

Lauren M. T. Broyles, Ph.D., E.I.T.  
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## **ACADEMIC EMPLOYMENT**

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**2023-**            **Postdoctoral Scholar at the Population Research Institute**  
The Pennsylvania State University, University Park, PA  
National Institute of Child Health and Development: T-32 Training Program in Social Environments and Population Health (T32 HD007514-23)  
Primary mentor: Dr. Asher Rosinger in the [Water, Health, and Nutrition Lab](#)

## **EDUCATION**

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**2023**            **Ph.D. in Civil Engineering**  
Concentration in Water Resources  
The Pennsylvania State University, University Park, PA  
Dissertation: “[Hydroclimatic risks for household water insecurity and the household water-food nexus](#)”

**2015**            **M.S. in Civil Engineering**  
Interdisciplinary Ecological Sciences and Engineering Program  
Purdue University, West Lafayette, IN

**2013**            **B.S. in Agriculture Engineering**  
Concentration in Environmental and Natural Resources Engineering and Minor in Spanish  
Purdue University, West Lafayette, IN

## **PROFESSIONAL EXPERIENCE**

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**2024-**            **Affiliate of Mortenson Center in Global Engineering & Resilience**  
University of Colorado, Boulder, CO

**2015-**            **New International Water Resources Specialist \***  
Fort Myers, Florida and Narok, Kenya  
*\*Part-time consultant*  
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; Raised funds 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.

**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.

## **PAPERS AND PUBLICATIONS**

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### **Peer-Reviewed Journal Articles**

**2024**            **Broyles, L.M.T., Huanca, T., Conde, E., Rosinger, A. (2024).** Water insecurity may exacerbate food insecurity even in water-rich environments: evidence from the Bolivian Amazon. *Science of the Total Environment* 954:17605. <https://doi.org/10.1016/j.scitotenv.2024.176705>

**Broyles, L.M.T., Pakhtigian, E., Mejia, A. (2024).** Estimating effects of monsoon flooding on household water access. *Environmental Research Letters*. <http://doi.org/10.1088/1748-9326/ad6ce9>.

**Broyles, L.M.T.** (2024). Extreme weather threatens informal settlements. *Nature Climate Change*. <https://doi.org/10.1038/s41558-024-01992-6>

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>.

Rosinger A.Y., & **Broyles L.M.T.** (2023). Water insecurity is a structural, often invisible barrier to healthy beverage patterns and nutritious diets. (Invited Commentary): *Journal of Nutrition*: <http://doi.org/10.1016/j.tjnut.202.09.015>.

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 under Review

**Broyles, L.M.T.,** Pakhtigian, E., Mejia, A. Monsoon flooding and undernutrition among children in Bangladesh. (In Review at *Journal of the Academy of Nutrition and Dietetics*)

## GRANTS

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### Internal Grants (Total Costs)

2023-

Lead Investigator. "Climate effects on household water access and child undernutrition in Kenya." Penn State Population Research Institute Climate Change and Health Computation Support Grant (via NIH/NICHD). \$10,500.

## CONFERENCE, SEMINAR, AND WORKSHOP PRESENTATIONS

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### Conference Presentations

2024

"Drinking water sodium-chloride associated with higher blood pressure and odds of microalbuminuria among adults in hot-dry Northern Kenya: A longitudinal study". *American Geophysics Union Fall Meeting, Washington D.C.*-Poster

"Using drought exposure and satellite temperature and precipitation data to assess the effects of the 2020-2023 drought on child water access and undernutrition across Kenya". *American Geophysics Union Fall Meeting, Washington D.C.*-Poster

"Extreme drought disrupted water access and increased risk of undernutrition in Kenya: Evidence from 2020-2023 nationally representative Demographic Health Survey Data". *Founder's Day, The Pennsylvania State University, University Park, Pennsylvania* - Presentation

"Investigating the effects of the 2020-2022 drought on drinking water access and prevalence of undernutrition among children in Kenya". *Population Association of America, Columbus, Ohio*- Poster

"Understanding Household Water and Food Insecurity in a Water-Rich Environment in the Bolivian Amazon". *Penn State Water Conference, The Pennsylvania State University, University Park, Pennsylvania* - Presentation

2023

"Addressing Water Security in the Climate-HWI Nexus by Combining and Analyzing Social, Climate, and Disaster Data". *American Geophysics Union Fall Meeting, San Francisco, California* - Presentation.

