

Jeffrey A. Christians

Department of Engineering
Hope College
Holland, MI

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EDUCATION

- 2015–2018 **National Renewable Energy Laboratory, Golden, Colorado**
Postdoctoral Researcher (2015–2018)
EERE Postdoctoral Fellow (2016–2018)
Advisor: Joseph M. Luther, Senior Scientist, Chemistry & Nanoscience Center
- 2010–2015 **University of Notre Dame, Notre Dame, Indiana**
Ph. D. in Chemical and Biomolecular Engineering
Recipient of the Eli J. and Helen Shaheen award (top graduate student, College of Engineering)
Mesostuctured Thin Film Solar Cells: Examining Hole Transfer Mechanisms and Device Stability
Advisor: Prashant V. Kamat, Rev. John A. Zahm, C. S. C. Professor of Science
- 2006–2010 **Calvin College, Grand Rapids, Michigan**
B. S. E. in Chemical Engineering, Dual Major in Chemistry (ACS Accredited)

RESEARCH AND PROFESSIONAL EXPERIENCE

- | | | |
|--------------|----------------------------|---|
| 2018–Present | Assistant Professor | <i>Hope College, Department of Engineering</i> |
| 2015–2018 | Postdoctoral Researcher | <i>National Renewable Energy Laboratory, Dr. Joseph M. Luther</i> |
| 2014–2015 | Teaching Apprentice | <i>University of Notre Dame</i> |
| 2010–2015 | Research Assistant | <i>University of Notre Dame, Prof. Prashant V. Kamat</i> |
| 2010–2012 | Teaching Assistant | <i>University of Notre Dame</i> |
| 2008–2010 | Teaching Assistant | <i>Calvin College</i> |
| 2009 | Research Assistant | <i>Calvin College, Prof. David E. Benson</i> |
| 2008–2009 | Quality Control Technician | <i>Delphi Automotive, Wyoming, MI</i> |

AWARDS AND HONORS

- 2020 2019 Highest Impact Publication Award, *National Renewable Energy Laboratory*
- 2015 Eli J. and Helen Shaheen Graduate School Award in Engineering, *University of Notre Dame*
- 2015 Advanced Teaching Scholar Certificate, *University of Notre Dame*
- 2014 Striving for Excellence in Teaching Certificate, *University of Notre Dame*
- 2010–2015 Dean's Fellow for Graduate Research, *University of Notre Dame*
- 2006–2010 National Merit Scholar, *National Merit Scholar Corporation*

FUNDED GRANT SUPPORT

- 2020 Research Seed Grant (\$5000 with \$5000 matching funds), *Michigan Space Grant Consortium*
- 2020 Undergraduate Fellowship (\$3000, with student Zachary Wylie), *Michigan Space Grant Consortium*
- 2020 Nyenhuis Research Grant (\$7488, with student Cedric Porter), *Hope College*
- 2016 EERE Postdoctoral Research Award (2 yrs, full funding), *DOE EERE*
- 2014 CEST/Bayer Predoctoral Research Fellow (1 yr, \$10,250), *University of Notre Dame*
- 2014 Patrick and Jana Eilers Graduate Student Fellow (1 yr, \$7000), *University of Notre Dame*
- 2014 Graduate Student Union Professional Development Award (\$1,050), *University of Notre Dame*
- 2014 Graduate Student Union Conference Presentation Grant (\$300), *University of Notre Dame*

PUBLICATIONS

32. Kerner, R. A.; Schulz, P.; **Christians, J. A.**; Dunfield, S. P.; Dou, B.; Zhao, L.; Teeter, G.; Berry, J. J.; Rand, B. P. Reactions at Noble Metal Contacts with Methylammonium Lead Triiodide Perovskites: Role of Underpotential Deposition and Electrochemistry. *APL Mater.* **2019**, 7 (4), 041103.
31. Schelhas, L. T.; Li, Z.; **Christians, J. A.**; Goyal, A.; Kairys, P.; Harvey, S. P.; Kim, D. H.; Stone, K. H.; Luther, J. M.; Zhu, K.; Stevanovic, V.; Berry, J. J. Insights into Operational Stability and Processing of Halide Perovskite Active Layers. *Energy Environ. Sci.* **2019**, 12 (4), 1341–1348.

