

Gary F. Moore

Associate Professor
 School of Molecular Sciences
 Arizona State University
 Tempe, AZ 85287-1604, U.S.A.

Phone: (480) 727-9578
Email: gfmoores@asu.edu
Web: <http://www.gfmooreslab.com>

Education and Training

- 2009 – 2011 **Camille and Henry Dreyfus Postdoctoral Fellow**, Yale University, New Haven, CT
 Advisors: Gary W. Brudvig and Robert H. Crabtree
- 2004 – 2009 **Ph.D.** Chemistry and Biochemistry Arizona State University, Tempe, AZ
 Advisor: Ana L. Moore
- 1998 – 2004 **B.S.** Chemistry, The Evergreen State College, Olympia, WA
 Advisor: Peter J. Pessiki

Research and Professional

- 2020 – present **Associate Professor**, Arizona State University, Tempe, AZ
 2014 – 2020 **Assistant Professor**, Arizona State University, Tempe, AZ
 2011 – 2014 **Research Staff Scientist**, Berkeley Lab, Berkeley, CA

20 Selected Fellowships, Awards, and Honors

1. Department of Energy Early Career Research Award (2020) (**One of 76 faculty nationwide**)
2. Camille Dreyfus Teacher-Scholar Award (2020) (**One of 14 faculty nationwide**)
3. Recognized as a “outstanding chemists with Native American heritage” by the National Science Foundation during Celebration of Native American Heritage Month (2020).
4. Scialog Fellow (2020) (**One of approximately 50 early-career faculty named as Scialog Fellows in Negative Emission Science by the Alfred P. Sloan Foundation and the Research Corporation for Science Advancement**)
5. ARCS Foundation Exceptional Mentor Award (2018) (**One of three faculty recognized nationally**)
6. Journal of Materials Chemistry Emerging Investigator (2018)
7. Arizona State University Laboratory Safety Innovation Award (2018)
8. Electron Donor-Acceptor Interactions Gordon Research Conference Emerging Investigator (2018)
9. National Science Foundation CAREER Award (2017)
10. Julie Ann Wrigley Global Institute for Sustainability Scholar (2017)
11. Photochemistry Gordon Research Conference Emerging Investigator (2017)
12. Yale Edward A. Bouchet Honor Society Fellow (2011)
13. Camille and Henry Dreyfus Foundation Energy Fellow (2009 – 2011)
14. Baruch 60 Center for Solar Energy Research Award (2011)
15. Renewable Energy: Solar Fuels Gordon Research Conference Young Investigator Award (2009)
16. Electron Donor-Acceptor Gordon Research Conference Young Investigator Award (2008)
17. Photosynthesis Gordon Research Conference Young Investigator Award (2008)
18. Carl Storm Underrepresented Minority Fellow (2006)
19. National Science Foundation Alliance for Graduate Education and Professoriate Fellow (2006 – 2009)
20. National Science Foundation Fellow (2004 – 2009)

Publications [67 archival contributions, including 25 research articles as a faculty member at Arizona State University, 9 research articles as a staff scientist at Berkeley Labs, one book chapter, and 21 archived conference proceedings). **These contributions demonstrate innovative research at the frontiers of science and technology for delivering scientific discoveries and major scientific tools to transform our understanding of nature and to advance the energy, economic, and national security of the United States.** In particular, my research program aims to understand and advance the science required to rationally develop molecular materials for applications in energy conversion technologies. The materials developed in my group’s laboratories resemble components of biological systems that carry out analogous chemical processes. Thus, nature provides inspiration and design considerations for the constructs we build and the

chemistries we develop. Acknowledged Funding supporting these works include: the U.S. Department of Energy, (Early Career Award DE-SC0021186), the Camille Dreyfus Teacher-Scholar Awards Program, the National Science Foundation (Early Career Award 1653982), LightWorks Technology and Research Initiative Fund, the National Science Foundation (1144616), the Achievement Rewards for College Scientists Foundation, the Philanthropic and Educational Organization, the U.S. Department of Energy (Award Number DE-SC0004993 / as part of DOE Energy Innovation Hub). * indicates corresponding authorship, undergraduate authors are underlined.]:

