

EDUCATION AND TRAINING

- 2011-2014 Postdoctoral Scholar, Chemical Engineering, Princeton University
- 2009-2011 Ph.D. in Chemistry, University of Buffalo, NY
- 2007-2009 M.S in Chemistry, University of Buffalo, NY
- 2005-2007 M.S. Environmental Planning, University of Panama, Rep. of Panama
- 2001-2005 B.S. Chemistry, University of Panama, Rep. of Panama

RESEARCH AND PROFESSIONAL EXPERIENCE

- 2014-present Assistant Professor, Department of Chemistry, University of Utah
2011-2014 Postdoctoral Research Associate, Chemical Engineering, Princeton University
2007-2012 Graduate Research Assistant, State University of New York at Buffalo, NY, USA
2009-2010 Teaching Assistant, State University of New York at Buffalo, NY, USA
2004-2007 Chemistry Lecturer, St. Mary's High School, Republic of Panama
2002-2004 Undergraduate Research Assistant, Institute for Specialized Research, Rep. of Panama

HONORS AND AWARDS

- 2021 Alfred P. Sloan Research Fellow in Chemistry, Sloan Foundation
- 2020 W.W. Epstein outstanding educator award, University of Utah
- 2020 Editorial Advisory Board, *ACS Applied Materials & Interfaces*
- 2020 Editorial Advisory Board, *ACS Omega*
- 2020 Scialog Fellow, Negative Emissions Science (NES) Initiative, Research Corporation for Science Advancement (RCSA)
- 2020 Early Career Faculty Advisor Board, *ChemNanoMat*
- 2019 Scialog Collaborative Innovation Awards, Research Corporation for Science Advancement
- 2018 Early Career Award, Department of Energy (DOE)
- 2018 Talented 12, American Chemical Society (ACS)
- 2018 Cottrell Research Scholar, RCSA
- 2018 Emerging Investigator, *Journal of Materials Chemistry A*
- 2017 GERA Ovshinsky Sustainable Energy Fellow, American Physical Society (APS)
- 2017 Scialog Fellow, Energy Storage Technologies, RCSA
- 2017 Lloyd N. Ferguson Young Scientist Award for Excellence in Research, NOBCCHE
- 2016 Young Leaders Award, The Minerals, Metals, and Materials Society (TMS)
- 2015 International Young Observer, International Union of Pure and Applied Chemistry (IUPAC)
- 2015 Marion Milligan Mason Fellow, American Association for the Advancement of Science
- 2014 Energy Award, Institute of Chemical Engineers (IChemE) Global Awards
- 2013 L'Oreal USA Fellowship for Women in Science, L'Oreal USA and AAAS
- 2011 Graduate Student MRS Gold Medal, Materials Research Society (MRS)
- 2007 Fulbright Fellowship, US. Department of State, Institute of International Education

DEPARTMENT AND UNIVERSITY SERVICE

- 2018-present Graduate recruiting committee
- 2018-present Mentor for the National Society of Black Scientists and Engineers (NBSE)
- 2018-present Academic advisor for SACNAS –University of Utah Chapter
- 2016-present Seminar and colloquium committee (Materials Division)
- 2016-present Mentor for the African American Doctoral Scholars Initiative (AADSI)

- 2016-2018 Technical support committee (X-ray)
- 2016-2017 Graduate admissions committee
- 2015-2016 Graduate education committee

PROFESSIONAL SERVICE

- Symposium organizer for OSA Advanced Photonic Congress (2020)
- Symposium organizer for APS and NOBCCChE (2020)
- Service as technical volunteer to the Materials Research Society (2014-present)
- Symposium organizer for the MRS Fall meeting (2015-present)
- Service as part of the international advisory panel for Materials Research Express (IOP Science)
- Reviewer for Nature Materials, JACS, J. Phys. Chem., Adv. Mater., and Chem. Sci.
- NSF, AFOSR, and DOE reviewer

TEACHING

- Spring 2018-2021 CHEM 1221 Honors General Chemistry II
- Fall 2015-2018 CHEM 7130/3130 Solid State Chemistry
- Fall 2014-2016 CHEM 1211 Honors General Chemistry I

RESEARCH INTERESTS

My research directions center around understanding the structural and optoelectronic properties at the interfaces of organic-inorganic materials in order to control charge (spin) injection, transport, and detection in devices for photovoltaic, spintronics, and quantum electronic applications. Our laboratories are divided into four main research areas, i.e., (1) towards the realization of topological states in 2D single-crystalline coordination polymers; (2) understanding the optoelectronic properties of doped 2D organic-inorganic halide perovskite quantum wells: towards efficient ultrafast quantum well IR photodetectors; (3) adaptive electrodes and electrolytes for electrochemical energy storage systems; and (4) the generation of self-doping design principles for organic semiconductors.