30. Tirmzi, A. M.; **Christians, J. A.**; Dwyer, R. P.; Moore, D. T.; Marohn, J. A. Substrate-Dependent Photoconductivity Dynamics in a High-Efficiency Hybrid Perovskite Alloy. *J. Phys. Chem. C* **2019**, *123* (6), 3402–3415.
29. Schloemer, T. H.; **Christians, J. A.**; Luther, J. M.; Sellinger, A. Doping Strategies for Small Molecule Organic Hole-Transport Materials: Impacts on Perovskite Solar Cell Performance and Stability. *Chem. Sci.* **2019**, *10* (7), 1904–1935.
28. Schloemer, T. H.; Gehan, T. S.; **Christians, J. A.**; Mitchell, D. G.; Dixon, A.; Li, Z.; Zhu, K.; Berry, J. J.; Luther, J. M.; Sellinger, A. Thermally Stable Perovskite Solar Cells by Systematic Molecular Design of the Hole-Transport Layer. *ACS Energy Lett.* **2019**, *4*, 473–482.
27. Hazarika, A.; Zhao, Q.; Gaulding, E. A.; **Christians, J. A.**; Dou, B.; Marshall, A. R.; Moot, T.; Berry, J. J.; Johnson, J. C.; Luther, J. M. Perovskite Quantum Dot Photovoltaic Materials beyond the Reach of Thin Films: Full-Range Tuning of A-Site Cation Composition. *ACS Nano* **2018**, *12* (10), 10327–10337.
26. **Christians, J. A.**; Zhang, F.; Bramante, R. C.; Reese, M. O.; Schloemer, T. H.; Sellinger, A.; van Hest, M. F. A. M.; Zhu, K.; Berry, J. J.; Luther, J. M. Stability at Scale: The Challenges of Durable Module Interconnects for Perovskite Photovoltaics. *ACS Energy Lett.* **2018**, *3* (10), 2502-2503.
25. **Christians, J. A.**; Habisreutinger, S. N.; Berry, J. J.; Luther, J. M. Stability in Perovskite Photovoltaics: A Paradigm for Newfangled Technologies. *ACS Energy Lett.* **2018**, *3* (9), 2136-2143.
24. Harvey, S. P.; Li, Z.; **Christians, J. A.**; Zhu, K.; Luther, J. M.; Berry, J. J. Probing Perovskite Inhomogeneity beyond the Surface: TOF-SIMS Analysis of Halide Perovskite Photovoltaic Devices. *ACS Appl. Mater. Interfaces*, **2018**, *10* (34), 28541-28552.
23. Wheeler, L. M.; Sanehira, E. M.; Marshall, A. R.; Schulz, P.; Suri, M.; Anderson, N. C.; **Christians, J. A.**; Nordlund, D.; Sokaras, D.; Kroll, T.; Harvey, S. P.; Berry, J. J.; Lin, L. Y.; Luther, J. M. Targeted Ligand Exchange Chemistry on Cesium Lead Halide Perovskite Quantum Dots for High-Efficiency Photovoltaics. *J. Am. Chem. Soc.* **2018**, *140* (33), 10504-10513.
