



Dr. Peter Watson

www.docwatson.ai

[LinkedIn](#)

SUMMARY

Dr. Watson is an Infrastructure Scientist at Los Alamos National Laboratory, where he works on projects that quantify the impacts that weather can have on critical infrastructural systems with an emphasis on the power grid, natural gas pipelines, and other national critical functions. Using a blend of data science, geospatial analysis, and earth science he is able to create predictive models that estimate the amounts and types of damage that storms can have on the systems that support our way of life. He is passionate about innovation, education, international cooperation, and creating practical solutions and information that address real problems.

EDUCATION

Doctor of Philosophy

Environmental Engineering (GPA: 4.024)

University of Connecticut

January 2022

RESEARCH: *Advancing Weather-Related Power Outage Prediction*, a in-depth examination of the strength and weaknesses of current empirical approaches for weather-related power outage prediction, including several methods that can be used address the identified weaknesses.

Master of Science

Environmental Engineering (GPA: 4.04)

University of Connecticut

May 2018

RESEARCH: *Wastewater Treatment Plant Resilience Study*, an evaluation of the resilience and adaptive capacity of wastewater treatment systems in Connecticut using surveys and personal interviews of management staff.

Bachelor of Arts

Environmental Studies (GPA: 3.42)

University of Chicago

June 2006

PROFESSIONAL EXPERIENCE

Infrastructure Staff Scientist 2

Los Alamos National Laboratory, Los Alamos NM

January 2023 – Current

SUMMARY: Applying state of the art techniques and environmental datasets to support the resilience of American infrastructure and critical national systems.

Postdoctoral Researcher

University of Connecticut, Storrs CT

January 2022 – December 2022

SUMMARY: Developing predictive models for applications in estimating the effects of adaptive change using a hybrid structural analysis and machine learning methodology.

Lab Instructor

University of Connecticut, Storrs CT

January 2020 – May 2020

SUMMARY: Taught the laboratory portion of an undergraduate fluid mechanics course to five sections of students.

Doctoral Student Researcher

Los Alamos National Laboratory, Los Alamos NM

June 2019 – December 2020

SUMMARY: Developed a national-scale tropical storm power outage model as part of the National Infrastructure Simulation and Analysis Center (NISAC).

Founder

Whether Inc, Stamford CT

June 2018 – March 2022

SUMMARY: Founded and managed a start-up company engaged in finding a market for weather-related predictive analytics and infrastructure impact models.

Graduate Research Assistant - Power Outage Prediction

University of Connecticut, Storrs CT

June 2017 – June 2021

SUMMARY: Developed improvements and new architectures for a power outage prediction system that is operational for two electrical power distribution utilities.

Graduate Research Assistant - Wastewater Resilience

University of Connecticut, Storrs CT

June 2015 – June 2017

SUMMARY: Interviewed wastewater treatment plant managers and analyzed data for a wastewater system resilience study.

MCAT Test Preparation Instructor

Kaplan, Storrs CT

March 2014 – July 2015

SUMMARY: Taught MCAT test preparation to premedical students.

English Instructor & Teacher Trainer

Miyagi, Japan

March 2007 – March 2012

SUMMARY: Taught English as a Second Language in Japan to students of wide range of abilities, and also had management duties including onsite training in schools around Tohoku and interviewing candidates for teaching positions.

System Administrator

University of Chicago Computer Science Department, Chicago IL

April 2004 – December 2006

SUMMARY: Maintained the computers and servers of large instructional computer lab.

COMMUNITY ENGAGEMENT

Judge

Supercomputing Challenge, Los Alamos NM

April 2023

SUMMARY: Judge student entries into a regional supercomputing and programming competition.

President

Japan Society of Greater Hartford, Glastonbury CT

January 2020 – December 2022

SUMMARY: Managed a non-profit organization with approximately 100 members devoted to promoting Japanese cultural awareness and community in Central Connecticut.

