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EDUCATION

- 2023** **Ph.D. Candidate Civil Engineering – Water Resources**
The Pennsylvania State University, University Park, PA
Department of Civil and Environmental Engineering

Dissertation Title: “Hydroclimatic risks for household water insecurity and the household water-food nexus”
Dissertation Adviser: Dr. Alfonso Mejia

Coursework in International Agriculture & Development Graduate Program: International Rural Social Change, Ethics of Engineering and Environmental Management, Sociology of Agriculture and Food Systems, Research Methods of Rural Sociology, International Agriculture and Development Seminar, Geography: Humans and the Environment Seminar, Program Evaluation
- 2015** **Civil Engineering, M.S. – Environmental Engineering**
Interdisciplinary Ecological Sciences and Engineering Program
Purdue University, West Lafayette, IN
Department of Civil and Environmental Engineering
Advisers: Dr. Ernest R. Blatchely III, Dr. John Lumkes
- 2013** **Agriculture Engineering, B.S. – Environmental Engineering**
Concentration in Environmental and Natural Resources Engineering
Minor in Spanish
Purdue University, West Lafayette, IN
Department of Agriculture and Biological Engineering

PUBLICATIONS

Peer-Reviewed Journal Articles

- 2023** **Broyles, L.M.T.**, Pakhtigian, E., Aziz, S., Akanda, A., Mejia, A. (2023). Seasonal variation in household water insecurity: Evidence from rural Bangladesh. *PLOS Water* 2(7): e0000157. <https://doi.org/10.1371/journal.pwat.0000157>
- 2022** **Broyles, L.M.T.**, Pakhtigian, E., Rosinger, A., Mejia, A. (2022). Climate and hydrological seasonal effects on household water insecurity: A systematic review. *WIREs: Water*. <http://doi.org/10.1002/wat2.1593>
- 2021** **Trepanier, L.**, Orare, J., Nyagwencha, J. & Grady, C. (2021). How are we actually doing? Comparing water and sanitation in Kenya with MDG and SDG Criteria. *Journal of Water, Sanitation and Hygiene for Development*. <http://doi.org/10.2166/washdev.2021.023>

Ransom, E., Grady, C., **Trepanier, L.**, & Bain, C. (2021). Situated Ethics in Development: STS Insights for a Pragmatic Approach to Development Policy and Practice. *Science, Technology & Human Values* <http://doi.org/10.1177/01622439211052685>

Works in Progress

Broyles, L.M.T., Pakhtigian, E., Mejia, Effects of interannual variation in hydrological and climate risk on household water access in Bangladesh: A panel regression ([in progress](#))

TEACHING EXPERIENCE

- 2023** **GEOG 6N: Maps and the Geospatial Revolution – Instructor of Record – 30 students**
The Pennsylvania State University, University Park, PA
Department of Civil and Environmental Engineering
- GEOG 431: Geography of Water Resources – Instructor of Record – 52 students**
The Pennsylvania State University, University Park, PA
Department of Civil and Environmental Engineering
- 2022** **CE461: Water Resources Engineering – Teaching Assistant**
The Pennsylvania State University, University Park, PA
Department of Civil and Environmental Engineering
- CE465W: Water Resources Senior Capstone - Co-Instructor**
The Pennsylvania State University, University Park, PA
Department of Civil and Environmental Engineering
- 2021** **GEOG 431: Geography of Water Resources - Teaching Assistant**
The Pennsylvania State University, University Park, PA
Department of Geography
- 2020** **CE 360: Fluid Mechanics - Teaching Assistant**
The Pennsylvania State University, University Park, PA
Department of Civil and Environmental Engineering

PROFESSIONAL EXPERIENCE

- 2018** **Aqua Clara International Lab Assistant/Intern**
Holland, Michigan
Managed household hollow fiber membrane filter production and preparing arsenic reduction media for household sand filters; Evaluated filter function in response to novel filter developments.
- 2015-2018** **New International Water Resources Specialist ***
Fort Myers, Florida and Narok, Kenya
**Continuing part-time consultation work*
Designed water filtration and purification system specifically for the context of Maasai people group in Southwestern Kenya; Collaborated with Florida Gulf Coast University and ECHO Global Farms to build and test BioSand Filtration concept; Coordinated with donors to raise over \$48,000 for program and project expenses; Trained and managed Kenyan national staff for water purification concept testing program; Built Kenyan-Kenyan partnership with Aqua Clara Kenya for further expansion of water purification concept with the Maasai communities with whom Kenyan national staff work.
- New International Child Sponsorship Data Analyst**
Fort Myers, Florida and Narok, Kenya
Evaluated current poverty level of Kenyan communities in Child Sponsorship program based on Global Multidimensional Poverty Index and traveled to Kenya to communicate results with Kenyan national staff and develop collaborative Child Sponsorship community projects; Trained Kenyan national staff to use CommCare Mobile Health App for Child Sponsorship registration and follow up with the communities

