P. Srivastava, **Z. Gong**<sup>‡</sup>, B. McDonald, **E. Sprague-Klein\***, "Investigating Biomimetic Chemoresponsive Cation- $\pi$  Interactions Using Raman Spectroscopy," *Journal of Raman Spectroscopy*, 2025, 56 (9), 808-816.

[IF = 5.3] J. M. Hoffman, T. N. Haddock, M. W. Mara, B. T. Phelan, Z. J. Mast, E. H. Oriel, B. Guzelturk, J. Yu, C. Liu, R. D. Schaller, **E. A. Sprague-Klein**, G. C. Schatz, A. B.F. Martinson, X. Zhang, D. M. Tiede, L. X. Chen\*, "X-ray Transient Absorption Spectroscopy Reveals Light Responses of Cobalt Centers in Co-Pi OER Catalytical Devices under Electrochemical Biases," *Energy & Fuels* 2025, 39, 13, 6703–6707.

[IF = 3.9] C. Shi, S.-H. Kim, N. Warren, N. Guo, X. Zhang, Y. Wang, A. Willemsen, C. López-Pernía, Y. Liu, A. Kingon, H. Yan, Y. Zheng, M. Chen\*, **E. Sprague-Klein\***, B. Sheldon\*, "A Hierarchically Micro- and Nano-structured Polymer via Crystallinity Alteration for Sustainable Environmental Cooling," *Langmuir*, 2024, 40, 38, 20195–20203.

[IF = 3.3] **D. G. Schauer**<sup>‡</sup>, J. Bredehoeft, U. Yunusa, A. Pattammattel, H. J. Wörner, **E. A. Sprague-Klein\***. "Targeted synthesis of gold nanorods and characterization of their tailored surface properties using optical and X-ray spectroscopy," *Phys. Chem. Chem. Phys.*, 2024, 26, 25581-25589. PCCP 2023 Emerging Investigators

[IF = 29.7] N. Guo, C. Shi\*, N. Warren, **E. A. Sprague-Klein**, B. W. Sheldon, M. Chen\*, "Challenges and Opportunities for Passive Thermoregulation," *Advanced Energy Materials*, 2024, 2401776.