20 Representative Contributions as a Faculty Member at ASU (25 total)

1. Yoneda, Y.; Mora, S. J.; Shee, J.; Wadsworth, B.; Arsenault, E.; Hait, D.; Kodis, G.; Gust, D.; Moore, G. F.*; Moore, A. L.*; Head-Gordon, M.*; Moore, T. A.*; Fleming, G.* **Electron-Nuclear Dynamics Accompanying Proton-Coupled Electron Transfer**. *J. Am. Chem. Soc.* **2021**, (Just Accepted / DOI: 10.1021/jacs.0c10626 / Spotlight Article).
2. Nguyen, N. P.; Wadsworth, B. L.; Nishiori, D.; Reyes Cruz, E. A.; Moore, G. F.* **Understanding and Controlling the Performance-Limiting Steps of Catalysts-Modified Semiconductors**. *J. Phys. Chem. Lett.* **2021**, *12*, 199-203.
3. Guerra, W. D.; Odella, E.; Sector, M.; Goings, J. J.; Wadsworth, B. L.; Gervaldo, M.; Sereno, L. E.; Moore, T. A.; Moore, G. F.*; Hammes-Schiffer, S.*; Moore, A. L.* **Role of Intact Hydrogen-Bond Networks in Multiproton-Coupled Electron Transfer**. *J. Am. Chem. Soc.* **2020**, *142*, 21842-21851.
4. Wadsworth, B. L.; Nguyen, N. P.; Nishiori, D.; Belier, A.M.; Moore, G. F.* **Addressing the Origin of Photocurrents and Fuel Production Activities in Catalyst-Modified Semiconductor Electrodes**. *ACS Appl. Energy Mater.* **2020**, *8*, 7512-7519. (Cover Article)
5. Wadsworth, B. L.; Khusnutdinova, D.; Urbine, J.; Reyes, A.; Moore, G. F.* **Expanding the Redox Range of Surface-Immobilized Metallocomplexes using Molecular Interfaces**. *ACS Appl. Mater. Interfaces.* **2020**, *12*, 3903-3911. (Cover Article)
6. Wadsworth, B. L.; Nishiori, D.; Nguyen, N. P.; Nishiori, D.; Reyes Cruz, E. A.; Moore, G. F.* **Electrochemistry of Polymeric Cobaloxime-Containing Assemblies in Organic and Aqueous Solvents**. *ECS J. Solid State Sci. Technol.* **2020**, *9*, 061018 (Invited Article Honoring Karl Kadish)
7. Wadsworth, B. L.; Beiler, A. M.; Khusnutdinova, D.; Reyes Cruz, E. A.; Moore, G. F.* **Interplay Between Light Flux, Quantum Efficiency, and Turnover Frequency in Molecular-Modified Photoelectrosynthetic Assemblies**. *J. Am. Chem. Soc.* **2019**, *141*, 15932-15941. (Cover Article)
8. Odella, E.; Wadsworth, B. L.; Mora, S. J.; Goings, J. J.; Huynh, M. T.; Gust, D.; Moore, T. A.; Moore, G. F.*; Hammes-Schiffer, S.*; Moore, A. L.* **Proton-Coupled Electron Transfer Drives Long-Range Proton Translocation in Bioinspired Systems**. *J. Am. Chem. Soc.* **2019**, *141*, 14057-14061. (Cover Article)
9. Khusnutdinova, D.; Wadsworth, B. L.; Flores, M.; Beiler, A. M.; Reyes Cruz, E. A.; Zenkov, Y.; Moore, G. F.* **Electrocatalytic Properties of Binuclear Cu(II) Fused Porphyrins for Hydrogen Evolution**. *ACS Catal.* **2018**, *8*, 9888-9898. (Cover Article)
10. Wadsworth, B. L.; Khusnutdinova, D.; Moore, G. F.* **Polymeric Coatings for Applications in Electrocatalytic and Photoelectrosynthetic Fuel Production**. *J. Mater. Chem. A.* **2018**, *6*, 21654-21665. (Invited Contribution for a Special Issue on Emerging Investigators)
11. Odella, E.; Mora, S. J.; Wadsworth, B. L.; Huynh, M. T.; Goings, J. J.; Liddell, P. A.; Groy, T. L.; Gervaldo, M.; Sereno, L. E.; Gust, D.; Moore, T. A.; Moore, G. F.*; Hammes-Schiffer, S.*; Moore, A. L.* **Controlling Proton-Coupled Electron Transfer in Bioinspired Artificial Photosynthetic Relays**. *J. Am. Chem. Soc.* **2018**, *140*, 15450-15460.
12. Khusnutdinova, D.; Beiler, A. M.; Wadsworth, B. L.; Nanyangwe, S. K.; Moore, G. F.* **Vibrational Structure Analysis of Cobalt Fluoro-Porphyrin Surface Coatings on Gallium Phosphide**. *J. Porphyrins Phthalocyanines.* **2018**, *22*, 461-466. (Cover Article)
13. Ardo, S.*; Rivas, D. F.*; Modestino, M.*; Greiving, V. S.*; Abdi, F.; Llado, E. A.; Artero, V.; Ayers, K.; Battaglia, C.; Becker, J-P.; Bederak, D.; Berger, A.; Buda, F.; Chinello, E.; Dam, B.; Palma, V. D.; Edvinsson, T.; Fujii, K. Gardeniers, H.; Geerlings, H.; Hashemi, M.; Haussener, S.; Houle, F.;