FELLOWSHIPS, PRIZES, AND AWARDS

- 2023** Allen L. Rayfield Graduate Fellowship, *The Pennsylvania State University* (\$3,000)
Mark E. and Claire L. Alpert Graduate Fellowship, *The Pennsylvania State University* (Full Tuition and Salary)
- 2021** Graduate Scholarship for Excellence in Engineering, *The Pennsylvania State University* (\$3,000)
- 2020** James E. Marley Graduate Fellowship in Engineering, *The Pennsylvania State University* (\$2,000)
Fulbright Award to Vietnam, *U.S. Department of State– declined due to COVID travel restrictions* (\$18,000)

	Boren Fellow Alternate, <i>National Security Education Program</i>
2019	Boren Fellow Alternate, <i>National Security Education Program</i>
2018-2019	University Graduate Fellowship in College of Engineering, <i>The Pennsylvania State University</i> (Full Tuition)
2013-2015	Chappelle Fellowship, <i>Purdue University</i> (Full Tuition)
2012-2013	Dean's List, <i>Purdue University</i>
2012	Gerbert Wilson Engineering Scholarship, <i>Purdue University</i> (\$2,000) Gruel Memorial Scholarship, <i>Purdue University</i> (\$2,000)
2011	Rex Hall Memorial Scholarship, <i>Purdue University</i> (\$1,500) Outstanding Service Project Award, <i>Kappa Kappa Psi</i>
2010	Charles Haas Memorial Scholarship, <i>Purdue University Bands</i> (\$2,000)
2009-2013	Trustees Scholarship Recipient, <i>Purdue University</i> (Full Tuition)
2009	Hoosier Scholar Award (\$1,000)

CONFERENCE AND SEMINAR PRESENTATIONS

* *Upcoming*

Contributed Talks

2023	HWISE-RCN Workshop: <i>Causes, Consequences, and Measurement of Unpredictable Water Supplies: An Underlying Driver of Water Insecurity</i> . University of Miami, Florida
2022	“Pre- and post-monsoon variation in household water insecurity in rural Bangladesh”. <i>UNC 2022 Water and Health Conference</i> . Chapel Hill, North Carolina “An engineering response to climate change and household water insecurity: Results from a systematic literature review and case study”. <i>Clemson University, Clemson, South Carolina</i> “Investigating seasonal environmental effects on household experiences with water in Matlab, Bangladesh”. <i>American Geophysics Union - Frontiers in Hydrology Meeting, San Juan, Puerto Rico</i> “Implications for water governance in the face of climate change considering household water insecurity (HWI) variation pre- and post-monsoon in rural Bangladesh”. <i>8th Annual Conference on Environmental Politics and Governance (EPG), The Pennsylvania State University, University Park, Pennsylvania</i>
2021	“Environmental seasonality contributes to variations in household experiences with water: Results from a systematic review”. <i>American Geophysics Union Fall Meeting, New Orleans, Louisiana</i> “Seasonal climate and hydrological effects on household water insecurity (HWI): Synthesizing knowledge and areas for future research”. <i>Delft International Conference on Sociohydrology, Delft Netherlands</i> “Multisectoral partnerships to further advance clean drinking water and sanitation” <i>International Conference on Sustainable Development, Columbia University, New York, New York</i>
2020	“Partnerships for clean water and sanitation”. <i>International Conference on Sustainable Development, Columbia University, New York, New York</i>
2018	“Bridging Disciplines and Community Values in the Food, Energy, and Water Nexus”. <i>International Workshop on Water Governance, Climate Change, and Food Security in Minority Communities, Vietnam</i> . An Giang University, Long Xuyen, Vietnam

Campus Talks

2023	“Hydroclimatic risks in the household water-food nexus”. <i>Penn State Water Conference, The Pennsylvania State University, University Park, Pennsylvania</i> “An engineering response to seasonal household water insecurity: Case study from Matlab, Bangladesh. <i>Penn State College of Engineering Research Symposium, The Pennsylvania State University, University Park, Pennsylvania</i>
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“Hydroclimatic influences on household water security across Bangladesh: results from a case study and multi-year country-wide analysis”. *Penn State Water Resources Engineering Seminar, The Pennsylvania State University, University Park, Pennsylvania*