22. **Christians, J. A.**; Marshall, A. R.; Zhao, Q.; Ndione, P. F.; Sanehira, E. M.; Luther, J. M. Perovskite Quantum Dots: A New Absorber for Perovskite-Perovskite Tandem Solar Cells. *2018 IEEE 7th World Conference on Photovoltaic Energy Conversion (WCPEC) (A Joint Conference of 45th IEEE PVSC, 28th PVSEC & 34th EU PVSEC)*, Waikoloa Village, HI, **2018**, pp. 81-84, doi: 10.1109/PVSC.2018.8547642.
21. Dunfield, S. P.; Moore, D. T.; Klein, T. R.; Fabian, D. M.; **Christians, J. A.**; Dixon, A. G.; Dou, B.; Ardo, S.; Beard, M. C.; Shaheen, S. E.; Berry, J. J.; van Hest, M. F. A. M. Curtailing Perovskite Processing Limitations via Lamination at the Perovskite/Perovskite Interface. *ACS Energy Lett.*, **2018**, *3* (5), 1192–1197.
20. Dou, B.; Wheeler, L. M.; **Christians, J. A.**; Moore, D. T.; Harvey, S. P.; Berry, J. J.; Barnes, F. S.; Shaheen, S. E.; van Hest, M. F. A. M. Degradation of Highly Alloyed Metal Halide Perovskite Precursor Inks: Mechanism and Storage Solutions. *ACS Energy Lett.*, **2018**, *3*, 979–985.
19. Draguta, S.; **Christians, J. A.**; Morozov, Y. V.; Mucunguzi, A.; Manser, J. S.; Kamat, P. V.; Luther, J. M.; Kuno, M. K. A Quantitative and Spatially Resolved Analysis of the Performance-Bottleneck in High Efficiency, Planar Hybrid Perovskite Solar Cells *Energy Environ. Sci.*, **2018**, *11* (4), 960-969.
18. **Christians, J. A.**; Schulz, P.; Tinkham, J. S.; Schloemer, T. H.; Harvey, S. P.; Tremolet de Villers, B. J.; Sellinger, A.; Berry, J. J.; Luther, J. M. Tailored Interfaces of Unencapsulated Perovskite Solar Cells for >1000 Hours of Ambient Operational Stability. *Nature Energy*, **2018**, *3* (1), 68-74.
17. Sanehira, E. M.; Marshall, A. R.; **Christians, J. A.**; Harvey, S. P.; Ciesielski, P. N.; Wheeler, L. M.; Schulz, P.; Lin, L. Y.; Beard, M. C.; Luther, J. M. Enhanced Mobility CsPbI₃ Quantum Dot Arrays for Record Efficiency, High Voltage Photovoltaic Cells. *Science Advances*, **2017**, *3* (10) eaao4204.
16. Dou, B.; Miller, E. M.; **Christians, J. A.**; Sanehira, E. M.; Klein-Stockert, T. R.; Barnes, F. S.; Shaheen, S. E.; Garner, S.; Mallick, A.; Basak, D. van Hest, M. F. A. M. High Performance Flexible Perovskite Solar Cells on Ultra-Thin Glass. Implications of the TCO. *The Journal of Physical Chemistry Letters*, **2017**, *8* (19) 4960-4966.