FUNDED PROPOSALS

| | |
|--|-------------|
| Weather Outage Prediction Model | \$500,000 |
| University of Connecticut from Los Alamos National Laboratory Subaward | 2021 – 2024 |
| Long-Term Resilience Sensitivity Model for Power Grids | \$40,000 |
| University of Connecticut from Electric Power Research Institute | 2022 |

PEER-REVIEWED ARTICLES

A Data-Driven Decision Support Tool for Anticipating Tropical Storm Impacts to the United States Power Grid. PL Watson, D Pasqualini, EN Anagnostou. IEEE Access (2024). [IN REVIEW]

Integrating Structural Vulnerability Analysis and Data-Driven Machine Learning to Evaluate Storm Impacts on The Power Grid. PL Watson, W Hughes, D Cerrai, W Zhang, A Bagtzoglou, E Anagnostou. IEEE Access (2024). DOI: [10.1109/ACCESS.2024.3396414](https://doi.org/10.1109/ACCESS.2024.3396414)

A Framework for Predicting High Impact Weather-Related Outage Events. PL Watson, A Spaulding, M Koukoula, and EN Anagnostou. Weather and Climate Extremes (2022). DOI: [10.1016/j.wace.2022.100487](https://doi.org/10.1016/j.wace.2022.100487)

Influence of the Characteristics of Weather Information in a Thunderstorm-Related Power Outage Prediction System. PL Watson, M Koukoula, and EN Anagnostou. Forecasting (2021). DOI: [10.3390/forecast3030034](https://doi.org/10.3390/forecast3030034)

A Weather-Related Power Outage Model with a Growing Domain: Structure, Performance, and Generalizability. PL Watson, D Cerrai, and EN Anagnostou. The Journal of Engineering (2020). DOI: [10.1049/joe.2019.1274](https://doi.org/10.1049/joe.2019.1274)

Assessment of Grid Hardening Strategies to Improve Power Distribution System Resilience Using a Hybrid Mechanistic-Machine Learning Outage Prediction Model Corresponding. W Hughes; PL Watson, D Cerrai, X Zhang, A Bagtzoglou, EN Anagnostou. Reliability Engineering & System Safety (2024). DOI: [10.1016/j.ress.2024.110169](https://doi.org/10.1016/j.ress.2024.110169)

Dynamic Modeling of the Effects of Vegetation Management on Weather-Related Power Outages. WO Taylor, PL Watson, D Cerrai, and EN Anagnostou. Electric Power Systems Research (2022). DOI: [10.1016/j.epsr.2022.107840](https://doi.org/10.1016/j.epsr.2022.107840)

A Statistical Framework for Evaluating the Effectiveness of Vegetation Management in Reducing Power Outages Caused during Storms in Distribution Networks. WO Taylor, PL Watson, D Cerrai, EN Anagnostou. Sustainability (2022). DOI: [10.3390/su14020904](https://doi.org/10.3390/su14020904)

Dynamic Modeling of Power Outages Caused by Thunderstorms. B Alpay, D Wanik, PL Watson, et al. Forecasting (2020). DOI: [10.3390/forecast2020008](https://doi.org/10.3390/forecast2020008)

Enhancing Weather-Related Power Outage Prediction by Event Severity Classification. F Yang, PL Watson, M Koukoula, and EN Anagnostou. IEEE Access. DOI: [10.1109/ACCESS.2020.2983159](https://doi.org/10.1109/ACCESS.2020.2983159)

Outage Prediction Models for Snow and Ice Storms. D Cerrai, M Koukoula, PL Watson, et al. Sustainable Energy, Grids and Networks. DOI: [10.1016/j.segan.2019.100294](https://doi.org/10.1016/j.segan.2019.100294)

Assessing the Effects of a Vegetation Management Standard on Distribution Grid Outage Rates. D Cerrai, PL Watson, EN Anagnostou. Electric Power Systems Research (2019). DOI: [10.1016/j.epsr.2019.105909](https://doi.org/10.1016/j.epsr.2019.105909)

Are Wastewater Systems Adapting to Climate Change?. CJ Kirchhoff, PL Watson. Journal of the American Water Resources Association (2019). DOI: [10.1111/1752-1688.12748](https://doi.org/10.1111/1752-1688.12748)

Recognizing high-priority disinfection byproducts based on experimental and predicted endocrine disrupting data: Virtual screening and in vitro study. S Sui, N Zhou, H Liu, PL Watson, X Yang. *Chemosphere* (2024). DOI: [10.1016/j.chemosphere.2024.142239](https://doi.org/10.1016/j.chemosphere.2024.142239)

Application of passive sampling device for exploring the occurrence, distribution, and risk of pharmaceuticals and pesticides in surface water. X Yu, Y Wang, PL Watson, X Yang, H Liu. *Science of the Total Environment* (2023). DOI: [10.1016/j.scitotenv.2023.168393](https://doi.org/10.1016/j.scitotenv.2023.168393)