"Extreme Flooding Effects on Household Water Insecurity: A Multi-Year, Country-Wide Analysis of Bangladesh Using DHS, IMDAA, and EM-DAT Disaster Data". *Postdoctoral Research Symposium, The Pennsylvania State University, University Park, Pennsylvania*, Poster.

"Hydroclimatic risks to water access and food insecurity in Rural Bangladesh". *UNC 2023 Water and Health Conference. Chapel Hill, North Carolina* – Poster.

“Hydroclimatic risks in the household water–food nexus”. *Penn State Water Conference, The Pennsylvania State University, University Park, Pennsylvania* –Presentation.

“An engineering response to seasonal household water insecurity: Case study from Matlab, Bangladesh”. *Penn State College of Engineering Research Symposium, The Pennsylvania State University, University Park, Pennsylvania* –Presentation.

**2022** “Pre- and post-monsoon variation in household water insecurity in rural Bangladesh”. *UNC 2022 Water and Health Conference. Chapel Hill, North Carolina* – Poster.

“Investigating seasonal environmental effects on household experiences with water in Matlab, Bangladesh”. *American Geophysics Union – Frontiers in Hydrology Meeting, San Juan, Puerto Rico* – Poster.

“Implications for water governance in the face of climate change considering household water insecurity (HWI) variation pre- and post-monsoon in rural Bangladesh”. *8<sup>th</sup> Annual Conference on Environmental Politics and Governance (EPG), The Pennsylvania State University, University Park, Pennsylvania* – Poster.

**2021** “Environmental seasonality contributes to variations in household experiences with water: Results from a systematic review”. *American Geophysics Union Fall Meeting, New Orleans, Louisiana* – Poster.

“Seasonal climate and hydrological effects on household water insecurity (HWI): Synthesizing knowledge and areas for future research”. *Delft International Conference on Sociohydrology, Delft Netherlands* –Presentation.

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

“Multisectoral partnerships to further advance clean drinking water and sanitation” *International Conference on Sustainable Development, Columbia University, New York, New York* – Poster.

**2020** “Partnerships for clean water and sanitation”. *International Conference on Sustainable Development, Columbia University, New York, New York* – Poster.

**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* – Poster.

**2018** “Bridging Disciplines and Community Values in the Food, Energy, and Water Nexus”. *International Workshop on Water Governance, Climate Change, and Food Security in Minority Communities, Vietnam. An Giang University, Long Xuyen, Vietnam* – Presentation.

### Seminars

**2023** Studying the Effects of Environmental Seasonality and Hydroclimatic Influences on Household Water-related Health and Well-being. *Population Research Institute, The Pennsylvania State University, University Park, Pennsylvania.*

“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.*

**2022** “An engineering response to climate change and household water insecurity: Results from a systematic literature review and case study”. *Clemson University, Clemson, South Carolina.*

**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.*

### Workshops

**2023** HWISE-RCN Workshop: *Causes, Consequences, and Measurement of Unpredictable Water Supplies: An Underlying Driver of Water Insecurity. University of Miami, Florida*