- [IF = 4.40] N. Warren, U. Yunusa, [A. Singhal](#)<sup>‡</sup>, **E. Sprague-Klein**<sup>\*</sup>, "Facilitating Excited-State Plasmonics and Photochemical Reaction Dynamics," *Chemical Physics Reviews*, 2024, 5, 011307. Editorial Board Featured Article.
- [IF = 8.31] U. Yunusa, N. Warren, D. Schauer, P. Srivastava, **E. Sprague-Klein**<sup>\*</sup>, "Plasmon resonance dynamics and enhancement effects in Tris(bipyridine)ruthenium(II) gold nanosphere oligomers," *Nanoscale*, 2024, 16, 5601-5612. Nanoscale and Nanoscale Horizons: Surface Enhanced Raman Spectroscopy and Nanoscale 2024 Emerging Investigators.
- [IF = 5.44] A. M. Potocny, B. T. Phelan, **E. A. Sprague-Klein**, M. W. Mara, D. M. Tiede, Lin X. Chen, K. L. Mulfort<sup>\*</sup>. "Harnessing Intermolecular Interactions to Promote Long-Lived Photoinduced Charge Separation from Copper Phenanthroline Chromophores," *Inorganic Chemistry*, 2022, 61, 48, 19119-19133.
- [IF = 3.70] R. B. Weerasooriya, M. C. Drummer, B. T. Phelan, J. L. Gesiorski, **E. A. Sprague-Klein**, L. X. Chen, K. D. Glusac<sup>\*</sup>. "Towards Metal-free Photocatalysis: Photochemical Regeneration of Organic Hydride Donors Using Phenazine-based Photosensitizers," *Journal of Physical Chemistry C*, 2022, 126, 42, 17816-17825.
- [IF = 22.0] **E. A. Sprague-Klein**<sup>\*</sup>, X. He, M. W. Mara, B. J. Reinhart, S. Lee, L. M. Utschig, K. L. Mulfort, L. X. Chen<sup>\*</sup>, D. M. Tiede<sup>\*</sup>. "Photo-Electrochemical Effect in the Water Oxidation Catalyst Cobalt-Phosphate (CoPi)," *ACS Energy Letters*, 2022, 7, 9, 3129-3138.
- [IF = 5.44] L. Gimeno, B. Phelan, **E.A. Sprague-Klein**, T. Roisnel, E. Blart, C. Gourlaouen<sup>\*</sup>, L.X. Chen<sup>\*</sup>, Y. Pellegrin<sup>\*</sup>. "A very bulky and stable copper(I)-phenanthroline complex: impact of steric strain and symmetry on the excited state properties," *Inorganic Chemistry*, 2022, 61, 19, 7296-7307.
- [IF = 3.70] **E. A. Sprague-Klein**, R. Ho-Wu, D. Nguyen, S. C. Coste, Y. Wu, T. Seideman, G. C. Schatz<sup>\*</sup>, R. P. Van Duyne, "Modulating the Electron Affinity of Polypyridine Molecules on Single Gold Nanoparticles for Plasmon-Driven Electron Transfer," *Journal of Physical Chemistry C*, 2021, 125, 40, 22142-22153. Featured in the Marie-Paule Pileni Festschrift Special Edition
- [IF = 4.65] B. V. Kramer, B. T. Phelan, **E. A. Sprague-Klein**, B. T. Diroll, S. Lee, K. Otake, R. Palmer, M. W. Mara, O. K. Farha, J. T. Hupp<sup>\*</sup>, L. X. Chen<sup>\*</sup>, "Single-Atom Metal Oxide Sites as Traps for Charge Separation in nano Zr-MOF NDC-NU-1000," *ACS Energy & Fuels*, 2021, 35, 23, 19081-19095.
- [IF = 10.5] A. R. Bielinski, **E. A. Sprague-Klein**, B. T. Phelan, A. B. F. Martinson<sup>\*</sup>, "Pyroelectric Heat Detection for Calibrated Measurement of Atomic Layer Deposition Reaction Heat," *Chemistry of Materials*, 2021, 33, 6176-6185.
- [IF = 4.9] M. S. Eberhart, B. T. Phelan, J. Niklas, **E. A. Sprague-Klein**, D. M. Kaphan, D. J. Gosztola, L. X. Chen, D. M. Tiede, O. G. Poluektov, K. L. Mulfort<sup>\*</sup>, "Surface immobilized copper(I)diimine photosensitizers as molecular probes for elucidating the effects of confinement at interfaces for solar energy conversion," *Chemical Communications*, 2020, 56, 12130-12133. Featured as the journal's back cover article
- [IF = 15.0] **E. A. Sprague-Klein**, B. Negru, L. R. Madison, S. C. Coste, B. K. Rugg, [A. M. Felts](#)<sup>‡</sup>, M. O. McAnally, M. Banik, V. A. Apkarian, M. R. Wasielewski, M. A. Ratner, T. Seideman, G. C. Schatz, R. P. Van Duyne<sup>\*</sup>, "Photoinduced Plasmon-Driven Chemistry in trans-1,2-Bis(4-pyridyl)ethylene Gold Nanosphere Oligomers," *Journal of the American Chemical Society*, 2018, 140, 10583-10592.
- [IF = 3.70] B. Negru, M. O. McAnally, H. E. Mayhew, T. W. Ueltschi, L. Peng, **E. A. Sprague-Klein**, G. C. Schatz, and R. P. Van Duyne<sup>\*</sup>, "Fabrication of Gold Nanosphere Oligomers for Surface-Enhanced Femtosecond Stimulated Raman Spectroscopy," *Journal of Physical Chemistry C*, 2017, 121, 27004-27008.

[IF = 15.0] **E. A. Sprague-Klein**, M. O. McAnally, D. V. Zhdanov, A. B. Zrimsek, V. A. Apkarian, T. Seideman, G. C. Schatz, and R. P. Van Duyne\*, "Observation of Single Molecule Plasmon-Driven Electron Transfer in Isotopically Edited 4,4'-Bipyridine Gold Nanosphere Oligomers," *Journal of the American Chemical Society*, 2017, 139, 15212-15221. Highlighted in ACS Nano "Present and future of surface-enhanced Raman scattering" and in ACS Energy Letters "Plasmons for Energy Conversion"

\* denotes corresponding author    ‡ denotes undergraduate coauthor  
IF: impact factor

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## ARTICLES IN PREPARATION (DATA COLLECTED, MANUSCRIPT WRITTEN)

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U. Yunusa, Y. Yun, Z. Gong, A. Willemsen, **E. A. Sprague-Klein\***. "LSPR-Assisted Spatial Assessment of Heavy Metal Contamination in Surface Water Sediments," Submitted to Nature Communications, 2026.

**E. A. Sprague-Klein\***, B. Phelan, M. Mara, J. Yu, J. Niklas, M. Drummer, K. Glusac, S. Lee, X. Zhang, D. M. Tiede, L.X. Chen\*. "Ultrafast Electronic and Structural Dynamics in CoPi and CoBi Photocatalysts," In preparation, *Angewandte Chemie*, 2026.

