

KATHRYN B. NEWHART

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PROFESSIONAL EXPERIENCE

Oregon State University <i>Assistant Professor of Environmental Engineering</i>	June 2024 - Present <i>Corvallis, OR</i>
United States Military Academy <i>Assistant Professor of Environmental Engineering</i>	June 2021 - June 2024 <i>West Point, NY</i>
Metro Wastewater Reclamation District <i>Technology & Innovation Engineer Associate</i>	March 2020 - May 2021 <i>Denver, CO</i>

AFFILIATED INSTITUTIONS

Baylor University <i>Graduate School, Department of Statistical Science</i>	2023 - Present <i>Waco, TX</i>
Colorado School of Mines <i>Department of Civil and Environmental Engineering</i>	2020 - Present <i>Golden, CO</i>

TEACHING

<i>Institution</i>	<i>Course</i>	<i>Title (Credit Hours)</i>	<i>Semesters</i>
USMA	EV201 ¹	Introduction to Environmental Engineering (3)	2
USMA	EV350 ²	Environmental Engineering Technologies (3)	1
USMA	EV401 ¹	Physical and Chemical Treatment (3.5)	3
USMA	EV450 ²	Environmental Engineering for Sustainable Development (3)	3
USMA	EV490/491 ²	Environmental Engineering Design (Capstone) (3)	5
USMA	XE365 ³	Advanced Experimental Methods & Data Processing (3)	1
RRCC	WQM42 ¹	Water Data Management & Analysis (3)	1
CSM	CEE 470/570 ³	Unit Processes for Water and Wastewater Treatment (3)	3
CSM	CEE 471/571 ³	Advanced Water Treatment and Reclamation (3)	1
CSM	CEE 330 ³	Field Session for Environmental Engineering (3)	3

¹ Course director, ² Instructor, ³ TA / Guest lecturer

EDUCATION

Doctor of Philosophy <i>Civil and Environmental Engineering</i>	2018 - 2020 <i>Colorado School of Mines, Golden, CO</i>
· Dissertation: "Data-driven process control of municipal wastewater treatment"	
· Advisors: Prof. Tzahi Cath and Prof. Amanda Hering (Baylor University)	
Master of Science <i>Civil and Environmental Engineering</i>	2016 - 2018 <i>Colorado School of Mines, Golden, CO</i>
Bachelor of Science <i>Environmental Engineering</i>	2013 - 2016 <i>Colorado School of Mines, Golden, CO</i>

PUBLICATIONS

12. Black, A., **Newhart, K.**, Linvill, C., Pytlar, A., Galaitsi, S., Fairfield, C., Wait, M., Bennett, E., Butkus, M., “Examination of the water-energy nexus: linguistic analysis of energy terminology in the wastewater literature,” *Environmental Challenges*, 2024, *in review*.
11. Grimm, T.R., Branch, A., Thompson, K.A., Salevon, A., Zhao, J., Johnson, D., Hering, A.S., **Newhart, K.B.**, “Long-term Statistical Process Monitoring of an Ultrafiltration Water Treatment Process,” *ACS ES&T Engineering*, 2024, DOI: 10.1021/acsestengg.4c00042
10. **Newhart, K.B.**, Klanderman, M.C., Hering, A.S., Cath, T.Y., “A holistic evaluation of multivariate statistical process monitoring in a biological and membrane treatment system,” *ACS ES&T Water*, 2023, DOI: 10.1021/acsestwater.3c00058
9. Martin, M., Goethals, P., **Newhart, K.**, Rhodes, E., Vogel, J., Stevenson, B., “Optimization of sewage sampling for wastewater-based epidemiology through stochastic modeling,” *J. Eng. Appl. Sci.*, 2023, 70, 11.
8. **Newhart, K.B.**, Pfluger, A.R., Butkus, M.A., “The Green Escape Room: Part 2 – Teaching Students Professional Engineering Ethics by Applying Environmental Engineering Principles and Deciphering Clues and Puzzles.” Paper presented at *2022 ASEE Annual Conference & Exposition*, Minneapolis, MN, 2022.
7. **Newhart, K.B.**, Hering, A.S., Cath, T.Y., “Data science tools to enable decarbonized water and wastewater treatment systems,” *Pathways to Water Sector Decarbonization, Carbon Capture and Utilization*, edited by Z. Jason Ren and Krishna Pagilla, IWA Publishing, 2022.
6. **Newhart, K.B.**, Goldman-Torres, J., Wisdom, B., Freedman, D., Hering, A.S., Cath, T.Y., “Real-time dose control of peracetic acid disinfection in municipal wastewater treatment,” *ACS ES&T Water*, 2021, 1, 2, 328–338
5. **Newhart, K.B.**, Marks, C.A., Rauch-Williams, T., Cath, T.Y., Hering, A.S. “Hybrid statistical-machine learning ammonia forecasting in continuous activated sludge treatment for improved process control,” *Journal of Water Process Engineering*, 2020, 37, 101389
4. Klanderman, M., **Newhart, K.B.**, Cath, T.Y., Hering, A.S., “Fault isolation for a complex decentralized wastewater treatment facility,” *Journal of the Royal Statistical Society, Series C.*, 2020, 69, 931-951.
3. **Newhart, K.B.**, Holloway, R.W., Hering, A.S., Cath, T.Y., “Data-driven performance analyses of wastewater treatment plants: A review,” *Water Research*, 2019, 157, 498-513
2. Odom, G.J., **Newhart, K.B.**, Cath, T.Y., Hering, A.S., “Multi-state multivariate statistical process control,” *Applied Stochastic Models in Business and Industry*, 2018, 34(6), 880-892
1. Bell, E.A., Poynor, T.E., **Newhart, K.B.**, Regnery, J., Coday, B.D., Cath, T.Y., “Produced water treatment using forward osmosis membranes: evaluation of extended-time performance and fouling,” *Journal of Membrane Science*, 2017, 525, 77-88.

