Renee Obringer, PhD

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APPOINTMENTS

2022-   **Pennsylvania State University**, University Park, Pennsylvania
           Assistant Professor, Department of Energy and Mineral Engineering
           Faculty Associate, Earth and Environmental Systems Institute
           Faculty Affiliate, Institute for Computational and Data Sciences
           Faculty Affiliate, Institutes of Energy and the Environment

2023-   **United Nations University Institute for Water, Environment and Health**, Hamilton, Ontario, Canada
           Research Fellow, Urban and Interdependent Infrastructure Systems

EDUCATION

2020   PhD in Environmental and Ecological Engineering
           Ecological Science and Engineering Interdisciplinary Graduate Program
           Purdue University, West Lafayette, Indiana

2015   Bachelor of Science in Environmental Engineering
           Ohio State University, Columbus, Ohio

RESEARCH EXPERIENCE

2020-2021 **National Socio-Environmental Synthesis Center**, Annapolis, Maryland
           Postdoctoral Research Fellow

2015-2020 **Purdue University**, West Lafayette, Indiana
           Research Assistant

JOURNAL PUBLICATIONS

<u>Published</u>

1. **Obringer, R.** and White, D.D. (2024) Simulating Socio-Hydrological Responses to Climatic Conditions, *Journal of the American Water Resources Association*.
2. **Obringer, R.**, Nateghi, R., Knee, J., Madani, K., and Kumar, R. (2024) Urban Water and Electricity Demand Data for Understanding Climate Change Impacts on the Water-Energy Nexus, *Scientific Data*.
3. **Obringer, R.**, Nateghi, R., Knee, J., Madani, K., and Kumar, R. (2023) Contemporary climate analogs project strong regional differences in the future water and electricity demand across US cities, *One Earth*.
4. AghaKouchak, A., Huning, L.S., Sadegh, M., Qin, Y., Markonis, Y., Vahedifard, F., Love, C.A., Mishra, A., Mehran, A., **Obringer, R.**, Hjelmstad, A., Pallickara, S., Shakil, J., Hanel, M., Zhao, Y., Pendergrass, A.G., Arbabi, M., Davis, S.J., Ward, P.J., Svoboda, M., Pulwarty, R., and Kreibich, H. (2023) Toward impact-based monitoring of drought and its cascading hazards, *Nature Reviews of Earth and Environment*.
5. Pezalla, S.* and **Obringer, R.** (2023) Evaluating the household-level climate-electricity nexus across three cities through statistical learning techniques, *Socio-Economic Planning Sciences*.

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* Students mentored by Dr. Obringer

6. **Obringer, R.** and White, D.D. (2023) Leveraging unsupervised learning to develop a typology of residential water users' attitudes towards conservation, *Water Resources Management*.
7. **Obringer, R.**, Nateghi, R., Ma, Z., and Kumar, R. (2022) Improving the interpretation of data-driven water consumption models via the use of social norms, *Journal of Water Resources Planning and Management*.
8. **Obringer, R.**, Nateghi, R., Maia-Silva, D., Mukherjee, S., CR, V., McRoberts, D.B., and Kumar, R. (2022) Implications of increasing household air conditioning use across the United States under a warming climate, *Earth's Future*.
9. **Obringer, R.** and Nateghi, R. (2021) What makes a city 'smart' in the Anthropocene? A critical review of smart cities under climate change, *Sustainable Cities and Society*.
10. **Obringer, R.**, Maia-Silva, D., Rachunok, B., Arbabzadeh, M., Nateghi, R., and Madani, K. (2021) The overlooked environmental footprint of increasing internet use, *Resources, Conservation and Recycling*.
11. **Obringer, R.**, Kumar, R., and Nateghi, R. (2020) Managing the water-electricity demand nexus in a warming climate, *Climatic Change*.
12. **Obringer, R.**, Mukherjee, S., and Nateghi, R. (2020) Evaluating the climate sensitivity of coupled electricity-natural gas demand using a multivariate framework, *Applied Energy.*
13. Paulvannan Kanmani, A., **Obringer, R.**, Rachunok, B., and Nateghi, R. (2020) Assessing global environmental sustainability via an unsupervised clustering framework, *Sustainability*.
14. **Obringer, R.**, Kumar, R., and Nateghi, R. (2019) Analyzing the climate sensitivity of the coupled water-electricity demand nexus in the Midwestern United States, *Applied Energy.*
15. **Obringer, R.** and Nateghi, R. (2018) Predicting reservoir levels using statistical learning techniques, *Scientific Reports.*
16. Zhang, X., Wei, C., **Obringer, R.**, Li, D., Chen, N., and Niyogi, D. (2017) Gauging the severity of the 2012 Midwestern U.S. drought for agriculture, *Remote Sensing*.
17. Zhang, X., **Obringer, R.**, Wei, C., Chen, N., and Niyogi, D. (2017) Droughts in India from 1981 to 2013 and implications to wheat production, *Scientific Reports*.
18. Deppe, J., Ward, M., Bolus, R., Diehl, R., Celis-Murillo, A., Zenzal, T., Moore, F., Benson, T., Smolinsky, J., Schofield, L., Enstrom, D., Paxon, E., Bohrer, G., Beveroth, T., **Obringer, R.**, Delaney, D., and Cochran, W. (2015) Fat, weather, and date affect migratory songbirds' departure decisions, routes, and crossing times in the Gulf of Mexico, *Proceedings of the National Academy of Sciences.*