## **TEACHING EXPERIENCE**

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- 2023**      **GEOG 6N: Maps and the Geospatial Revolution – Instructor of Record – 30 Students**  
The Pennsylvania State University, University Park, PA, Department of Geography  
*Prepared ArcGIS Online lab materials for weekly online classroom assignments, term project, and classroom discussions. Graded assignments and classroom discussion posts; mentored students through term-long projects.*
- GEOG 431: Geography of Water Resources – Instructor of Record – 52 Students**  
The Pennsylvania State University, University Park, PA, Department of Geography  
*Prepared classroom assignments for online course, mentored students through weekly writing assignments, graded homework assignments and classroom discussion posts.*
- 2022**      **CE 461: Water Resources Engineering – Teaching Assistant – 45 Students**  
The Pennsylvania State University, University Park, PA, Department of Civil and Environmental Engineering
- CE 465W: Water Resources Senior Capstone - Co-Instructor – 8 Students**  
The Pennsylvania State University, University Park, PA, Department of Civil and Environmental Engineering  
*Prepared lab materials for weekly lab assignments for both HEC-RAS and ArcGIS Pro. Mentored students through written term-long project deliverables and completion of lab assignments. Facilitated classroom relationship with Senior Capstone client, the Tennessee Valley Authority (TVA), and prepared students for final project presentations to TVA and Senior Capstone Presentation Seminar.*
- 2021**      **GEOG 431: Geography of Water Resources - Teaching Assistant – 50 Students**  
The Pennsylvania State University, University Park, PA, Department of Geography
- 2020**      **CE 360: Fluid Mechanics - Teaching Assistant – 2 Sections of 35 Students each**  
The Pennsylvania State University, University Park, PA, Department of Civil and Environmental Engineering

## **FELLOWSHIPS, PRIZES, AND AWARDS**

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- 2023**      Allen L. Rayfield Graduate Fellowship, *The Pennsylvania State University*  
Mark E. and Claire L. Alpert Graduate Fellowship, *The Pennsylvania State University*
- 2021**      Graduate Scholarship for Excellence in Engineering, *The Pennsylvania State University*
- 2020**      James E. Marley Graduate Fellowship in Engineering, *The Pennsylvania State University*  
Fulbright Award to Vietnam, *U.S. Department of State– declined due to COVID travel restrictions*  
Boren Fellow Alternate, *National Security Education Program*
- 2019**      Boren Fellow Alternate, *National Security Education Program*
- 2018-2019**      University Graduate Fellowship in College of Engineering, *The Pennsylvania State University*
- 2013-2015**      Chappelle Fellowship, *Purdue University*
- 2012-2013**      Dean’s List, *Purdue University*
- 2012**      Gerbert Wilson Engineering Scholarship, *Purdue University*  
Gruel Memorial Scholarship, *Purdue University*
- 2011**      Rex Hall Memorial Scholarship, *Purdue University*  
Outstanding Service Project Award, *Kappa Kappa Psi*
- 2010**      Charles Haas Memorial Scholarship, *Purdue University Bands*
- 2009-2013**      Trustees Scholarship Recipient, *Purdue University*
- 2009**      Hoosier Scholar Award

## **STUDENTS MENTORED**

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### **Graduate Students**

- 2019-2022**      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*)

### New International Interns

- 2019 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* Kenya Internship, Team Leader)
- 2015 Hannah Hede and Savannah Froese O'Malley (*New International* Zimbabwe Internship, Team Leader)

### SERVICE

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**Peer Reviewer** Journal of the Academy of Nutrition and Dietetics; Nature Climate Change; Journal of Water, Sanitation, and Hygiene for Development; Environmental Science and Technology; Population and Environment, Environmental Research Infrastructure and Sustainability, PLOS Global Health

#### University Service – Selected activities since 2022

- 2024 **Penn State Spring Water Conference – Planning Committee:** Weekly meetings to organize Penn State Conference including session planning; Curated a post-doc presence at the conference; session moderator
- 2023- **Population Research Institute Climate Change and Health (CCH) Working Group – Steering Committee:** Responsibilities of the steering committee include: Hold a CCH 101 workshop that will bring together climate and population health scientists for training and structured discussions on the data, measures, and frameworks used in each respective field for CCH applications; Run the CCH seed grant program (*The Pennsylvania State University*)
- 2022 **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*)  
 Presentation Judge-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*)

### SCIENTIFIC COMMUNITY MEMBERSHIPS

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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

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**Languages:** English (native), Spanish (Minor from Purdue University, conversational); **Software:** ArcGIS Pro, ArcMap, AutoCAD, CommCare Mobile Health App, HEC-HMS, HEC-RAS 6.1, MatLab, Minitab, mWater, Python, Revit, Visual Basic, SPSS; **Trainings:** Community Health Empowerment (CHE) – CMF International; **Fieldwork:** Kenya