

EMILY A. SPRAGUE-KLEIN

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EMPLOYMENT

Assistant Professor **Brown University** July 2022
Department of Chemistry, Physical Chemistry

Postdoctoral Associate **Northwestern University/Argonne National Laboratory** 2019 - 2022
Division of Chemical Sciences & Engineering
Solar Energy Conversion Group
Advisors: Prof. Lin X. Chen and Dr. David M. Tiede

Honors/Awards: Department of Energy LDRD award in Emerging Materials

EDUCATION

Ph.D. **Northwestern University**, Applied Physics 2018
Advisors: the late Prof. Richard Van Duyne, now Prof. George C. Schatz

Honors/Awards: National Science Foundation Graduate Research Fellowship,
National Defense Science & Engineering Graduate Fellowship, Ryan Fellowship

B.S. **University of Illinois at Urbana-Champaign**, Engineering Physics 2012
Advisors: Prof. Aaron Lindenberg and Prof. Alexey Bezryadin

Honors/Awards: James Scholar, Dean's List, Laura B. Eisenstein Award,
Excellence in Physics Award, Department of Energy Science & Energy Research
Challenge National Finalist, National Merit Scholar

PEER-REVIEWED PUBLICATIONS

A. M. Potocny, B. T. Phelan, **E. A. Sprague-Klein**, M. W. Mara, D. M. Tiede, Lin X. Chen, K. L. Mulfort. "Harnessing Intermolecular Interactions to Promote Long-Lived Photoinduced Charge Separation from Copper Phenanthroline Chromophores," *Inorganic Chemistry*, 2022, 61, 48, 19119-19133.

R. B. Weerasooriya, M. C. Drummer, B. T. Phelan, J. L. Gesiorski, **E. A. Sprague-Klein**, L. X. Chen, K. D. Glusac. "Towards Metal-free Photocatalysis: Photochemical Regeneration of Organic Hydride Donors Using Phenazine-based Photosensitizers," *Journal of Physical Chemistry C*, 2022, 126, 42, 17816-17825.

E. A. Sprague-Klein, X. He, M. W. Mara, B. J. Reinhart, S. Lee, L. M. Utschig, K. L. Mulfort, L. X. Chen, D. M. Tiede. "Photo-Electrochemical Effect in the Water Oxidation Catalyst Cobalt-Phosphate (CoPi)," *ACS Energy Letters*, 2022, 7, 9, 3129-3138.

L. Gimeno, B. Phelan, **E.A. Sprague-Klein**, T. Roisnel, E. Blart, C. Gourlaouen, L.X. Chen, Y. Pellegrin. "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.

E. A. Sprague-Klein, R. Ho-Wu, D. Nguyen, S. C. Coste, Y. Wu, T. Seideman, G. C. Schatz, 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

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, L. X. Chen, "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.

A. R. Bielinski, **E. A. Sprague-Klein**, B. T. Phelan, A. B. F. Martinson, "Pyroelectric Heat Detection for Calibrated Measurement of Atomic Layer Deposition Reaction Heat," *Chemistry of Materials*, 2021, 33, 6176-6185.

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, "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

E. A. Sprague-Klein, B. Negru, L. R. Madison, S. C. Coste, B. K. Rugg, A. M. Felts, M. O. McAnally, M. Banik, V. A. Apkarian, M. R. Wasielewski, M. A. Ratner, T. Seideman, G. C. Schatz, R. P. Van Duyne, "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.

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, "Fabrication of Gold Nanosphere Oligomers for Surface-Enhanced Femtosecond Stimulated Raman Spectroscopy," *Journal of Physical Chemistry C*, 2017, 121, 27004-27008.

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"
- Highlighted in ACS Energy Letters "Plasmons for Energy Conversion"

E. A. Sprague-Klein, B. Phelan, M. Mara, J. Yu, J. Niklas, M. Drummer, M. Ferrandon, A. Farghaly, K. Glusac, O. Poluektov, S. Lee, D. Tiede, X. Zhang, L.X. Chen. "Ultrafast Electronic and Structural Dynamics in CoPi and CoBi Photocatalysts," 2022 (In preparation).

E. A. Sprague-Klein, M. F. Cardinal, Z. Mansley, Y. Guo, Y. Shin, L. Peng, H. Mayhew, N. Chiang, M. Mattei, M. Hersam, L.D. Marks, 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," 2022 (In preparation).

N. Warren, U. Yunusa, A. Singhal, **E. Sprague-Klein**, "Excited-state Chemistry in Confined Environments," 2022 (In preparation, invited submission to *Chemical Physics Reviews*).