SELECTED PUBLICATIONS

University of Utah (* corresponding author)

1. D. Powell, E. Campbell, L. Flannery, J. Ogle, and L. Whittaker-Brooks*. Steric hindrance dependence on the spin and morphology properties of highly oriented self-doped organic small molecule thin films. *Mater. Adv.*, 2021. *Advanced Article*.
2. L. Flannery, J. Ogle, D. Powell, C. J. Tassone, and L. Whittaker-Brooks*. Voltage bias stress effects in organic-inorganic halide perovskites are strongly dependent on morphology and ion migration pathways. *J. Mater. Chem. A*, 2020, **8**, 25109-25119.
3. E. Amerling, S. Baniya, E. Lafalce, S. Blair, V. Vardeny, and L. Whittaker-Brooks*. Quantifying exciton heterogeneities in mixed-phase organometal halide multiple quantum wells via Stark spectroscopy studies. *ACS Appl. Mater. Interfaces.*, 2020, **12**, 52538-52548.
4. J. Ogle, N. Lahiri, C. Jaye, C. J. Tassone, J. Louie, and L. Whittaker-Brooks*. Semiconducting to metallic electronic landscapes in defects controlled two-dimensional π -d conjugated coordination polymer thin films. *Adv. Funct. Mater.*, 2020, 2006920.
5. A. Bhattacharyya, P. Ranga, S. Roy, J. Ogle, L. Whittaker-Brooks, and S. Krishnamoorthy. Low temperature homoepitaxy of (010) β -Ga₂O₃ by metal-organic vapor phase deposition: Expanding the growth window. *Appl. Phys. Lett.*, 2020, **117**, 142102.
6. C. G. Hawkins, A. Verma, W. Horbinski, R. Weeks,[#] P. Mukherjee, and L. Whittaker-Brooks*. Decreasing the ion diffusion pathways for the intercalation of multivalent cations in defect-tolerant TiS_{2-x} nanobelt cathode insertion hosts. Accepted *ACS Appl. Mater. Interfaces*, 2020, **12**, 21788-21798. (featured as the front cover). [#]**Undergraduate student**.