Xinfeng Chen, Xiaohang Jia, Yan Zhou, Na Jin, Yuanqin Yun, Zhenyang Liu, Rongzhen Wu, Sooyeon Hwang, **Emily Sprague-Klein**, Brenda Rubenstein, Ou Chen, "Gold-Single-Atom Decorated Core-Shell Quantum Dots for High-Efficiency Overall Photocatalytic Water Splitting," In preparation, *Nature Catalysis*, 2026.

Rongzhen Wu, Andes Willemsen, Xiaohang Jia, Zhenyang Liu, Jianbo Gao, **Emily Sprague-Klein**, Ou Chen "Single-Step Colloidal Synthesis of Palladium Nanocluster-Functionalized Cs<sub>4</sub>MnSb<sub>2</sub>Cl<sub>12</sub> Layered Double Perovskite Nanocrystals," In preparation, *Nano Letters*, 2026.

**E. A. Sprague-Klein**, M. F. Cardinal, Z. Mansley, Y. Guo, Y. Shin, L. Peng, H. Mayhew, N. Chiang, M. Mattei, L.D. Marks, M. Hersam\*, G.C. Schatz\*, R.P. Van Duyne, "Polarization-Resolved and Pump Energy Dependence of Plasmon-Driven Electron Transfer in 4,4'-Bipyridine Single Particle Surface-Enhanced Raman Spectroscopy," *In preparation*, 2026.

Tomáš Malina, E. Serino, E. Smith, Erika Keil, Jakub Pšenčík, **Emily A. Sprague-Klein\***, "Plasmonic Confinement in a Protein-Free Photosynthetic Antenna through Magnesium-Mediated Self-Assembly," In preparation, to be submitted to *Nano Letters* 2026.

C. Efaw, X. Tan, J. Russell, Y. Yun, S. Langois, S. B. Eskender, S. Pooley, J. Thomas, M. S. Khan, **E. Sprague-Klein**, J. D. Cyran, O. Andreussi, Y. Qi\*, Y. Xiong\*, "The Electrical Double Layer in Batteries – Perspective on Complex Electrolytes and Future Directions," In preparation, to be submitted to *Advanced Functional Materials* 2026.

U. Yunusa, P. Srivastava, Y. Yun, **E. Sprague-Klein\*** "Plasmon-driven chemistry in a covalently linked ruthenium-gold icosahedral nanocatalyst for enhanced electron harvesting," In preparation, *Journal of the American Chemical Society*, 2027.

Y. Yun, L. Clarke, A. Farghaly, **E. Sprague-Klein\*** "Plasmonic-enhancement in Pt/Ag/Au alloy aerogels for enhanced methanol oxidation," In preparation, *Journal of Physical Chemistry*, 2026.

Y. Yun, U. Yunusa, **E. Sprague-Klein\*** "Highly uniform and periodic shell-isolated nanoparticle-enhanced Raman spectroscopy electrodes for aqueous battery electrolytes," In preparation, *Analytical Chemistry*, 2026.

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**AFFILIATE FACULTY & SYNERGISTIC CAMPUS AFFILIATIONS**


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Affiliate Faculty, Initiative for Sustainable Energy (Executive Board, 2026), Feb 2023 – present

Affiliate Faculty, Initiative for Native American and Indigenous Studies (Steering Committee, 2025), Feb 2023 - present

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**GRANTS & AWARDS**


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*Completed*

Institute for Sustainable Energy Seed Award (CoPI), Amount: \$115,591 (\$30,197 direct costs to the group). Performance Period: 8/1/2023 – 7/31/2024. Title: Bullet-Proof Rigid-Rod Polymer to Block Dendrite Penetration in Batteries.

Department of Energy, NSLS-II (PI), GUP: 313725. Amount: 12 shifts (96 hours) of hard x-ray nanoprobe (HXN) beamtime. Performance Period: 9/1/2023 – 12/21/2023 Title: In situ Structural Characterization of Enhanced Thermal Conductivity in Copper-Carbon Materials.

Nipmuc Indian Development Corporation, Blackstone River Watershed Council, National Park Service (PI). Amount: \$50,000 direct costs to the group. Performance Period: 1/15/2024 – 1/14/2025. Title: SERS-Based Methodology for Quantifying Pollutants in the Blackstone River.

Department of Energy, NSLS-II (PI), GUP: 314737. Amount: 36 shifts (288 hours) of hard x-ray nanoprobe (HXN) beamtime. Performance Period: 1/3/2024 – 12/31/2024. Title: Structural Characterization of Enhanced Thermal Conductivity in Copper-Carbon Materials.