TECHNICAL REPORTS, CONFERENCE PROCEEDINGS & STEM POLICY

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

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

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

INVITED TALKS AND SELECTED CONFERENCE PRESENTATIONS

- Vistas in Catalysis, National Academies of Science, Engineering and Medicine Workshop, Washington D.C., October 2022
- ACS National Meeting, Photochemistry Spotlight: Answering the Big Questions in Photochemistry, Chicago, IL, August 2022
- Brown University, Department of Chemistry, February 2022*
- Dartmouth, Department of Chemistry, January 2022*
- Baylor University, Department of Chemistry, Waco, TX, January 2022
- Miami University, Department of Chemistry, January 2022*
- Utah State University, Department of Chemistry, Logan (main campus) & Blanding (Diné/Navajo Nation)*, Aggie Broadcast, December 2021
- SACNAS National Diversity in STEM Digital Conference, October 2021 (Winner of the Indigenous Greeting, Native American Welcome)*
- ACS National Meeting, “Understanding surface plasmon-driven electron transfer by modulating the electronic affinity of polypyridine molecules adsorbed on single gold nanoparticles,” Division of Colloids & Surface Chemistry, Atlanta, GA, August 2021 (speaker & presider)
- ACS Postdoc Symposium, “Structural Changes and Charge Transport in Heterogenous and Molecular Cobalt Catalysts for Water Splitting Reactions,” CATL/ENFL/PHYS/NUCL Divisions, November 2021*
- ACS National Meeting, “Structural Changes and Charge Transport in Heterogenous and Molecular Cobalt Catalysts for Water Splitting Reactions,” Spectroscopy for Understanding Catalysis, August 2020*
- ACS National Meeting, “Nanoscale plasmon-driven electron transfer for solar energy applications,” Chemistry in Real Space and Time Symposium, San Diego, CA, August 2019
- University of Chicago, “Plasmon-Driven Electron Transfer in Single Gold Nanoparticles Functionalized with Adsorbed Pyridine Derivatives,” Institute for Molecular Engineering Seminar, Chicago, IL, December 2018
- University of Chicago, James Franck Institute Special Seminar, “Hot Electrons & Transient Molecular Dynamics in Plasmonic Nanomaterials,” Chicago, IL, November 2018
- Northwestern University, Spectroscopy & Theory Seminar, “Direct Observation of Plasmon-Driven Electron Transfer in Gold Nanosphere Oligomers,” Evanston, IL, March 2018
- ACS 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
- ACS National Meeting, Undergraduate Research Session, “Plasmon-Driven Chemistry in Gold Nanosphere Assemblies,” Washington D.C., August 2017#

* denotes a virtual talk # denotes a student presentation and mentorship of an undergraduate REU student

TEACHING EXPERIENCE

- Brown University**, Providence, RI January – May 2023
Department of Chemistry
- CHEM 2020 – Advanced Statistical Mechanics, a graduate level physical chemistry course with emphasis on applications to computational challenges in catalysis, spectroscopy, and nanotechnology
- Northwestern University**, Evanston, IL January – March 2014
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
- University of Illinois**, Urbana-Champaign, IL January – May 2012
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

LEADERSHIP & SERVICE

- NAACP Afro-Academic, Cultural, Technological and Scientific Olympics** 2020 - 2021
Mentor and Science Panelist, Certificate of Volunteer Appreciation
- QuantumHispano** 2020 - 2021
STEM Career Counseling and Resume Preparation
- Mentorship Opportunities for Research Engagement** 2013 – 2017
Founding Board Member, Northwestern University
- Society for Women in Physics** 2011 – 2012
President, University of Illinois & Urbana-Champaign
- Science Fair Judge** 2013 – 2017
Illinois Junior Academy of Science, Chicago, IL
- Peer Reviewer** 2016 – present
Chemical Reviews, Chemical Science, ACS Omega

PROFESSIONAL AFFILIATIONS AND MEMBERSHIPS

Electrochemical Society (ECS)
American Chemical Society (ACS)
Materials Research Society (MRS)
Society for Women Engineers (SWE)
Association for Women in Science (AWIS)
Society of Asian Scientists and Engineers (SASE)

American Indian Science and Engineering Society (AISES)
Society for the Advancement of Chicanos and Native Americans in STEM (SACNAS)

REFERENCES

Professor George Schatz

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Professor of Applied Physics
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Dr. David M. Tiede

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