- Huskens, J.; James, B.; Konrad, K.; Kudo, A.; Kunturu, P. P.; Lohse, D. Mei, B.; Miller, E.; Moore, G. F.; Muller, J.; Orchard, K.; Post, R.; Rosser, T.; Saadi, F.; Schüttauf, J-F.; Seger, B.; Sheehan, S.; Spurgeon, J.; Tang, M.; van de Krol, R.; Vesborg, P.; Westerik, P. **Pathways to Electrochemical Solar Hydrogen Technologies**. *Energy Environ. Sci.* **2018**, *11*, 2768-2783.
14. Khusnutdinova, D.; Flores, M.; Beiler, A. M.; Moore, G. F.* **Synthesis and Characterization of a Cobalt(II) Tetrakis(3-fluorophenyl)porphyrin with a Built-In 4-Vinylphenyl Surface Attachment Moiety**. *Photosynthetica*. **2018**, *56*, 67-74. (Invited Research Article)
 15. Beiler, A. M.; Moore, G. F.* **Multi-Electron Photochemistry: Caught in the Act**. *Nat. Chem.* **2018**, *10*, 3-4. (Invited News and Views Article)
 16. Beiler, A. M.; Khusnutdinova, D.; Wadsworth, B. L.; Moore, G. F.* **Cobalt Porphyrin-Polypyridyl Surface Coatings for Photoelectrosynthetic Hydrogen Production**. *Inorg. Chem.* **2017**, *56*, 12178-12185.
 17. Khusnutdinova, D.; Beiler, A. M.; Wadsworth, B. L.; Jacob, S. I.; Moore, G. F.* **Metalloporphyrin-Modified Semiconductors for Solar Fuel Production**. *Chem. Sci.* **2017**, *8*, 253-259.
 18. Wadsworth, B. L.; Beiler, A. M.; Khusnutdinova, D.; Jacob, S. I.; Moore, G. F.* **Electrocatalytic and Optical Properties of Cobaloxime Catalysts Immobilized at a Surface-Grafted Polymer Interface**. *ACS Catal.* **2016**, *6*, 8048-8057.
 19. Beiler, A. M.; Khusnutdinova, D.; Jacob, S. I.; Moore, G. F.* **Solar Hydrogen Production Using Molecular Catalysts Immobilized on Gallium Phosphide (111)A and (111)B Polymer-Modified Photocathodes**. *ACS Appl. Mater. Interfaces.* **2016**, *8*, 10038-10043.
 20. Beiler, A. M.; Khusnutdinova, D.; Jacob, S. I.; Moore, G. F.* **Chemistry at the Interface: Polymer-Functionalized Semiconductors for Solar Hydrogen Production**. *Ind. Eng. Chem. Res.* **2016**, *55*, 5306-5314. (Invited Research Article)