UTRA & SPRINT Awards (PI). Amount: \$12,000 direct costs to the group. Performance Period: 6/24/2024 – 12/30/2025. Title: Plasmon-driven ring opening reactions in porphyrins. Plasmon-driven chemistry.

DARPA ExCURSion (CoPI), Amount: \$2,080,539 (\$224,000 to the group). Performance Period: 11/21/2024 – 4/29/2027. Title: Novel sorbents for CO<sub>2</sub> capture for fuel production.

*Awarded*

NSF EPSCoR Research Fellow (PI), Amount: \$300,000 to the group. Performance Period: 1/1/2025 – 12/31/2026. Title: In situ characterization of Copper-Carbon Heterostructures for Renewable Energy.

DOE EPSCoR Implementation (CoPI), Amount: \$2,400,006 (\$206,307 to the group). Performance Period: 8/15/2025 – 8/14/2027. Title: Effect of the Electrical Double Layer (EDL) in Understanding the Correlation of Metal Plating/Stripping and Electrolyte Decomposition at Metal/Electrolyte Interface.

ACS Graduate Student Success Grant (PI), Amount: \$25,000 direct costs to the group. Performance Period: 01/01/2026 – 12/30/2026.

Division of Research Seed Award, Track 3 (PI), Amount: \$64,494 direct costs to the group. Performance Period: 06/01/2026 – 5/30/2027. Visualization of Microplastics and Lung Cell Function in Idiopathic Pulmonary Fibrosis Using Advanced Optical Vibrational Imaging.

Rhode Island Science & Research Council (coPI), Amount: \$83,000 (\$41,500 direct costs to the group). Performance Period: 05/15/2026 – 05/14/2027. Passive Daytime Radiative Cooling Nanomaterials for the Ocean State.

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**SEMINARS, PRESENTATIONS & SCHOLARSHIP**

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2027 International Conference on Chemistry for a Sustainable Future, Prague, Czech Republic, International Union of Pure and Applied Chemistry (IUPAC) and Chemistry Europe, September 2027, Invited Talk.

ACS National Conference, Trends in Strong Light-Matter Interactions Across Platforms, San Diego, CA, Fall 2027, Invited Talk.

Royal Society of Chemistry, Surface-Enhanced Raman Scattering Faraday Discussion, London, UK, April 2027, Contributed Talk.

Massachusetts Institute of Technology, Boston, MA, Physical Chemistry Seminar, 2027, Invited Talk.

University of Vermont, 2026-2027, Invited Talk.

University of Massachusetts-Lowell, December 2026, Invited Talk.

Colby College, October 2026, Invited Talk.

2026 Vibrational Spectroscopy Conference Gordon Research Conference, August 2026, Invited Talk.

ACS Northwest Regional, *"Lighting the Way: Unraveling Chemical Structure and Dynamics with Advanced Nonlinear Spectroscopy"* Symposium, June 2026, Invited Talk.

University of Massachusetts Dartmouth, Department of Chemistry, Dartmouth, MA, February 2026, Invited Talk.

Simmons University, Department of Chemistry and Physics, Boston, MA, March 2026, Invited Talk.

The International Chemical Congress of Pacific Basin Societies, Division of Physical Chemistry (Pacifichem), Latest Development Of Advanced Vibrational Spectroscopy, "Plasmon-adsorbate photochemistry in nanoscale confined systems," Honolulu, Hawaii, December 2025, Invited Talk.

2025 SLAC/SSRL Users' Meeting, Characterization of Advanced Materials for Electrochemical Systems by Synchrotron X-ray, Palo Alto, CA, (rescheduled, TBD), Invited Talk.

American Chemical Society National Meeting, *Division of Physical Chemistry*, "Plasmonics for enhancing molecular adsorbate photochemistry," Washington D.C., August 2025, Contributed Talk.

DARPA Proposers Day, *Radiovoltaics Rads to Watts*, "Photonic and Plasmonic Enhancements for Improved Radiation Performance," Arlington, VA, June 2025, Contributed Talk.

Brown University Initiative for Sustainable Energy Mini-Symposium, "Photoredox Spectroscopy for Understanding Light-harvesting Dynamics," Providence, RI, May 2025, Invited Talk.

University of New Hampshire, Department of Chemistry, Durham, NH, February 2025, Invited Talk.

Brown University, Center for Students of Color, *Environmental Engagement Seminar*, Providence, RI, November 2024, Invited Talk.