7. M. T. Pham, E. Amerling, H. M. Luong, H. Dang, L. Whittaker-Brooks, and T. D. Nguyen. Origin of Rashba spin-orbit coupling in 2D and 3D lead iodide perovskites. *Sci. Rep.*, 2020, 10, 4964.
8. W. Nimens, S. Lefave, L. Flannery, M. Kieber-Emmons, and L. Whittaker-Brooks*. Understanding hydrogen bonding interactions in crosslinked methylammonium lead iodide crystals: towards moisture and light degradation pathways. *Angew. Chem. Int. Ed.*, 2019, **58**, 13912-13921.
9. J. Ogle, D.-M. Smilgies, and L. Whittaker Brooks*. Quantifying the degree of orientation and ordering in organic-inorganic interfaces via grazing incidence X-ray diffraction. *CrystEngComm*, 2019, **21**, 5707-5720. (featured as the back cover)
10. L. Flannery, H. Galvez,[#] W. Nimens, A. Rahman, and L. Whittaker-Brooks*. WWMOD? What would metal oxides do?: Redefining their applicability in today's energy technologies. *Polyhedron*, 2019, **170**, 334-358. **#Undergraduate student**
11. C. Fei, M. Zhou, J. Ogle, D.-M. Smilgies, L. Whittaker-Brooks, H. Wang. Self-assembled propylammonium cations at grain boundaries and film surface to improve efficiency and stability of perovskite solar cells. *J. Mater. Chem. A.*, 2019, **7**, 23739-23746.
12. M. Teferi, J. Ogle, D. L. Baird, S. Jamali, G. Joshi, H. Malissa, L. Whittaker Brooks, and C. Boehme. Tuning effective hyperfine fields in PEDOT:PSS thin films by doping. *Phys. Rev. B*, 2018, **98**, 241201(R).
13. C. Hawkins and L. Whittaker Brooks*. Vertically oriented TiS_{2-x} nanobelt arrays as binder- and carbon-free intercalation electrodes for Li- and Na-based energy storage devices. *J. Mater. Chem. A.*, 2018, **6**, 21949-21960. (featured as the inside cover) **Emerging Investigator Special Issue. Top 5% most-read paper in Q4 2018.**
14. W. Nimens, A. Caruso, M. Jonely, C. Simon, J. Ogle, D.-M. Smilgies, R. Noriega, M. Scarpulla, and L. Whittaker-Brooks*. Morphology and optoelectronic variations underlying the nature of the electron transport layer in perovskite solar cells. *ACS Appl. Energy Mater.*, 2018, **1**, 602-615.
15. C. Hawkins and L. Whittaker-Brooks*. Controlling sulfur vacancies in TiS_{2-x} cathode insertion hosts via the conversion of TiS₃ nanobelts for energy conversion storage. *ACS Appl. Nano Mater.*, 2018, **1**, 851-859.
16. C. Kilcoyne, A. Ali, A. AlSaqqa, A. A. Rahman, L. Whittaker-Brooks, and S. Ganapathy. Gate-tunable transport characteristics of Bi₂S₃ nanowire transistors. *Solid State Commun.*, 2018, **270**, 135-139.
17. A. Degrauw,[#] R. Armstrong,[#] A. A. Rahman, J. Ogle, and L. Whittaker-Brooks*. Catalytic growth of vertically-aligned SnS/SnS₂ p-n heterojunctions. *Mater. Res. Express*, 2017, **4**, 094002. **#Undergraduate students; Emerging Investigator Special Issue**
18. E. Amerling, S. Baniya, E. Lafalce, C. Zhang, Z.-V. Vardeny, and L. Whittaker-Brooks*. Electroabsorption spectroscopy studies of (C₄H₉NH₃)₂PbI₄ organic-inorganic hybrid perovskite multiple quantum-wells. *J. Phys. Chem. Lett.*, 2017, **8**, 4557-4564.
19. A. A. Rahman, R. Huang, and L. Whittaker-Brooks*. Distinctive extrinsic atom effects on the structural, optical, and electronic properties of Bi₂S_{3-x}Se_x solid solutions. *Chem. Mater.*, 2016, **28**, 6544-6552.
20. H. Wang, L. Valkunas, T. Cao, L. Whittaker-Brooks, and G. R. Fleming. Coulomb screening and coherent phonon in methylammonium lead iodide perovskites. *J. Phys. Chem. Lett.*, 2016, **7**, 3284-3289.
21. W. Nimens, L. Whittaker-Brooks, and M. H. Bartl. Enhanced sensing in mixed porous-solid photonic stacks. *J. Mater. Chem. C*, 2016, **4**, 668-672.
22. H. Wang, L. Whittaker-Brooks, and G. R. Fleming. Exciton and free charge dynamics in methylammonium lead iodide perovskites are different in the tetragonal and orthorhombic phases. *J. Phys. Chem. C*, 2015, **119**, 19590-19595.

SEMINARS AND PRESENTATIONS

Invited talks

37. Designer organic-inorganic interfaces for coherent charge and spin transfer. UMass Amherst, February 5, 2021. Virtual meeting.
36. Fundamental, state-of-the-art, and recent trends in nanostructured materials for energy and electronic applications. Metropolitan State University of Denver, January 29, 2021. Virtual meeting.
35. Designer organic-inorganic interfaces for coherent charge and spin transfer. University of Delaware, December 4, 2020. Virtual meeting.
34. Designer organic-inorganic interfaces for coherent charge and spin transfer. Harvard University, December 3, 2020. Virtual meeting.
33. Fundamental, state-of-the-art, and recent trends in nanostructured materials for energy and electronic applications. Tennessee State University, November 5, 2020. Virtual meeting.
32. Vapor-vapor and vapor-solid interactions in the formation of single-crystalline 2D coordination polymer thin films. Advanced Light Source, Stanford. August 25, 2020. Virtual meeting.
31. A non-traditional journey thru energy, electronics, and STEM. Spelman College. April 23, 2020 (virtually held due to COVID-19).
30. Investigating the optical and electrical properties of two-dimensional organic-inorganic hybrid perovskite multiple quantum wells via electroabsorption spectroscopy studies. Georgia Tech. April 24, 2020 (virtually held due to COVID-19).
29. Fundamental, state-of-the-art, and recent trends in nanostructured materials for energy and electronic applications. Franklin and Marshall College (keynote speaker for undergraduate STEM conference). April 4, 2020 (virtually held due to COVID-19).
28. The many facets of organic-inorganic halide perovskites: challenges and opportunities. Penn State University. April 2, 2020 (virtually held due to COVID-19).
27. Investigating the optical and electrical properties of two-dimensional organic-inorganic hybrid perovskite multiple quantum wells via electroabsorption spectroscopy studies. APS March Meeting 2020, Denver, CO, March 1 – March 5, 2020.
26. Extrinsic and intrinsic doping design principles in organic semiconductors. Texas A&M, November 12, 2019.
25. Fundamental, state-of-the-art, and recent trends in nanostructured materials for energy and electronic applications. St. Olaf College (recruiting seminar), November 8, 2019.
24. Fundamental, state-of-the-art, and recent trends in nanostructured materials for energy and electronic applications. Carleton College, November 7, 2019.
23. Addressing the disparity between being a non-traditional student and the guidelines imposed by contemporary research in STEM. Committee of Minority Affairs Luncheon Keynote Speaker. ACS Fall Meeting, San Diego, CA.
22. Investigating the optical and electrical properties of two-dimensional organic-inorganic hybrid perovskite multiple quantum wells via electroabsorption spectroscopy studies. Novel Optical Materials and Applications (NOMA) Conference, San Francisco, CA. July 29-August 1, 2019.
21. HOPE Workshop. In situ and in operando characterization of energy devices via synchrotron techniques. National Renewable Energy Laboratory, Denver, Colorado, July 18, 2019.
20. Fundamental, state-of-the-art, and recent trends in nanostructured materials for energy and electronic applications. Colorado College (recruiting seminar), May 3, 2019.
19. Extrinsic and intrinsic doping design principles in organic semiconductors. University of Buffalo, April 26, 2019.
18. Self-dopant design rules in n-type organic thermoelectrics. Yale University. February 6, 2019.