Three Representative Contributions as a Staff Scientist at Berkeley Lab (Nine total)

1. Krawicz, A.; Yang, J.; Anzenberg, E.; Yano, J.; Sharp, I. D.; Moore, G. F.* **Photofunctional Construct That Interfaces Molecular Cobalt-Based Catalysts for H₂ Production to a Visible-Light-Absorbing Semiconductor**. *J. Am. Chem. Soc.* **2013**, *135*, 11861-11868.
2. Faunce, T. A.*; Lubitz, W.; Rutherford, A. W.; MacFarlane D.; Moore, G. F.; Yang, P.; Nocera, D. G.; Moore, T. A.; Gregory, D. H.; Fukuzumi, S.; Yoon, K. B.; Armstrong, F. A.; Wasielewski, M. R. **Energy and Environment Policy Case for a Global Project on Artificial Photosynthesis**. *Energy Environ. Sci.* **2013**, *6*, 695-698.
3. Moore, G. F.*; Sharp, I. D.* **A Noble-Metal-Free Hydrogen Evolution Catalyst Grafted to Visible Light-Absorbing Semiconductors**. *J. Phys. Chem. Lett.* **2013**, *13*, 568-572.

Three Representative Contributions as a Postdoctoral Fellow at Yale University (Five total)

1. Moore, G. F.*; Ananyev, G. M.; Govindjee **Young Research Investigators Honored at 2012 Gordon Research Conference on Photosynthesis**. *Photosynth. Res.* **2012**, *114*, 137-142.
2. Moore, G. F.; Blakemore, J. D.; Milot, R. L.; Hull, J.; Song, H; Cai, L; Schmuttenmaer, C. A.*; Crabtree, R. H.*; Brudvig, G. W.* **A Visible Light Water-Splitting Cell with a Photoanode Formed by Codeposition of a High-Potential Porphyrin and a Homogeneous Iridium Water-Oxidation Catalyst**. *Energy Environ. Sci.* **2011**, *4*, 2389-2892.
3. Moore, G. F.*; Brudvig, G. W.* **Energy Conversion in Photosynthesis: A Paradigm for Solar Fuel Production**. *Annu. Rev.: Condensed Matter Physics.* **2011**, *2*, 303-327.

Three Representative Contributions as a Graduate Student at ASU (Six total)

1. Moore, G. F.; Hambourger, M.; Kodis, G.; Michl, W.; Gust, D.*; Moore, T. A.*; Moore, A. L.* **Effects of Protonation State on a Tyrosine-Histidine Bioinspired Mediator**. *J. Phys. Chem. B.* **2010**, *114*, 14450-14457.
2. Hambourger, M.; Moore, G. F.; Kramer, D. M.; Gust, D.*; Moore, A. L.*; Moore, T. A.* **Biology and Technology for Photochemical Fuel Production**. *Chem. Soc. Rev.* **2009**, *38*, 25-35.

- Moore, G. F.; Hambourger, M.; Gervaldo, M.; Poluektov, O. G.; Rajh, T.*; Gust, D.*; Moore, T. A.*; Moore, A. L.* **A Bioinspired Construct that Mimics the Proton Coupled Electron Transfer between P680 and the TyrZ-His190 Pair of Photosystem II.** *J. Am. Chem. Soc.* **2008**, *130*, 10466-10467.