15. Li, Z.; Xiao C.; Yang, Y.; Harvey, S. P.; Kim, D.; **Christians, J. A.**; Yang, M.; Schulz, P.; Nanayakkara, S. U.; Jiang, C.; Luther, J. M.; Berry, J. J.; Beard, M. C.; Al-Jassim M.; Zhu, K. Extrinsic Ion Migration in Perovskite Solar Cells. *Energy & Environmental Science*, **2017**, 10 (5), 1234-1242.
14. Schulz, P.; Tjepelt, J. O.; **Christians, J. A.**; Levine, I.; Edri, E.; Sanehira, E. M.; Hodes, G.; Cahen, D.; Kahn, A. High Work Function Molybdenum Oxide Hole Extraction Contacts in Hybrid Organic-Inorganic Perovskite Solar Cells. *ACS Applied Materials & Interfaces*, **2016**, 8, 31491-31499.
13. Schelhas, L. T.[†]; **Christians, J. A.**[†]; Berry, J. J.; Toney, M. F.; Tassone, C. J.; Luther, J. M.; Stone, K. H. Monitoring a Silent Phase Transition in CH₃NH₃PbI₃ Solar Cells via Operando X-ray Diffraction. *ACS Energy Letters*, **2016**, 1, 1007-1012. [†]These authors contributed equally
12. Swarnkar, A.; Marshall, A. R.; Sanehira, E. M.; Chernomordik, B. D.; Moore, D. T.; **Christians, J. A.**; Chakrabarti, T.; Luther, J. M. Quantum Dot-Induced Phase Stabilization of α -CsPbI₃ Perovskite for High-Efficiency Photovoltaics. *Science*, **2016**, 354, 6308, 92-95.
11. Manser, J. S.; **Christians, J. A.**; Kamat, P. V. Intriguing Optoelectronic Properties of Metal Halide Perovskites. *Chem. Rev.* **2016**, 116, 12956-13008. (Invited Review)
10. Nenon, D. P.[†]; **Christians, J. A.**[†]; Wheeler, L. M.; Blackburn, J. L.; Sanehira, E. M.; Dou, B.; Olsen, M. L.; Zhu, K.; Berry, J. J.; Luther, J. M. Structural and Chemical Evolution of Methylammonium Lead Halide Perovskites During Thermal Processing from Solution. *Energy & Environmental Science*, **2016**, 9, 2072-2082. [†]These authors contributed equally
9. Manser, J.S.; Saidaminov, M. I.; **Christians, J. A.**; Bakr, O. M.; Kamat, P. V. Making and Breaking of Lead Halide Perovskites. *Acc. Chem. Res.* **2016**, 49 (2), 330-338.
8. **Christians, J. A.**; Manser, J. S.; Kamat, P. V. Multifaceted Excited State of CH₃NH₃PbI₃. Charge Separation, Recombination, and Trapping. *J. Phys. Chem. Lett.* **2015**, 6, 2086-2095. (Perspective)
7. **Christians, J. A.**; Miranda Herrera, P. A.; Kamat, P. V. Transformation of the Excited State and Photovoltaic Efficiency of CH₃NH₃PbI₃ Perovskite upon Controlled Exposure to Humidified Air. *J. Am. Chem. Soc.* **2015**, 137, 1530-1538.
6. Kamat, P. V.; **Christians, J. A.**; Radich, J. G., Quantum Dot and Nanowire Solar Cells. Hole Transfer as a Limiting Factor. *Langmuir* **2014**, 30 (20), 5729-5738. (Invited Feature)
5. Kim, J.-P.; **Christians, J. A.**; Choi, H.; Krishnamurthy, S; Kamat, P. V. CdSeS Nanowires. Compositionally Controlled Band Gap and Charge Dynamics. *J. Phys. Chem. Lett.*, **2014**, 5, 1103-1109.
4. **Christians, J. A.**; Leighton Jr., D. T.; Kamat, P. V. Rate Limiting Interfacial Hole Transfer in Solid-State Solar Cells. *Energy Environ. Sci.* **2014**, 7, 1148-1158.
3. **Christians, J. A.**; Fung, R. C. M.; Kamat, P. V. An Inorganic Hole Conductor for Organo-Lead Halide Perovskite Solar Cells. Improved Hole Conductivity with Copper Iodide. *J. Am. Chem. Soc.* **2014**, 136, 758-764.
2. **Christians, J. A.**; Kamat, P. V. Trap and Transfer. Two-Step Hole Injection Across the Sb₂S₃/CuSCN Interface in Solid State Solar Cells. *ACS Nano* **2013**, 7, 7967-7974.
1. Opperwall, S. R.; Divakaran, A.; Porter, E. G.; **Christians, J. A.**; Denhartigh, A. J.; Benson, D. E. Wide Dynamic Range Sensing with Single Quantum Dot Biosensors. *ACS Nano* **2012**, 6, 8078-86.