17. Morphology and optoelectronic variations underlying the nature of the electron transport layer in perovskite solar cells. Joint Undertaking for an African Materials Institute, NSF sponsored workshop, Uganda, December 9-22, 2018.
16. Toward establishing self-dopant design rules in n-type organic thermoelectrics. Material Research Society Fall Meeting 2018, Boston, MA, November 27 – December 2, 2018.
15. Fundamental, state-of-the-art, and recent trends in nanostructured materials for energy and electronic applications. Montana Tech, November 30, 2018.
14. In situ and in operando characterization of energy devices via synchrotron techniques. National Renewable Energy Laboratory, Denver, Colorado, July 9, 2018.
13. Nanostructured metal chalcogenide networks for multivalent ion batteries. Spring MRS. Phoenix, Arizona. April 2-6, 2018.
12. Nanostructured metal chalcogenide networks as carbon- and binder-free cathode materials for Li, Na, and Al-ion batteries. 233rd ECS Meeting. Seattle, Washington. May 13-17, 2018.
11. Tailoring defects and orientation in nanostructured metal chalcogenide cathode insertion hosts. Pacific Northwest Laboratory, Pasco, Washington, June 19-22, 2018.
10. Fundamental, state-of-the-art, and recent trends in nanostructured materials for energy and electronic applications. Wayne State University, Detroit, Michigan, April 5, 2018.
9. Morphology and optoelectronic variations underlying the nature of the electron transport layer in perovskite solar cells. 2018 Conference on excited state processes, Los Alamos National Laboratory, Santa Fe, New Mexico, June 4- June 7, 2018.
8. Manipulating the thermoelectric properties of polymer semiconductors. ACS March Meeting 2018, New Orleans, LA March 18 – March 22, 2018.
7. Materials for applications in solar energy conversion, thermoelectrics, batteries, and electronics. APS March Meeting 2018, Los Angeles, CA, March 5 – March 9, 2017.
6. Manipulating the thermoelectric and spin properties of polymeric systems. International Conference on Organic and Hybrid Thermoelectrics, Valencia, Spain January 29 – February 1, 2018.
5. Fundamental, state-of-the-art, and recent trends in nanostructured materials for energy and electronic applications. BYU Idaho, February 6, 2017.
4. Fundamental, state-of-the-art, and recent trends in nanostructured materials for energy and electronic applications. Idaho State University, February 7, 2017.
3. Counter ion and dopant effects on the thermoelectric properties of Poly(3,4-ethylenedioxythiophene) thin films. Material Research Society Fall Meeting 2016, Boston, MA, November 27 – December 2, 2016.
2. Bi₂S₃ nanowire networks as electron transport layers in solution-processed hybrid solar cells. 45th IUPAC Congress, Busan South Korea, August 6-14, 2015.
1. Synthesis, characterization, and device fabrication of metal chalcogenides nanostructures for solar and waste-heat energy conversions. Pacifichem, Honolulu, Hawaii, December 15-20, 2015.