Invited Presentations & Symposia [>50 invited research presentations, including 22 at international conferences, 12 at national conferences, 17 at academic institutions, two at national laboratories, and two at corporate institutions.]:

20 Selected Research Presentations as a Faculty Member at ASU (>50 total)

- Bioinspired Materials for Sustainable Chemistry. Gary F. Moore. **N.I.C.E. Conference 2020 Nature Inspires Creativity Engineers.** Nice, France. October 12-14, 2020 (**Keynote Speaker**)
- Porphyrinoids for Applications in Electrocatalysis and Photoelectrosynthesis. Gary F. Moore. **11th International Conference on Porphyrins and Phthalocyanines.** New York, NY. June 28-July 3, 2020 (**Invited Speaker**) (Rescheduled due to COVID-19)
- Bridging Heterogeneous, Homogeneous, and Enzymatic Catalysis to Model Kinetics Involving Complex Architectures and Interfaces. Gary F. Moore. **2nd Frontiers in Photochemistry Conference.** Nassau, Bahamas. February 22-25, 2020 (**Invited Speaker**)
- Nanoscale Architectures for Applications in Electrocatalysis and Photoelectrosynthesis. Gary F. Moore. **The Sixth International Conference from Nanoparticles and Nanomaterials to Nanodevices and Nanosystems.** Island of Corfu (Kerkyra), Greece. June 30-July 3, 2019 (**Invited Lecturer**)
- The Interplay between Quantum Efficiency, Light Flux, and Turnover Frequency in Molecular-Modified Photocathodes. Gary F. Moore. **235th Electrochemical Society Meeting.** Dallas, TX. May 26-30, 2019 (**Invited Speaker**)
- Homogeneous and Heterogeneous Porphyrin Architectures for Electrocatalysis. Gary F. Moore. **235th Electrochemical Society Meeting.** Dallas, TX. May 26-30, 2019 (**Invited Speaker**)
- Bioinspired Hard-soft Matter Interfaces for Applications in Cooperative Electrocatalysis and Photoelectrosynthesis. Gary F. Moore. **2019 Materials Research Society Spring Meeting and Exhibit.** Phoenix, AZ. April 22-26, 2019 (**Hot Topic Presentation**)
- Nature Inspired Surface Coatings for Applications in Photoelectrosynthesis. Gary F. Moore. **N.I.C.E. Conference 2018 Nature Inspires Creativity Engineers.** Nice, France. October 14-17, 2018 (**Invited Speaker**)
- Molecular Coatings for Applications in Electrocatalysis and Photoelectrosynthesis. Gary F. Moore. **Electron Donor-Acceptor Interactions Gordon Research Conference.** Salve Regina, Newport, RI. August 5-10, 2018 (**Selected Presentation**)
- Porphyrin Modified Surfaces. Gary F. Moore. **10th International Conference on Porphyrins and Phthalocyanines.** Munich, Germany. July 1-6, 2018 (**Invited Speaker**)
- Molecular Surface Coatings for Applications in Solar Fuels and Artificial Photosynthesis. Gary F. Moore. **First European Congress on Photosynthesis Research, EPS-1.** Uppsala, Sweden. June 25-28, 2018 (**Invited Speaker**)
- Tetrapyrrolic Surface Coatings for Applications in Photoelectrosynthetic Fuel Production. Gary F. Moore. **233rd Electrochemical Society Meeting.** Seattle, WA. May 13-17, 2018 (**Invited Lecturer**)
- Molecular Surface Coatings for Applications in Artificial Photosynthesis. Gary F. Moore. **3rd Molecules and Materials for Artificial Photosynthesis Conference.** Cancun, Mexico. March 2-5, 2018 (**Invited Lecturer**)
- Bioinspired Polymeric Surface Coatings for Applications in Photoelectrosynthetic Fuel Production. Gary F. Moore. **2018 Materials Research Society Spring Meeting and Exhibit.** Phoenix, AZ. April 2-6, 2018 (**Invited Lecturer**)
- Polymeric Surface Coatings for Semiconductor Photoelectrochemical Fuel Production. Gary F. Moore. **Photochemistry Gordon Research Conference.** Bates College, Lewiston, ME. July 23- 28, 2017 (**Selected Short Talk**)