RESEARCH

“Unlocking the Nationwide Potential of Water Reuse,” U.S. Environmental Protection Agency, National Priorities: Water Innovation, Science, and Engagement to Advance Water Reuse. EPA-G2021-ORD&EI. Awarded 2023. Total award \$4,000,000. Research Partner at West Point.

“Data-driven Fault Detection and Process Control for Potable Reuse with Reverse Osmosis,” National Alliance for Water Innovation, Autonomous Water and Precision Separations. NAWI-2-2021. Awarded 2022. Total award \$1,034,000. Principal Investigator at West Point.

“Crossing the Finish Line: Integration of Data-Driven Process Control for Maximization of Energy and Resource Efficiency in Advanced Water Resource Recovery Facilities,” U.S. Department of Energy, Research and Development for Advanced Water Resource Recovery Systems. DE-FOA-0002336. Awarded 2021. Total award \$2,400,000. Principal Investigator at West Point.

“Advancing Energy Resilience through Demonstrating, Characterizing, and Modeling Anaerobic Co-digestion of Organic Wastes for Widespread Implementation on DOD Installations.” U.S. Department of Defense, Environmental Security Technology Certification Program. Total award \$925,000. co-Principal Investigator.

WORKSHOPS

“Defining Pathways for Solving Environmental Challenges using Machine Learning” *AEESP Annual Conference*, 2023, Organizer

“A Convergence of WRF Machine Learning Based Controller Implementation and Research” *WEF/IWA Innovations in Process Engineering*, June 6, 2023, Facilitator and presenter

“Visualization, Analysis, and Modeling in R for the Water Professional” *MoWaTER PRO: Data Science Workshop*, 2021 & 2022, Organizer

“Machine Learning in the Water Industry” *WEF/IWA Innovations in Process Engineering*, June 8, 2021, Organizer

“Understanding and Embracing Machine Learning, Artificial Intelligence and Predictive Analytics,” *AWWA/SWAN International Smart Water Symposium*, November 10, 2020, Facilitator and presenter

“Data Research Advances Water Industry,” *NSF Mid-scale Research Infrastructure Workshop for Intelligent Water Systems*, August 25, 2020, Virtual, Facilitator and presenter

INVITED TALKS

“Machine Learning to the Rescue: Mining data to optimize water reclamation disinfection.” *Water Environment Federation*, June 13, 2024, Webcast, Presenter

“Process Modeling and Machine Learning – Selecting the Right Tool(s) for Troubleshooting and Optimization,” *Water Environment Federation*, November 30, 2023, Webcast, Presenter

“Artificial Intelligence in the Water Industry” *Orange County Water District*, August 1, 2023, Webcast, Presenter, URL

“Understanding and Embracing Machine Learning, Artificial Intelligence and Predictive Analytics” *Metropolitan Water Reclamation District of Greater Chicago*, June 30, 2023, Seminar