The University of Rhode Island, Department of Chemical Engineering, *Amgen-sponsored Seminar Series*, Kingston, RI, November 2024, Invited Talk.

The University of Rhode Island, *Department of Chemistry Seminar*, "Observing Molecule-Plasmon Dynamics for Reactive Chemistry at the Nanoscale," Kingston, RI, October 2024, Invited Talk.

The XXVIII International Conference on Raman Spectroscopy (ICORS), *SERS, TERS, and Plasmonics: Mechanistic*, "Plasmonics for Photochemistry of Ions and Molecules," Sapienza Università di Roma, Rome, Italy, August 2024, Invited Talk.

Electrochemical Society National Meeting, *Light Induced Redox*, "Light-Induced Redox Dynamics in Plasmonic Nanostructures and Photosensitizer Transition Metal Compounds," San Francisco, CA, May 2024, Contributed Talk.

DARPA Proposers Day, *Expeditionary Carbon Utilization for Energy Resilience and Stabilization (ExCURSion)*, "Energy-storing fuel sources for CO<sub>2</sub> capture," Arlington, VA, March 2024, Contributed Talk.

Brown University, *The Tony & Pat Houghton Condensed Matter Seminar Series*, "Plasmon-driven electron transfer in single gold nanoparticles functionalized with adsorbed pyridine derivatives," Providence, RI, December 2023, Invited Talk.

Brown University Sustainable Energy Workshop, *Electrochemical Redox Catalysis for Energy Conversion and Usage*, "Photoelectrochemical spectroscopy for understanding oxygen evolving reactions in water-splitting catalysis," Providence, RI, October 2023, Invited Talk.

American Chemical Society National Meeting, *Catalysis Dynamics of Active Sites, Catalyst Structure, and Reaction Environment*, "Light-induced chemical structure dynamics in photosensitizer transition metal compounds and metal-oxide catalysts," San Francisco, CA, August 2023, Invited Talk.

Brown University, *Department of Chemistry Colloquium*, "Light-Induced Chemical Structure Dynamics in Plasmonic Nanostructures and Photosensitizer Transition Metal Compounds," Providence, RI, October 2022, Invited Talk.

Vistas in Catalysis, National Academies of Science, *Engineering and Medicine Workshop*, Washington D.C., October 2022, Contributed Talk.

American Chemical Society National Meeting, *Photochemistry Spotlight: Answering the Big Questions in Photochemistry*, Chicago, IL, August 2022, Contributed Talk.

Brown University, *Department of Chemistry*, "Light-Harvesting Photonic Materials for Electron Transfer and Water-Splitting Catalysis," February 2022<sup>†</sup>, Invited Talk.

Dartmouth, *Department of Chemistry*, "Light-Harvesting Photonic Materials for Enhanced Electron Transfer and Water-Splitting Catalysis Probed by Optical Spectroscopy," January 2022<sup>†</sup>, Invited Talk.

Baylor University, *Department of Chemistry*, "Time-resolved Dynamics of Photonic Materials Probed by Optical and X-ray Spectroscopy," Waco, TX, January 2022, Invited Talk.

Miami University, *Department of Chemistry*, "Solar Materials Probed by Time-Resolved Optical and X-ray Spectroscopy," January 2022<sup>†</sup>, Invited Talk.

Utah State University, *Department of Chemistry*, “Electronic and Structural Dynamics in Solar Materials Probed by Time-Resolved Optical and X-ray Spectroscopy,” Logan (main campus), Blanding (Diné/Navajo Nation)<sup>‡</sup>, Uintah Basin (Ute Indian Tribe Education Partnership)<sup>‡</sup>, Aggie Broadcast, December 2021, Invited Talk.

SACNAS National Diversity in STEM Digital Conference, *Winner of the Indigenous Greeting, Native American Welcome*<sup>‡</sup>, October 2021, Invited Talk.

American Chemical Society Postdoc Symposium, *CATL/ENFL/PHYS/NUCL Divisions*, “Structural Changes and Charge Transport in Heterogenous and Molecular Cobalt Catalysts for Water Splitting Reactions,” November 2021<sup>‡</sup>, Contributed Talk.

Department of Energy, *Office of Intelligence and Counterintelligence*, “Native American Heritage Month,” Diversity, Equity + Inclusion Advisory Council Newsletter, B. Gaynor, M. R. Banon, and E. A. Sprague-Klein. United States: DY22 November 2021, Edition 13, Invited Talk.

American Chemical Society National Meeting, *Division of Colloids & Surface Chemistry*, “Understanding surface plasmon-driven electron transfer by modulating the electronic affinity of polypyridine molecules adsorbed on single gold nanoparticles,” Atlanta, GA, August 2021, Contributed Talk.