SUBMITTED PATENTS AND RECORDS OF INVENTION

- Kuno, M.; Brennan, M.; Ruth, A.; Pavlovte, I.; **Christians, J. A.**; Moot, T.; Luther, J. M. Compositional microstructuring to harden hybrid metal halide perovskites against cation and anion migration. 63/047,426 (7/2/2020).
- Ndione, P.; Berry, J. J.; Zhu, K.; **Christians, J. A.**; Luther, J. M. Multilayer Transparent Contacts as Top and Bottom Electrodes for Perovskite and Semi-Transparent Solar Cells. ROI-18-06 (10/10/2017).
- Wheeler, L. M.; **Christians, J. A.**; Berry, J. J.; Luther, J. M. Photovoltaic Absorber with Switchable Phase and Absorption Properties. No. 62/463,850 (2/27/2017).

OTHER SCIENTIFIC PUBLICATIONS

Elizabeth V. Cutlip, **Christians, J. A.** Exploring Halide Perovskite Structural Tunability to Design Materials for Dynamic Photovoltaic Windows. IEEE 47th Photovoltaic Specialists Conference, **2020**, accepted.

Rolston, N.; Bennett-Kennett, R.; Schelhas, L. T.; Luther, J. M.; **Christians, J. A.**; Berry, J. J.; Dauskardt, R. H. Comment on "Light-Induced Lattice Expansion Leads to High-Efficiency Perovskite Solar Cells." *Science* **2020**, 368 (6488), eaay8691.

Christians, J. A.; Marshall, A. R.; Zhao, Q.; Ndione, P.; Sanehira, E. M.; Luther, J. M. Perovskite Quantum Dots. A New Absorber for Perovskite-Perovskite Tandem Solar Cells. IEEE 7th World Conference on Photovoltaic Energy Conversion, **2018**, 81-84. DOI: 10.1109/PVSC.2018.8547642

Kamat, P. V.; **Christians, J. A.** Solar Cells versus Solar Fuels: Two Different Outcomes. *J. Phys Chem. Lett.* **2015**, 6, 1917-1918. (Editorial)

Christians, J. A.; Manser, J. S.; Kamat, P. V. Best Practices in Perovskite Solar Cell Efficiency Measurements. Avoiding the Error of Making Bad Cells Look Good. *J. Phys Chem. Lett.* **2015**, 6, 852-857. (Viewpoint Article)

INVITED PRESENTATIONS

Christians, J. A. Thinking about Applying to a PUI?. *2020 MRS Spring Meeting & Exhibit*, Apr. **2020**, Phoenix, AZ. (cancelled due to COVID-19)

Christians, J. A. Perovskite Solar Cell Stability: From Cells to Modules. *Chemical Engineering and Materials Science Seminar*, Michigan State University, Jan. **2020**, East Lansing, MI.

Christians, J. A. Perovskite Solar Cell Stability: From Cells to Modules. *ND Energy Seminar*, University of Notre Dame, Sept. **2019**, Notre Dame, IN.

Christians, J. A.; Manser, J. S.; Kamat, P. V. Best Practices in Perovskite Solar Cell Efficiency Measurements. Avoiding the Error of Making Bad Cells Look Good. *StableNextSol COST Action no. MP1307 7th MC Meeting*, Congress Center of Instituto Superior Técnico, Apr. **2017**, Lisbon, Portugal.

Christians, J. A. An Introduction to Perovskite Solar Cells: Fundamentals, Techniques, and Current Trends. *International Workshop on Energy-Driven Materials 2015*, Universidad Autonoma de Nuevo Leon, Oct. **2015**, Monterrey, Mexico.

Christians, J. A. The Possibilities and Pitfalls of Perovskite Solar Cells. *Engineering Department Seminar*, Calvin College, Apr. **2015**, Grand Rapids, MI.

Christians, J. A. Solar Paint, Notre Dame, and Surviving Graduate School. *Engineering Department Seminar*, Calvin College, Oct. **2013**, Grand Rapids, MI.

Christians, J. A. Painting the Future: Bringing Solar Power to the People. *ND Spark Conference*, Mendoza College of Business, *University of Notre Dame*, Apr. **2013**, South Bend, IN.

REFEREED CONFERENCE PROCEEDINGS

Cutlip, E. V.; **Christians, J. A.** Interactions Between 2D Halide Perovskite Materials and Methylamine. *12th International Conference on Hybrid and Organic Photovoltaics*, **2020**, Virtual Session. (Poster)

Cutlip, E. V.; **Christians, J. A.** Interactions Between 2D Halide Perovskite Materials and Methylamine. *nanoGE Online Meetup Conferences: Contemporary Stability Challenges in Hybrid Perovskite Photovoltaics*, **2020**, Virtual Session. (Poster)

Cutlip, E. V.; **Christians, J. A.** Exploring Halide Perovskite Structural Tunability to Design Materials for Dynamic Photovoltaic Windows. *2020 MRS Spring Meeting & Exhibit*, **2020**, Phoenix, AZ. (Poster, cancelled due to COVID-19)

Christians, J. A.; Marshall, A. R.; Zhao, Q.; Ndione, P.; Sanehira, E. M.; Luther, J. M. Perovskite Quantum Dots. A New Absorber for Perovskite-Perovskite Tandem Solar Cells. *IEEE 7th World Conference on Photovoltaic Energy Conversion*, **2018**, Waikoloa, HI. (Oral)

