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

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

RESEARCH INTERESTS & EXPERTISE

Methodological: data analytics, statistical learning techniques, predictive modeling, agent-based modeling

Applications: water-energy nexus, energy systems, climate change adaptation, critical infrastructure networks, smart cities, socio-technical systems

JOURNAL PUBLICATIONS

Published

1. 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., Arbabi, M., Davis, S.J., Ward, P., Svoboda, M., Pulwarty, R., and Kreibich, H. (accepted for publication) Toward impact-based monitoring of drought and its cascading hazards, *Nature Reviews of Earth and Environment*.
2. **Obringer, R.** and White, D.D. (2023) Leveraging unsupervised learning to develop a typology of residential water users' attitudes towards conservation, *Water Resources Management*.
3. **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*.
4. **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*.

5. **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*.
6. **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*.
7. **Obringer, R.**, Kumar, R., and Nateghi, R. (2020) Managing the water-electricity demand nexus in a warming climate, *Climatic Change*.
8. **Obringer, R.**, Mukherjee, S., and Nateghi, R. (2020) Evaluating the climate sensitivity of coupled electricity-natural gas demand using a multivariate framework, *Applied Energy.*
9. Paulvannan Kanmani, A., **Obringer, R.**, Rachunok, B., and Nateghi, R. (2020) Assessing global environmental sustainability via an unsupervised clustering framework, *Sustainability*.
10. **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.*
11. **Obringer, R.** and Nateghi, R. (2018) Predicting reservoir levels using statistical learning techniques, *Scientific Reports*.
12. 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*.
13. 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*.
14. 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>
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
<u>Chair</u>
Joy Adul (PhD, 2022-)
Vijay Chiluveru (MS, 2022-)
Simon Pezalla (BS, 2022) [MCREU]

Caden Vitti (BS, 2023-) [Honors Thesis]

Committee Member
 Duc Nguyen (MS, 2023-)

TEACHING
Penn State University
 EME 597: Data Analytics for Earth and Energy Systems (Fall 2022, 2023)
 EME 210/PNG 397: Data Analytics for Energy Systems (Spring 2022, 2023)

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

PROFESSIONAL SERVICE
Professional and University Service

2023	Member, PhD Qualifying Exam Committee, 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-	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

NSF Proposal Reviews

2023	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

Journal Reviews

2023	*Risk Analysis*
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

Fellowships
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

Awards
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

Honors
2023	Penn State nominee for the 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	Building Future Faculty Workshop (North Carolina State University) Finalist
2019	*Earth's Future* Editor's Choice for Excellence in Refereeing
2019	NextProf Nexus Workshop (Georgia Institute of Technology) Finalist

EDUCATIONAL OUTREACH & ENGAGEMENT

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

PROFESSIONAL AFFILIATIONS
- Society for Risk Analysis, Member
- United States Association for Energy Economics, Member