16. Molecular Surface Coatings for Applications in Catalysis and Solar Fuels. Gary F. Moore. **2nd International Solar Fuels Conference**. San Diego, CA. July 6-10, 2017 (**Selected Flash Presentation**)
17. Molecular Coatings for Semiconductor Photoelectrochemistry and Photocatalysis. Gary F. Moore. **253rd ACS National Meeting**. San Francisco, CA. April 2-6, 2017 (**Invited Lecturer**)
18. Hybrid Nanomaterials for Solar Fuel Production. Gary F. Moore. **The Fifth International Conference from Nanoparticles and Nanomaterials to Nanodevices and Nanosystems**. Porto Heli, Peloponnese-Greece. June 26-30, 2016 (**Invited Lecturer**)
19. Chemistry at the Interface: Hybrid Materials for Solar Fuel Production. Gary F. Moore. **2016 Materials and Research Society Spring Meeting and Exhibit**. Phoenix, AZ. March 28-April 1, 2016 (**Invited Lecturer**)
20. Controlling Catalysis at Interfaces. Gary F. Moore. **Royal Society Meeting 2014**. The Royal Society at Chicheley Hall, Buckinghamshire, England. July 8-10, 2014 (**Invited Speaker**)

Scientific Leadership, Service, and Outreach

Five Selected Examples of Conference and Workshop Organization

1. **30th Western Photosynthesis Conference**. January 2nd and 9th, 2021 (**Meeting Co-Organizer**)
2. **29th Winter Inter-American Photochemical Society Conference**. Sarasota, FL. January 2-5, 2020 (**Meeting Co-Organizer**)
3. **2019 Gordon Research Conference on Photosynthesis Power Hour**. Newry, ME. July 21-26, 2019 (**Session Chair**)
4. **2017 Doing Research in Indian Country Conference** Tempe, AZ. October 27, 2017 (**Discussion Moderator and Session Chair**)
5. **26th Winter Inter-American Photochemical Society Conference, Synthetic Photochemistry Session**. Sarasota, FL. January 2-5, 2017 (**Session Chair**)

12 Selected Examples of Other Activities Demonstrating Scientific Leadership, Service, and Outreach

1. Panel speaker at the Fifteenth Annual Arizona Western Alliance to Expand Student Opportunities (WAESO) Student Research Conference. In a session on "*Why you should consider Doctoral education and the Professorate*" (2021)
2. Worked with the Inter-Tribal Council of Arizona and the American Indian Education Association to participate in the 2020 youth camp during a breakout session titled, Careers in STEM (which was ultimately canceled due to COVID-19)
3. Panel speaker at the Fourteenth Annual Arizona Western Alliance to Expand Student Opportunities (WAESO) Student Research Conference. In a session on "*Why you should consider Doctoral education and the Professorate*" (2020)
4. Mentor of undergraduate students affiliated with the American Indian Science & Engineering Society (AISES) at ASU (2015-current)
5. Mentor undergraduate students affiliated with ASU's Barrett Honors College (2015-current)
6. Initiated and host the Running on Sun Internship (ROSI) program at ASU, a project providing internships for developing scientists through the Phoenix Preparatory Academy, which is composed almost entirely of underserved groups (2017-current)
7. Assisted with Organizing the Doing Research in Indian Country Conferences (2017-2019)
8. Grand Judge for the INTEL International Science & Engineering Fair (2016-current)
9. Coached high school students for the Arizona Science and Engineering Fair (AzSEF) (2015-current)
10. Worked with the Tempe Center for the Arts and Arizona artist Jose Benavides on a project regarding bioinspired research and the use of art to convey scientific concepts to the general public (2017)
11. Speaker at the Telluride "*Solar Solutions to Environmental Problems*" Workshop (2015 and 2017)
12. Panel Participant at the Berkeley Lab Film Screening of *Switch: Discover the Future of Energy* (2013)