Christians, J. A.; Schulz, P.; Schloemer, T. H.; Harvey, S. P.; Tremolet de Villers, B. J.; Sellinger, A.; Berry, J. J.; Luther, J. M. Designing Perovskite Solar Cell Interfaces to Exceed 1000 Hour Unencapsulated Ambient Operational Stability. *2018 MRS Spring Meeting & Exhibit*, **2018**, Phoenix, AZ. (Oral)

- Christians, J. A.;** Schulz, P.; Tinkham, J. S.; Schloemer, T. H.; Harvey, S. P.; Tremolet de Villers, B. J.; Sellinger, A.; Berry, J. J.; Luther, J. M. Engineering Perovskite Solar Cell Interfaces to Realize >1000 Hr, Unencapsulated Ambient Stability. *2017 AIChE Annual Meeting*, **2017**, Minneapolis, MN. (Oral)
- Christians, J. A.;** Schelhas, L. T.; Berry, J. J.; Toney, M. F.; Tassone, C. J.; Luther, J. M.; Stone, K. H. Monitoring the Cubic-Tetragonal Phase Transition in Working CH₃NH₃PbI₃ Solar Cells. *2017 MRS Spring Meeting & Exhibit*, **2017**, Phoenix, AZ. (Oral)
- Christians, J. A.;** Nenon, D. P.; Wheeler, L. M.; Luther, J. M. Processing Methylammonium Lead Halide Perovskites from Solution-Structural and Chemical Evolution. *2016 MRS Fall Meeting & Exhibit*, **2016**, Boston, MA. (Poster)
- Christians, J. A.** Charge Carrier Dynamics in Thin Film Solid-State Solar Cells. Tailoring Solution-Processed Semiconductors for Energy Applications. *2014 AIChE Annual Meeting*, **2014**, Atlanta, GA. (Poster)
- Christians, J. A.;** Kamat, P. V. Organometal Halide Perovskite Solar Cells Featuring Inorganic Hole Conductors. *2014 AIChE Annual Meeting*, **2014**, Atlanta, GA. (Oral)
- Christians, J. A.;** Kamat, P. V. Semiconductor Quantum Dot and Perovskite Photovoltaics. Tracking the Hole Transport in Thin Film Solid State Solar Cells. *2014 MRS Spring Meeting & Exhibit*, **2014**, B7.01, San Francisco, CA. (Oral)
- Christians, J. A.;** Leighton Jr., D. T.; Kamat, P. V. Determination of the Limiting Mechanism of Hole Transfer in Sb₂S₃/CuSCN Solid-State Solar Cells. *6th AIChE Midwest Regional Conference*, **2014**, Chicago, IL. (Oral)
- Christians, J. A.;** Kamat, P. V. Hole Transfer Dynamics of Sb₂S₃ Solar Cells. *246th ACS National Meeting & Exposition*, **2013**, 359, Indianapolis, IN. (Poster)
- Christians, J. A.;** Den Hartigh, A. J.; Benson, D. E. Analysis of Single Molecule Biosensors. *West Michigan Regional Undergraduate Science Research Conference*, **2009**, Grand Rapids, MI. (Poster)

MENTORED STUDENT CONFERENCE PROCEEDINGS

- *Cutlip, E. V.; **Christians, J. A.** Interactions Between 2D Halide Perovskites and Methylamine. *47th IEEE Photovoltaics Specialists Conference*, **2020**. (Virtual Poster)
- *Porter, C. B.; *Hallock, C. D.; **Christians, J. A.** Improved Surface Passivation of Halide Perovskite Quantum Dots using 5-AVA. *19th Annual Celebration of Undergraduate Research and Creative Activity at Hope College*, **2020**, Holland, MI. (Virtual Poster)
- *Cutlip, E. V.; **Christians, J. A.** Interactions Between 2D Halide Perovskites and Methylamine. *19th Annual Celebration of Undergraduate Research and Creative Activity at Hope College*, **2020**, Holland, MI. (Virtual Poster)
- *Wylie, Z. R.; **Christians, J. A.** Vapor Initiated Crystal Phase Transition of Cesium Halide Perovskites. *19th Annual Celebration of Undergraduate Research and Creative Activity at Hope College*, **2020**, Holland, MI. (Virtual Poster)
- *Wylie, Z. R.; **Christians, J. A.** Vapor Initiated Crystal Phase Transition of Cesium Halide Perovskites. *2019 AIChE Annual Meeting*, **2019**, Orlando, FL. (Poster)
- *Hallock, C. D.; *Porter, C. B.; **Christians, J. A.** Improved Surface Passivation of Halide Perovskite Quantum Dots Using 5-AVA. *2019 AIChE Annual Meeting*, **2019**, Orlando, FL. (Poster)

