

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)
Mesostructured 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. in Engineering, Chemical Concentration, Major in Chemistry (ACS Accredited)

RESEARCH AND PROFESSIONAL EXPERIENCE

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|--------------|----------------------------|---|
| 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> |

FUNDED FELLOWSHIP AND GRANT SUPPORT

- 2021–2024 NSF: MRI Award Number 2117655, co-PI (\$321,363), *National Science Foundation*
- 2021–2024 NSF: RUI Award Number 2128632 (\$238,828), *National Science Foundation*
- 2021 Nyenhuis Research Grant (\$3488, student Rory Campagna), *Hope College*
- 2021 Undergraduate Fellowship (\$3000, student James Mandeville), *Michigan Space Grant Consortium*
- 2021–2025 Towsley Research Scholar (\$16,000 + semester sabbatical), *Hope College*
- 2020 Research Seed Grant (\$5000 with \$5000 matching funds), *Michigan Space Grant Consortium*
- 2020 Undergraduate Fellowship (\$3000, student Zachary Wylie), *Michigan Space Grant Consortium*
- 2020 Nyenhuis Research Grant (\$7488, student Cedric Porter), *Hope College*
- 2016–2018 EERE Postdoctoral Research Award (2 yrs, full funding, ~\$300k value), *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*

OTHER AWARDS AND HONORS

- 2020 2019 Highest Impact Publication Award, *National Renewable Energy Laboratory (NREL)*
Recognizing the field-weighted highest impact publication from the preceding 3 years
- 2015 Eli J. and Helen Shaheen Graduate School Award in Engineering, *University of Notre Dame*
Awarded to the outstanding graduating Ph.D. student in the College of Engineering
- 2015 Advanced Teaching Scholar Certificate, *University of Notre Dame*
Certificate from Notre Dame Learning's Kaneb Center recognizing participation in teaching professional development programs and completion of an independent teaching project
- 2014 Striving for Excellence in Teaching Certificate, *University of Notre Dame*
Certificate awarded in recognition of teaching professional development work

- 2010–2015 Dean's Fellow for Graduate Research, *University of Notre Dame*
Awarded to entering doctoral students in recognition of outstanding performance in undergraduate studies and notable promise in graduate studies and professional life
- 2006–2010 National Merit Scholar, *National Merit Scholar Corporation*

PEER-REVIEWED PUBLICATIONS

Total Google Scholar citations: 8873, h-index: 29 (9/23/2021)

*underline denotes Hope College undergraduate student

35. Wylie, Z. R.; Ruffolo, P.; Campagna, R. M.; **Christians, J. A.** Measuring Phase Changes to Predict Halide Perovskite Solar Cell Degradation. *2021 IEEE 48th Photovoltaic Specialists Conference (PVSC)*, **2021**, in press. (Conference Proceedings)
34. Pavlovetc, I. M.; Brennan, M. C.; Draguta, S.; Ruth, A.; Moot, T.; **Christians, J. A.**; Aleshire, K.; Harvey, S. P.; Toso, S.; Nanayakkara, S. U.; et al. Suppressing Cation Migration in Triple-Cation Lead Halide Perovskites. *ACS Energy Lett.* **2020**, 2802–2810.
33. Cutlip, E. V.; **Christians, J. A.** Interactions Between 2D Halide Perovskite Materials and Methylamine Vapor. *2020 IEEE 47th Photovoltaic Specialists Conference (PVSC)*, Calgary, OR, **2020**, pp 1972-1975, DOI: 10.1109/PVSC45281.2020.9300844. (Conference Proceedings)
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.

This paper has been widely cited (175 citations, Google Scholar 9/23/2021) and recognized as one of the most highly cited publications in JACS for the period 2018-2019.

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. (Conference Proceedings)
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.
This paper has been widely cited (593 citations, Google Scholar 9/23/2021) and was awarded the 2019 Highest Impact Publication Award at NREL. It was also highlighted in news media upon publication, see article on PV Magazine, <https://www.pv-magazine.com/2018/01/31/nrel-hits-new-milestone-in-reducing-perovskite-degradation/>
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.
This paper has been widely cited (596 citations, Google Scholar 9/23/2021) and highlighted in news media upon publication, see article on PV Magazine, <https://www.pv-magazine.com/2017/11/07/nrel-hits-new-efficiency-record-for-quantum-dot-cell/>
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.
This paper has been widely cited (1626 citations, Google Scholar 9/23/2021) and was highlighted in news media upon publication, see article on Materials Today, url: <https://www.materialstoday.com/nanomaterials/news/scientists-join-the-dots-to-perovskite-solar-cell/>
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)
This review article has been widely cited by researchers in the field (949 citations, Google Scholar 9/23/2021)
10. Nonon, 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.

This review article has been widely cited by researchers in the field (502 citations, Google Scholar 9/23/2021)

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.
This paper has been widely cited by researchers in the field (1006 citations, Google Scholar 9/23/2021)
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.
This paper has been widely cited (>1197 citations, Google Scholar 9/23/2021) and was highlighted in news media upon publication, see article on Phys.org, url: <https://phys.org/news/2014-01-perovskite-solar-cells-cheaper-materials.html>
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.

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. PCT/US2021/040285 (PTC Filing 7/2/2021).
- Wheeler, L. M.; **Christians, J. A.**; Berry, J. J.; Luther, J. M. Energy Harvesting Chromogenic Devices. U.S. Patent No. 10,844,658 B2 (11/24/2020).