CONFERENCE PUBLICATIONS

1. **Obringer, R.** and Nateghi, R. (2019) Multivariate modeling for sustainable and resilient infrastructure systems and communities, *Proceedings of the 2019 IISE Annual Conference*. H.E. Romeijn, A. Schaefer, and R. Thomas (Eds.). [arXiv: 1905.05803]
2. **Obringer, R.**, Zhang, X., Mallick, K., Alemohammad, S. H., and Niyogi, D. (2016) Assessing urban droughts in a smart city framework, *The International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences*, XLI-B2, 747-751.

BOOK CHAPTERS

1. Mukherjee, S. and **Obringer, R.** (in press) Electricity Demand Forecasting Under Climate Change for Efficient Grid Management, In *Advancing the Resilience of the Power Grid under a Changing Climate* (Nagethi, R. and Shadieezadeh, A., Eds.)
2. **Obringer, R.**, Bohrer, G., Weinzierl, R., Dodge, S., Deppe, J., Ward, M., Brandes, D., Kays, R., Flack, A., and Wikelski M. (2017) Track annotation: Determining the environmental context of movement through the air, In *Aeroecology* (Chilson P., Frick, F., Kelly, J., Liechti, F., Eds.).

PRESENTATIONS

<u>Invited</u>

2023   Investigating the impact of climate change on electricity demand through domain-informed machine learning, **Dartmouth College, New Energy Series**, Virtual

2022   *Exploring the disproportionate impact of rising temperatures on US household air conditioning demand*, **Society for Risk Analysis Annual Meeting**, Tampa, FL

Leveraging data analytics to evaluate the climate-induced changes to household air conditioning demand in the United States, **United States Association for Energy Economics/IAEE North American Conference**, Houston, TX

A data-driven systems approach for modeling the climate-induced shifts in future electricity demand, **Penn State University, Energy and Environmental Economics and Policy Seminar Series**, University Park, PA

Projecting climate-induced shifts in electricity demand through data analytics, **Penn State University, Department of Energy and Mineral Engineering, Energy for the Future Seminar Series**, University Park, PA

2021   *Simulating the role of water conservation attitudes on urban drought preparation and mitigation in the Southwestern United States*, **Society for Risk Analysis Annual Meeting**, Virtual

Understanding the climate change impacts on household air conditioning demand through predictive modeling, **INFORMS Annual Conference**, Virtual

Characterizing the human dimension of urban water systems in the southwestern United States, **National Socio-Environmental Synthesis Center**, Virtual

A socio-environmental systems approach for water demand management: A tale of two cities, **Vanderbilt University, Department of Civil and Environmental Engineering**, Virtual

Leveraging data science to model climate impacts on coupled water and electricity demand, **INFEWS Nexus Exploration of Opportunities in Uruguay and Argentina (NEXO-UA) Seminar Series**, Virtual

Improving urban resilience to climate change: A case for data-driven systems modeling, **University at Buffalo, Department of Industrial and Systems Engineering**, Virtual