*denotes mentored undergraduate student

TEACHING EXPERIENCE

- 2018–Present **Instructor:** *Hope College*
- Applied Thermodynamics
 - Phase Equilibrium & Separations I
 - Heat Transfer
 - Fluid Mechanics
 - Introduction to Engineering Laboratory
- 2014–2015 **Instructor:** *University of Notre Dame*
- Introduction to Engineering Systems I & II
- 2010–2012 **Teaching Assistant,** *University of Notre Dame*
- Nanoscience and Technology

- Introduction to Chemical Engineering
 - Physical Chemistry for Chemical Engineers
 - Chemical Engineering Laboratory II
- 2009–2010 **Teaching Assistant, Calvin College**
- Organic Chemistry Laboratory I & II
 - General Chemistry Laboratory I & II
- 2008 **Private Tutor, Grand Valley State University**
- Organic Chemistry I & II

RESEARCH MENTORING EXPERIENCE

- 2020-present Josephine Surel, undergraduate, *Hope College*
- 2020-present Peter Ruffolo, undergraduate, *Hope College*
- 2019-present Elizabeth Cutlip, undergraduate, *Hope College*
- 2019-present Zachary Wiley, undergraduate, *Hope College*
- 2019-present Cedric Porter, undergraduate, *Hope College*
- 2019 Claire Hallock, undergraduate, *Hope College (Pursuing Ph.D. Chemistry, UT Austin)*
- 2017 Mokshin Suri, undergraduate, *University of Texas at Austin*
- 2014 Mark Wilson, teacher, *John Adams High School, South Bend, IN*
- 2014 Pierre Alexander Miranda Herrera, undergraduate, *Tec de Monterrey*
- 2013–2014 Mia Eppler, undergraduate, *University of Notre Dame*
- 2013 Ken Poling, teacher, *Penn High School, Mishawaka, IN*
- 2013 David O’Shaughnassey, undergraduate, *University College Cork*
- 2012–2013 Raymond Fung, undergraduate, *University of Waterloo*
- 2012 Owen Abe, undergraduate, *University of Maryland*

SERVICE & COMMUNITY OUTREACH

- 2020-present Member of the NREL Postdoc Academic Advisory Panel
- 2020-present Member of the Engineering Department Promotions Committee
- 2020 Hope Academy of Senior Professionals (HASP) Lecturer (virtual lecture)
- 2020 Hope College Admissions Summer Open House Panelist (2x)
- 2020 Organized inaugural Engineering Showcase admissions event
- 2019-2020 Klesis Mentoring Program
- 2016–2017 Hands On Photovoltaic Experience at NREL mentor (2x)
- 2015 Northern Indiana Regional Science and Engineering Fair, senior science fair judge
- 2015 Outstanding Reviewer: *Journal of Physical Chemistry Letters*
- 2014 Facilitator for Elkhart Memorial High School solar cell experiment
- 2014 Imagination, Innovation, Discovery and Design at Notre Dame (I2D2) assistant
- 2014 Research Experience for Teachers mentor
- 2013 Student representative to the College of Engineering Advisory Council
- 2013 Lakeshore High School student laboratory tour guide
- 2012–2013 Siemens Competition Students laboratory tour guide (2x)
- 2012–2015 Maintained and updated Kamat group website and Social media outreach
- 2012 Notre Dame Chemical and Biomolecular Engineering Department website committee
- 2012 Project Infinite Green laboratory tour guide
- 2012 ACS Graduate Student/Postdoc Summer Institute
- 2011–2014 Research Experience for Teachers laboratory tour guide (4x)
- 2011 Northern Indiana Regional Science and Engineering Fair, middle school science fair judge