American Chemical Society National Meeting, *Spectroscopy for Understanding Catalysis*, “Structural Changes and Charge Transport in Heterogenous and Molecular Cobalt Catalysts for Water Splitting Reactions,” August 2020<sup>‡</sup>, Contributed Talk.

American Chemical Society National Meeting, *Chemistry in Real Space and Time Symposium*, “Nanoscale plasmon-driven electron transfer for solar energy applications,” San Diego, CA, August 2019, Invited Talk.

Electrochemical Society, “Tracking Structures in Solar Fuels Catalysis: In-Situ X-Ray Structure Characterization of Interfacial Water-Splitting Molecular and Thin-Film Catalysts,” D.M. Tiede, T.W. Kim, E. Sprague-Klein, G. Kwon, A.B.F. Martinson, and K.L. Mulfort. 2019 Vol. MA2019-02 Issue 41 1955, Invited Talk.

University of Chicago, *Institute for Molecular Engineering Seminar*, “Plasmon-Driven Electron Transfer in Single Gold Nanoparticles Functionalized with Adsorbed Pyridine Derivatives,” Chicago, IL, December 2018, Invited Talk.

University of Chicago, *James Franck Institute Special Seminar*, “Hot Electrons & Transient Molecular Dynamics in Plasmonic Nanomaterials,” Chicago, IL, November 2018, Invited Talk.

Northwestern University, *Spectroscopy & Theory Seminar*, “Direct Observation of Plasmon-Driven Electron Transfer in Gold Nanosphere Oligomers,” Evanston, IL, March 2018, Invited Talk.

American Chemical Society National Meeting, *Energy & Charge Transfer at Nanoscale Interfaces*, “Observation of Single Molecule Plasmon-Driven Electron Transfer in Isotopically Edited 4,4'-Bipyridine Gold Nanosphere Oligomers,” New Orleans, LA, March 2018, Contributed Talk.

University of Nebraska-Lincoln, *National Conference for Undergraduate Women in Physics*, “3D Superconducting Resonator for use in Graphene and Qubit Studies,” E.A. Sprague and A. Bezryadin, October 2011, Contributed Talk.

University of Illinois, *Women Chemists Committee (WCC) Regional Undergraduate Research Symposium*, “Dissipation due to Graphene within a High-Q Superconducting Fabry-Perot Resonator,” E.A. Sprague and A.

Bezryadin, April 2011, Contributed Talk.

University of Illinois, *Undergraduate Research Symposium*, “Dissipation due to Graphene within a High-Q Superconducting Fabry-Perot Resonator,” E.A. Sprague and A. Bezryadin, April 2011, Contributed Talk.

University of Illinois, *Physics Departmental Undergraduate Research Symposium*, “Femtosecond Timescale Bi-Plasma Interactions Probed by Visible Light Fluorescence,” E.A. Sprague, D. Daranciang, and A. Lindenberg, January 2011, Contributed Talk.

Department of Energy, *Office of Scientific and Technical Information*, “Bi-Plasma Interactions on femtosecond Time-Scales,” E. Sprague and A. Lindenberg, SLAC-TN-11-015, United States: N.p., 2011. doi:10.2172/1017214, Contributed Talk.

‡ denotes a virtual talk due to the COVID-19 pandemic

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## TEACHING

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### **Brown University**, Providence, RI

Department of Chemistry

*Chem 2770* – Quantum Mechanics, a graduate level physical and theoretical chemistry course using rigorous mathematical treatment and Dirac notation of one- and three-dimensional problems of relevance to low dimensional materials, spin systems, and excited-state molecular dynamics.

September – December 2023

September – December 2024

September – December 2025

September – December 2026

### **Brown University**, Providence, RI

Department of Chemistry

*Chem 2020* – Advanced Statistical Mechanics, a graduate level physical chemistry course with emphasis on applications to computational challenges in electronic structure, catalysis, spectroscopy, and electrochemistry.

January – May 2023

January – May 2024

January – May 2025

### **Northwestern University**, Evanston, IL

Department of Chemistry

*Chem 329/445* – an advanced undergraduate & graduate course in plasmonics and vibrational spectroscopy averaging 50 students per quarter. Assisted in course planning and organization, lecturing, and grading.

January – March 2014

### **University of Illinois**, Urbana-Champaign, IL

Department of Physics

*Phys 211* – a calculus based introductory physics class for engineering, mathematics, physics, and chemistry majors averaging 300 students per semester. Supervised two discussion sections and lectured over problem solving technique and concepts, graded weekly quizzes, held weekly office hours, and proctored exams.