2020   *Characterizing the impact of climate change on household air conditioning use across the United States*, **Society for Risk Analysis Annual Meeting**, Virtual

Looking ahead: How will household air conditioning use be affected by climate change, **INFORMS Annual Conference**, Virtual

2019   *Projecting the interdependent water and electricity use into the future under different climate change scenarios*, **Society for Risk Analysis Annual Meeting**, Arlington, VA

Multifaceted modeling for smart urban systems, **INFORMS Annual Conference**, Seattle, WA

Modeling the impact of climate change on the New York state energy consumption, **INFORMS Annual Conference**, Seattle, WA

Multivariate modeling for sustainable and resilient infrastructure systems and communities, **Institute of Industrial and Systems Engineers Annual Conference and Expo**, Orlando, FL

2018   *A multivariate analysis of the residential water-electricity demand nexus in the Midwest,* **Society for Risk Analysis Annual Meeting**, New Orleans, LA

STUDENT ADVISING

Chair

Joy Adul (PhD, 2022-)
Vijay Chiluveru (MS, 2022-)
Shruti Mehta (MS, 2023) [non-thesis paper]
Simon Pezalla (BS, 2022) [MCREU]
Caden Vitti (BS, 2023-) [Honors Thesis]
Grace Peterson (BS, 2023) [MCREU]

Committee Member

Duc Nguyen (MS, 2023)
Aravind Retna Kumar (PhD, 2023-)

TEACHING

Penn State University
EME 597: Data Analytics for Earth and Energy Systems (Fall 2022, 2023)
EME 210: Data Analytics for Energy Systems (Spring 2022-2024)
EGEE 102: Energy Conservation for Environmental Protection (Spring 2024)

Purdue University
IE 330: Probability and Statistics in Engineering II (Fall 2019)
EAPS 111: Physical Geology (Fall 2017)

PROFESSIONAL SERVICE

Professional and University Service

2024	Member, Diversity Council, College of Earth and Mineral Sciences
2023	Symposium Organizer on *Exploring multi-faceted impacts of climate change on energy infrastructure* (SRA: 12/2023)
2023-	PhD Qualifying Exam Evaluation, Department of Energy and Mineral Engineering, Penn State University
2022-2023	Online, Asynchronous Course Development, EME 210: Data Analytics for Energy Systems, Department of Energy and Mineral Engineering, Penn State University
2022-	Graduate Program Application Review, Department of Energy and Mineral Engineering, Penn State University
2022	Reviewer, Research Data Management Policy, Penn State University
2022-2023	Member, Faculty Search Committee, Earth and Environmental Systems Institute, Penn State University
2022-2024	Academic Advisor, Energy and Business Finance Program, Department of Energy and Mineral Engineering, Penn State University
2022-	Member, EESI Scholars Committee, Penn State University
2021	Instructor, Summer Data Science Institute, National Socio-Environmental Synthesis Center
2020-2022	Treasurer, Engineering and Infrastructure Specialty Group, Society for Risk Analysis
2019-2020	Symposium Organizer on: Assessing the resilience of urban systems under climate change (SRA: 12/2019); Building Sustainable Energy Systems under Climate Change (SRA: 12/2020)
2018-2019	Outreach and Social Committee Chair, Environmental and Ecological Engineering Graduate Student Organization, Purdue University
2017-2019	Graduate Assistant, Office of Interdisciplinary Graduate Programs, Purdue University
2016	Logistics and Catering Chair, 10th Annual Ecological Science and Engineering Symposium, Purdue University

<u>NSF Proposal Reviews</u>

2023	Panelist, Humans, Disasters, and the Built Environment (HDBE) Program
	Ad Hoc Reviewer, Decarbonization Technologies (SBIR)
2022	Ad Hoc Reviewer, Human-Environment and Geographical Sciences Program
	Panelist, Strengthening American Infrastructure (SAI) Program
2021	Panelist, Sustainable Regional Systems Research Networks
	Panelist, Large Scale Environmental Technology (SBIR/STTR)
2020	Ad Hoc Reviewer, Ecosystem Science Cluster