2021 “Synthesizing existing research of seasonal influences on household water insecurity (HWI): Preliminary results from a systematic review”. *Penn State Internal Water Conference, The Pennsylvania State University, University Park, Pennsylvania*

2020 “Water quality, water access, and sanitation monitoring in communities where service is unreliable”. *Penn State Water Resources Engineering Seminar, The Pennsylvania State University, University Park, Pennsylvania*

2019 “It’s not just about the technology: Political and socio-economic factors impacting safely managed water & sanitation in Uganda”. *Penn State College of Engineering Research Symposium, The Pennsylvania State University, University Park, Pennsylvania*

STUDENTS MENTORED

Graduate Students

2019-current Josephine Orare (*Amref International University, Aqua Clara Kenya*, Provided feedback for graduate school materials and thesis topic development)

Undergraduate Students

2022 Jahmal Wallen (Research Experience for Undergraduates in Climate Science, *The Pennsylvania State University*)

2021 Camila Van Oost (Senior Undergraduate Thesis, *The Pennsylvania State University*)

Baylee Sexton (Research Experience for Undergraduates in Climate Science, *The Pennsylvania State University*)

2019 Abigail Cowser (Senior Undergraduate Thesis, *The Pennsylvania State University*)

Taylor Beard (*New International Summer Internship to Kenya*, Team Leader)

2018 Lauren Lukasik, Spencer Morton, Stephen Nelson, Rene Mendoza Gonzalez (Senior Undergraduate Capstone Project, *Florida Gulf Coast University* in partnership with *New International*)

2017 Emmanuel McDowell, Jackson Cornelius, Shayn Hinde, Zachary McQuirt (Senior Engineering Volunteer Experience, *Florida Gulf Coast University* in partnership with *New International*)

2016 Elena Campbell, John Graham, Brock Sell (*New International Summer Internship to Kenya*, Team Leader)

2015 Hannah Hede and Savannah Froese O’Malley (*New International Summer Internship to Zimbabwe*, Team Leader)

SERVICE

2023 **Nature Climate Change – Peer Reviewer**, 1 article

2022 **Journal of Water, Sanitation, and Hygiene for Development – Peer Reviewer**, 1 article

Environmental Science and Technology – Peer Reviewer 2 articles

Civil and Environmental Engineering (CEE) Diversity, Equity, and Inclusion Committee - Student Member: organized and led student ice cream social to cultivate DEI culture among Civil Engineering students and generate ideas for future programming, lead developer of survey for understanding DEI needs of Civil Engineering students (*The Pennsylvania State University*)

Oral Presentation Judge - Penn State University College of Engineering Research Symposium (*The Pennsylvania State University*)

Penn State Association of Water Students (PAWS) – Secretary: organized tours of Penn State Wastewater Treatment Plant and Living Filter, managed student organization correspondence (*The Pennsylvania State University*)

2021 **Penn State Association of Water Students (PAWS) - Workshop coordinator:** planned student wetlands tour, **Secretary:** managed weekly emails and correspondence to student organization (*The Pennsylvania State University*)

Penn State Christian Graduate Students - Servant Team Leader (*The Pennsylvania State University*)

2020 Poster Judge for Penn State University Undergraduate Research Symposium (*The Pennsylvania State University*)

- 2020 - present** Developed and led weekly Writing Accountability Group for graduate students (*The Pennsylvania State University*)
- 2010-2015** **Kappa Kappa Psi National Honorary Band Service Fraternity** - Services Committee Head, created and implemented award-winning service project to assist marching band members in music memorization and managed the construction of theatrical props for marching band half-time shows (*Purdue University*)
- 2009-2014** **All American Marching Band** Performed clarinet at Macy's Thanksgiving Day Parade (2010), Dublin's St. Patrick's Day Parade (2013), and Indianapolis 500 (2010-2014) (*Purdue University*)

SCIENTIFIC COMMUNITY STUDENT MEMBERSHIPS

American Society of Civil Engineers (ASCE), Environmental and Water Resources Institute (EWRI), American Water Works Association (AWWA), American Geophysics Union (AGU), American Association of Geographers (AAG)

SKILLS

Languages: English (native), Spanish (Minor from Purdue University, conversational)

Software: ANSYS, ArcGIS Pro, ArcMap, AutoCAD, CommCare Mobile Health App, HEC-HMS, HEC-RAS 6.1, Jupyter Notebooks, MatLab, MathCAD, Microsoft Office, Minitab, mWater, Python, Revit, Visual Basic, SPSS

Trainings: Community Health Empowerment (CHE) – CMF International; **Fieldwork:** Kenya