January – May 2012

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**RESEARCH AND ACADEMIC ADVISING**

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**Ph.D. THESIS COMMITTEES:**

Lisa Huang (Ph.D 2026, Chemistry, Peter Weber)  
David Romano (5<sup>th</sup> year, Chemistry, Peter Weber)  
Ahsan Zohaib (5<sup>th</sup> year, Chemistry, Shouheng Sun)  
Vaibhav Wani (5<sup>th</sup> year, Chemistry, Lai-Sheng Wang)  
Abeera Hassan (4<sup>th</sup> year, Chemistry, Ou Chen)  
Alex Jodko (4<sup>th</sup> year, Chemistry, Peter Weber)  
Deniz Kahraman (4<sup>th</sup> year, Chemistry, Lai-Sheng Wang)  
Yitian Liu (4<sup>th</sup> year, Chemistry, Brenda Rubenstein)  
Shuchen Tian (4<sup>th</sup> year, Chemistry, Lai-Sheng Wang)  
Shijie Liu (3<sup>rd</sup> year, Chemistry, Ou Chen)  
Temirlan Kubanaliev (3<sup>rd</sup> year, Chemistry, Shouheng Sun)  
Linghang Meng (3<sup>rd</sup> year, Chemistry, Shouheng Sun)  
Xinyu Zhang (3<sup>rd</sup> year, Lai-Sheng Wang)  
Neil Ellis (2<sup>nd</sup> year, Lai-Sheng Wang)

**CHEMICAL PHYSICS (Sc.B) CONCENTRATION ADVISOR:**

Yungeun Kim (class of 2025, Brenda Rubenstein)  
Jasper Lincoln (class of 2025, Brenda Rubenstein)  
Kevin Rapp (class of 2025, Brenda Rubenstein)  
Jeff Tejada (class of 2025, Brenda Rubenstein)  
Medha Gereddy, class of 2026  
Zhanxian Gong, class of 2026  
Hugo Mullen, class of 2026  
Yilin Xie, class of 2026  
Congyun Liao, class of 2028  
Violet Dillinger, class of 2028  
Aaron Lestz, class of 2028  
Simon Nirenberg, class of 2028  
Shine Shine, class of 2030

**UNDERGRADUATE THESES/CAPSTONE PROJECTS ADVISED:**

Ariana Clark, Computer Science & Critical NAIS Concentrator (CNC), class of 2024  
Benjamín Córdova Herrera, Chemical Engineering & East Asian Studies (CNC), class of 2026

**STUDENTS & STAFF:****Postdoctoral**

Prasenjit Srivastava, Ph.D. Physical Chemistry (October 2023 – 2026)

**Graduate Students**

Natalie Warren, Ph.D. Physical Chemistry (December 2022 – October 2026)  
Umar Yunusa, 5<sup>th</sup> year, Physical Chemistry (December 2022 – present)  
Elizabeth Donahue, 4<sup>th</sup> year, Physical Chemistry (December 2023 – present)  
Andes Willemsen, 4<sup>th</sup> year, Physical Chemistry (December 2023 – present)  
Yuanqing Yun, 4<sup>th</sup> year, Physical Chemistry (December 2023 – present)  
Emma Smith, 3<sup>rd</sup> year, Physical Chemistry (December 2024 – present)  
Yan Zhou, 3<sup>rd</sup> year, Physical Chemistry (December 2024 – present)  
Kyra Watts, 2<sup>nd</sup> year, Materials Science & Physical Chemistry (September 2024 – 2026)  
Jayden Thomas, 2<sup>nd</sup> year, (December 2025 – present)  
Michael Norlander, 2<sup>nd</sup> year, Condensed Matter Physics & Photonics (April 2026 – present)

### Visiting Scholars

Tomáš Malina, PhD candidate in Chemical Physics/Biophysics, Charles University (summer 2024)  
 David Schauer, B.S. candidate in Biochemical-Physical Chemistry, ETH Zurich (Sept 2023 – July 2024)  
 Genevieve Geiser, B.S. candidate in Chemistry, Elmira College (summer 2025)  
 Caroline Moonan, B.S. candidate in Chemistry, College of the Holy Cross (summer 2025, 2026)