OTHER SCIENTIFIC PUBLICATIONS

- 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.
- 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 AND LECTURES

- Christians, J. A.** Research at Hope College: Designing Materials for Energy Applications. *Winterim*, Grand Rapids Christian High School, March **2021**, Virtual.
- Christians, J. A.**; Berkmen, M.; Munro, A. Thinking About Applying to a Primarily Undergraduate Institution? *Materials Research Society Webinar Series: How to Land a Faculty Position—From Application to Interview (Part 3)*, July **2020**, Virtual Session.
Participated as the keynote speaker for this virtual panel discussion with a live attendance of 163 participants.
- Christians, J. A.** Cutlip, E. V.; Surel, J. S. Where our Energy Comes from and what the Future Might Look Like. *Hope Academy of Senior Professionals (HASP)*, July **2020**, Virtual Session.

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. MPI307 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.

Led a 4 hour workshop on halide perovskite solar cells for graduate students, postdocs, and faculty.

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

Christians, J. A.; Wylie, Z. R.; Ruffolo, P.; Campagna, R. M.; Measuring Phase Changes to Predict Halide Perovskite Solar Cell Degradation. *IEEE 48th Photovoltaic Specialists Conference*, **2021**, Virtual Session. (Oral)

Christians, J. A.; Wylie, Z. R.; Ruffolo, P. In Situ Measurement of Halide Perovskite Phase Changes. *13th International Conference on Hybrid and Organic Photovoltaics*, **2021**, Virtual Session. (Oral)

Christians, J. A.; Surel, J. S.; Cutlip, E. V. Exploring Halide Perovskite Structural Tunability to Design Materials for Dynamic Photovoltaic Windows. *2020 MRS Fall Meeting & Exhibit*, **2020**, Virtual Session. (Oral)

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

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

Christians, J. A.; Cutlip, E. V. Exploring Halide Perovskite Structural Tunability to Design Materials for Dynamic Photovoltaic Windows. *2020 MRS Spring Meeting & Exhibit*, **2020**, Phoenix, AZ. (Poster, rescheduled 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.; Surel, J.L.; **Christians, J. A.** Exploring Halide Perovskite Structural Tunability to Design Materials for Dynamic Photovoltaic Windows. *20th Annual Celebration of Undergraduate Research and Creative Activity at Hope College*, **2021**. (Virtual Poster)
- Wylie, Z. R.; Ruffolo, P.; **Christians, J. A.** Vapor Initiated Crystal Phase Transition of Cesium Halide Perovskites. *20th Annual Celebration of Undergraduate Research and Creative Activity at Hope College*, **2021**. (Virtual Poster)
- Surel, J. L.; Cutlip, E. V.; **Christians, J. A.** Exploring Halide Perovskite Structural Tunability to Design Materials for Dynamic Photovoltaic Windows. *2020 AIChE Annual Meeting*, **2020**. (Virtual Poster)
Presentation awarded **1st place** in the National Student Conference category, Materials Engineering & Sciences I
- Wylie, Z. R.; Ruffolo, P.; **Christians, J. A.** Vapor Initiated Crystal Phase Transition of Cesium Halide Perovskites. *2020 MSGC Virtual Fall Conference*, **2020**. (Virtual Poster)
- 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)

TEACHING EXPERIENCE

- 2018–Present **Instructor:** Hope College
- ENGS 100-Lab: Introduction to Engineering Laboratory
 - ENGS 340: Applied Thermodynamics
 - ENGS 346: Fluid Mechanics
 - ENGS 348: Heat Transfer
 - ENGS 375: Phase Equilibrium & Separations I
- 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

- 2021-present Jonathan Outen
 2021-present Rory Campagna
 2021-present James Mandeville
 2020-present Josephine Surel
 2020-2021 Peter Ruffolo
 2019-2021 Elizabeth Cutlip
 2019-2021 Zachary Wiley ('21), (*Pursuing Ph.D. Chemical Engineering, U. Washington*)
 2019-2020 Cedric Porter ('21)
 2019 Claire Hallock ('20), (*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'Shaughnessey, undergraduate, *University College Cork*
 2012–2013 Raymond Fung, undergraduate, *University of Waterloo*
 2012 Owen Abe, undergraduate, *University of Maryland*

SERVICE & COMMUNITY OUTREACH

- 2021-2022 Area 6 Chair, 2022 IEEE 49th Photovoltaic Specialists Conference
 2021 NSF Review Panelist - MPS Ascending Postdoctoral Research Fellowships (MPS-Ascend)
 2021 Hope College Admissions Summer Open House Panelist
 2021 Guest Associate Editor for Energy Materials, *Frontiers in Materials*
 2020-2021 Holland Michigan Strategic Development Team
 part of a team of 8 tasked with advising the city of Holland on the Holland Community Energy Plan
 2020-2021 Area 6 co-chair, 2021 IEEE 48th Photovoltaic Specialists Conference
 2020-present Member of the Hope College Green Team
 2020-present Member of the NREL Postdoc Academic Advisory Panel
 2020-present Member of the Engineering Department Promotions Committee
 2020 Hope College Admissions Summer Open House Panelist (5x)
 2020 Organized inaugural Engineering Showcase admissions event
 Led work with Admissions, faculty, and students to organize and host ~40 prospective students for an all-day introduction to Hope's engineering program
 2019-2020 Klesis Mentoring Program
 2018 Area 6 co-chair, 2018 IEEE 45th Photovoltaics Specialists Conference
 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

Curriculum Vitae

Jeffrey A. Christians
Hope College

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