<u>Other Proposal Reviews</u>

2023	Ad Hoc Reviewer, Office of Biological and Environmental Research (BER) Climate Resilience Center (CRC) FOA (DOE)

<u>Journal Reviews</u>

2024	*Risk Analysis*, *Water Resources Management*, *Sustainable and Resilient Infrastructure*
2023	*Risk Analysis*, *Earth's Future*, *Sustainable and Resilient Infrastructure*, *Journal of Water Resources Planning and Management*, *Environmental Systems and Decisions*
2022	*Water Resources Management*, *Risk Analysis*, *Journal of Industrial Ecology*, *Journal of Urban Technology*, *Sustainable Production and Consumption*, *Journal of Infrastructure Systems*
2021	*Risk Analysis*, *Remote Sensing*, *Sustainability*, *Water*, *Journal of Management in Engineering*, *Journal of Infrastructure Systems*
2020	*Sustainability*, *Remote Sensing*, *Journal of Management in Engineering*
2019	*Earth's Future*, *Risk Analysis*, *Environmental Research Letters*, *Journal of Management in Engineering*, *Proceedings of the 2019 IISE Annual Conference*

ACADEMIC FELLOWSHIPS, AWARDS & HONORS

<u>Fellowships</u>

2020	National Socio-Environmental Synthesis Center Postdoctoral Fellowship (Proposal-Based; Award Amount: $204,724)
2019	Bilsland Dissertation Fellowship, Purdue University
2015	Andrews Fellowship, Purdue University

<u>Awards</u>

2020	Outstanding Graduate Student in Research, Ecological Science and Engineering Interdisciplinary Graduate Program, Purdue University
2020	Outstanding Service Award, College of Engineering, Purdue University
2019	Outstanding Research Award, College of Engineering, Purdue University
2019	Purdue University Office of Interdisciplinary Graduate Programs Travel Award
2019	Purdue Graduate Student Government Travel Grant
2019	Purdue Climate Change Research Center Travel Grant, Purdue University
2018	Engineering and Infrastructure Specialty Group Student Merit Award, Society for Risk Analysis
2018	Precourt Fellowship, Behavior, Energy and Climate Change
2017	Andrews Environmental Travel Grant, Purdue University

<u>Honors</u>

2024	Penn State nominee, Oak Ridge Associated Universities Ralph J. Powe Award
2023	Penn State nominee, Sloan Research Fellowship in Earth Systems Science
2023	Attendee, New Energy Summit, Irving Institute for Energy and Society, Dartmouth College
2023	Penn State nominee, Oak Ridge Associated Universities Ralph J. Powe Award
2022	Editor's Choice Paper, *Journal of Water Resources Planning and Management*
2022	Top Downloaded Article, *Earth's Future*

2021   Attendee, Building Future Faculty Workshop, North Carolina State University
2019   *Earth's Future* Editor's Choice for Excellence in Refereeing
2019   Attendee, NextProf Nexus Workshop, Georgia Institute of Technology

EDUCATIONAL OUTREACH & ENGAGEMENT

2023-   Mentor, Women+ in Statistics and Data Science, Pennsylvania State University

2023   Webinar Panelist, *Use of Systems Thinking Archetypes in Socio-Environmental Modeling*, National Socio-Environmental Synthesis Center

2022   Contributor for an online, open-source teaching resource, *Green Infrastructure: Urban Metabolism and Smart Cities*, National Socio-Environmental Synthesis Center

2022   First-Year Seminar Guest Lecture, College of Earth and Mineral Sciences, Penn State University

2022   Presentation at the College of Earth and Mineral Sciences Crescendo Weekend, Earth and Environmental Systems Institute Reception, Penn State University

2022   Poster Judge, Institute for Computational and Data Sciences Annual Symposium, Penn State University

2022   Poster Judge, Graduate Research Showcase, College of Earth and Mineral Sciences, Penn State University

2019   Presentation to the Purdue EEE External Advisory Committee, Purdue University

2019   Program Recruitment, Environmental and Ecological Engineering, Purdue University

2018   Science Fair Judge, Lafayette Regional Science and Engineering Fair

2017-2019   Program Recruitment, Ecological Science and Engineering Interdisciplinary Graduate Program, Purdue University

2016-2017   Peer Mentoring Program, Ecological Science and Engineering Interdisciplinary Graduate Program, Purdue University

2016   Spring Fest, Indiana State Climate Office, Purdue University

2015-2016   Educational Outreach with Noblesville Elementary, Indiana State Climate Office, Purdue University