### Undergraduates

Arnav Singhal, Chemical Physics (January 2023 – June 2023), class of 2026  
 Zhanxian George Gong, Chemical Physics (September 2023 – 2026), class of 2026  
 Yilin Xie, Chemical Physics (May 2024 – October 2024), class of 2026  
 Annika Svedlund, Chemistry (October 2024 – 2026), class of 2026  
 Nicole Marion, Biology (October 2024 – 2025), class of 2028  
 Benjamín Córdova Herrera, Chemical Engineering (October 2024 – 2025), class of 2026  
 Doaa Elhassan, Applied Mathematics – Biology (August 2025 – 2026), class of 2026  
 Sarah Paul, PreMed Biochemistry, Architecture (January 2026 – present), class of 2028  
 Ava Grave de Peralta, Chemistry (January 2026 – present), class of 2028  
 Noah Elbaum, Chemical Engineering (January 2026 – present), class of 2028  
 Peter Vachon, Biomedical Engineering (August 2025 – present), class of 2028  
 Bryan Quintero, Mechanical Engineering, Neuroscience (Fall 2025 – present), class of 2028  
 Bogomil Kissiov, Physics (January 2026 – present), class of 2028

### Summer High School Honors Thesis / ACS Project Seed

Genevieve Geiser, Barrington High School, class of 2024  
 Troy Tian, Barrington High School, class of 2025  
 Alan Weng, Barrington High School, class of 2025  
 Khanh Le, Woonsocket High School, class of 2026  
 Martin Pani, Barrington High School, class of 2026  
 Aagami Mohiraaj, Barrington High School, class of 2026  
 Matthew Tian, Barrington High School, class of 2026  
 Ela Yucel, Barrington High School, class of 2027

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## SERVICE AND OUTREACH

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### To the department/university:

Member of Brown's *Institute for Molecular and Nanoscale Innovation (IMNI)*, 2022 – present  
 Member of *Admissions Committee of the Chemistry Department*, 2022 – present  
 Member of Graduate Recruitment Committee, 2022 - present  
 Faculty organizer of *Chemistry Departmental Colloquium*, 2022 – present  
 Faculty tour guide for the Chemistry Department's *STEM-Day* to attract underrepresented high school students. Providence, RI 2023 – present.  
 Speaker for *Women and Non-Binary Faculty Panel Discussion*, March 2023  
 Faculty facilitator and advisor for community partnership activities at the intersection of Science and Native American identities, *NAISI @ Brown*, 2023 – present  
 NAISI Steering Committee, STEM-focused classes 2025 – present  
 Udall Foundation, *Faculty Review Committee*, 2024  
 National Lab Day @ Brown, *Faculty Host Committee*, 2024  
 Undergraduate curriculum development, *Faculty Committee*, 2023

Chemical physics undergraduate concentration advisor, September 2024 – present

**To the profession:**

Peer reviewer for *Journal of the American Chemical Society*, *Chemical Reviews*, *Chemical Science*, *ACS Omega*, *ACS Applied Energy Materials*, *Journal of Applied Physics*, *Journal of Physical Chemistry*, *ACS Nano*, *Communications Chemistry*

Reviewer for *Department of Energy (DOE)* grant funding

Reviewer for *National Science Foundation (NSF)* grant funding

Discussion Leader, *Gordon Conference in Vibrational Spectroscopy*, 2024

Discussion Leader, *Gordon Conference in Noble Metal Nanoparticles*, 2026

Session Presider, *ACS Division of Colloids and Surface Chemistry*, 2021

Session Co-Chair, *ECS Division of Physical and Analytical Electrochemistry: General Session*, Light Induced Redox, 2024

Member of the *American Chemical Society (ACS)*, since 2016

Member of the *Electrochemical Society (ECS)*, since 2019

Member of *Materials Research Society (MRS)*, since 2019

Member of *Society of Women Engineers (SWE)*, since 2008

Member of the *Association of Women in Science (AWIS)*, since 2019

Member of *Asian Scientists and Engineers (SASE)*, since 2019

Member of *American Indian Science and Engineering Society (AISES)*, since 2019

Member of the *Society for the Advancement of Chicanos/Hispanics and Native Americans in Science (SACNAS)*, since 2010

Mentor & Science Panelist for Chicago's *NAACP Afro-Academic, Cultural, Technological and Scientific Olympics*, 2020 -2021

STEM Career Counselor for Resume Preparation, *QuantumHispano*, 2020 -2021

Founding Board Member of Northwestern University's *Mentorship Opportunities for Research Engagement (MORE)*, 2013 – 2017

President of the University of Illinois at Urbana-Champaign's *Society for Women in Physics (SWIP)*, 2011 – 2012

**To the community:**

Science Fair Judge for the Illinois Junior Academy of Science, 2013 – 2017

Science Fair Judge for the Rhode Island Science and Engineering Fair, 2023 – 2024, 2026