“A Hypothetical – Potable Reuse Moves Towards Artificial Intelligence,” *36th Annual WateReuse Symposium*, March 1, 2021, Panelist

SELECT CONFERENCE PRESENTATIONS

“Prediction of Post-Secondary E. coli for Disinfection Control: Application of statistical and machine learning algorithms.” *WEF/IWA Innovations in Process Engineering*, June 9, 2023, Portland, OR

“Predictive Control in Wastewater Treatment Facilities Using Simple Statistical Models,” *South Platte Coalition for Urban River Evaluation: Confluence at the Confluence*, Oct 15, 2019, Englewood, CO

“Energy Reduction in Municipal Wastewater Treatment,” *Colorado Industrial Pretreatment Coordinators Association Fall Conference*, Oct 18, 2019, Black Hawk, CO

“Predictive Modeling and Performance Assessment of Ammonia-Based Aeration Control,” *Water Environment Federation Technical Exhibition and Conference (WEFTEC)*, Sept 23, 2019, Chicago, IL

“A Utility Perspective: Practical Considerations of Operating and Advancing Ammonia-Based Aeration Control,” *July 10, 2019, RMWEA Innovation Seminar*, Denver, CO

“Fault Detection Using PCA at a Municipal Wastewater Treatment Facility,” *July 30, 2019, Joint Statistical Meeting*, Denver, CO

“Performance Evaluation of a Sequencing Batch Membrane Bioreactor Using Principal Component Analysis,” *Annual WateReuse Symposium*, Sept 11, 2017, Phoenix, AZ

“Use of Principal Component Analysis for Early-Fault Detection in a Pilot-Scale Biological Wastewater Treatment System,” *Quality and Productivity Research Conference*, June 14, 2017, Storrs, CT

NON-REFEREED PUBLICATIONS

Weintraut, Z., **Newhart, K.**, Thompson, K., Roostaei, J., “Are you ready for big data? A checklist for readiness for data analytics in water utilities,” *Journal AWWA*, 2022, 114, 10, 78-82

Newhart, K.B. & Avila, I., “NDMA: relevance and regulatory status for drinking water facilities,” *Rocky Mountain Water*, November 2017

LEADERSHIP

Chair, National Water Research Institute (NWRI) Independent Expert Panel, supporting *Data-Driven Fault Detection and Process Control for Potable Reuse with Reverse Osmosis Project*

President, NSF ReNUWIt Engineering Research Center Student Leadership Committee, 2018 – 2019

President, CSM Campus Chapter of the Rocky Mountain Section of the American Water Works Association (RMSAWWA)/Rocky Mountain Water Environment Association (RMWEA), 2018 – 2019

Co-Chair, 15th Annual RMSAWWA/RMWEA Joint Student Conference, 2018

SERVICE

Institution (USMA)

- Department representative, Admissions Committee, September 2023– present
- Coordinator, Environmental Program Faculty Seminar Series, September 2023– present
- Faculty representative, Cycling (club), September 2023 – present
- Faculty representative, Women’s Tennis (NCAA Division I), January 2022 – present
- Department representative, Superintendent’s Civilian Faculty Advisory Council, January 2022 – May 2022

Professional

- Early Career Board, ACS Environmental Science & Technology Engineering, January 2024 – present
- Editorial Advisory Team, ACS Environmental Science & Technology Water, June 2022 – present
- Referee, ACS Environmental Science & Technology Engineering; Environmental Science: Water Research & Technology; Resources, Conservation & Recycling; Water Environment Research; Water Research (IWA); Journal of Water & Health
- Technology Reviewer, Water Research Foundation TechLink, January 2022 – present
- Member, AWWA Water Science & Research Division, Information Management & Technology, 2021 – present

IN THE NEWS

Newhart, K. B., Marks, C., Rauch-Williams, T., Cath, T. Y., Hering, A. S. (2020) “Boulder tests its waters with predictive aeration control,” *Advances in Water Research*, 30: 25–28. URL.

AWARDS

ASEE Environmental Engineering Division Early Career Award, 2022

ACS Publications Peer Reviewer, Certificate of Recognition, 2022

WEF/WRF LIFT Intelligent Water System Challenge, 1st place, 2019

AWRA-Colorado Rich Herbert Memorial Scholarship, 2019

CERTIFICATIONS

Wastewater Operator, Class D, Colorado, 2016-2024

Fundamentals of Engineering (FE), Environmental, Colorado, NCEES ID 16-475-7