Changes of the acute and chronic toxicity of three antimicrobial agents to *Daphnia magna* in the presence/absence of micro-polystyrene. C Yin, X Yang, T Zhao, PL Watson, F Yang, H Liu. *Environmental Pollution* (2020). DOI: [10.1016/j.envpol.2020.114551](https://doi.org/10.1016/j.envpol.2020.114551)

Binding interactions of halo-benzoic acids, halo-benzenesulfonic acids and halo-phenylboronic acids with human transthyretin. Y Xi, X Yang, H Zhang, H Liu, PL Watson, F Yang. *Chemosphere* (2020). DOI: [10.1016/j.chemosphere.2019.125135](https://doi.org/10.1016/j.chemosphere.2019.125135)

A cyclodextrin polymer membrane-based passive sampler for measuring triclocarban, triclosan and methyl triclosan in rivers. M Wei, X Yang, PL Watson, F Yang, H Liu. *Science of The Total Environment* (2019). DOI: [10.1016/j.chemosphere.2019.125135](https://doi.org/10.1016/j.chemosphere.2019.125135)

Development of QSAR model for predicting the inclusion constants of organic chemicals with α -cyclodextrin. M Wei, X Yang, PL Watson, F Yang, H Liu. *Environmental Science and Pollution Research* (2018). DOI: [10.1016/j.chemosphere.2019.125135](https://doi.org/10.1016/j.chemosphere.2019.125135)

PATENTS

Infrastructure Resilience Estimation and Assessment System. PL Watson, EN Anagnostou, D Cerrai, W Zhang, W Hughes, W Taylor, A Bagtzoglou. [US20240061735A1](https://patents.google.com/patent/US20240061735A1). U.S. Patent and Trademark Office. Non-Provisional Patent Filed August 2023.

System and Method for Damage Assessment and Restoration. PL Watson, D Cerrai, EN Anagnostou. [US20200160283A1](https://patents.google.com/patent/US20200160283A1). U.S. Patent and Trademark Office. Filed November 2019. Granted June 2022.

CONFERENCES & PRESENTATIONS

Using Machine Learning to Save the Earth: Adventures in Data Analysis. PL Watson. Supercomputing Challenge Expo. Los Alamos, NM. Invited Presentation: April 24th 2023.

Quantifying Outage Reductions Due to Resilience Improvements. PL Watson, W Hughes, A Bagtzoglou, W Zhang, D Cerrai, EN Anagnostou. Navigating Climate Change & Energy Security in the Northeast. Hartford, CT. Poster Presentation: October 24th 2022.

Weather-Related Power Outage Prediction: An Application of Data-Driven Impact Modeling. PL Watson. Fermat Capital. Westbrook, CT. Invited Presentation: June 21st 2022.

Weather-Related Power Outage Prediction: An Application of Machine-Learning and Impact Modeling. PL Watson, D Cerrai, and EN Anagnostou. Battelle Conference on Innovations in Climate Resilience. Oral Presentation: March 29th 2022. [\[URL\]](#)

A Modeling Framework for Predicting the Impacts of Extreme Weather Events on Power Infrastructure. PL Watson, A Spaulding, M Koukoulou, and EN Anagnostou. American Geophysical Union Fall Meeting 2021. Oral Presentation: December 15th 2021.

Using AI to Interpret Weather and Create Situational Intelligence for Storm Responders. PL Watson and V Jayachandran. Invited Seminar for NOAA UFS Group: December 17th 2020.

Studying the Tree Trimming Effects on Power Grid Resilience Using Weather and Outage Models. PL Watson, D Cerrai, EN Anagnostou. American Meteorological Society Annual Meeting 2020. Oral Presentation: Jan 14th 2020.

Building Impact Forecasting Systems Based-On Numerical Weather Prediction Models. PL Watson, D Cerrai, F Yang, M Koukoura, EN Anagnostou. Invited Seminar at Argonne National Lab: October 30th 2019.

Applying Transfer Learning to Improve Machine Learning Impact Model at Extremes. PL Watson. Japan Geoscience Union Meeting 2019. Oral Presentation: May 29th 2019.

Effects of the Structure of Training Regime on a Machine-Learning based Power Outage Model. PL Watson. American Geophysical Union Fall Meeting 2018. Poster Presentation: December 10th 2018.

ADDITIONAL PROFESSIONAL ACTIVITY

Academic Reviews

- Nature Energy
- Scientific Reports
- Environmental Science: Atmospheres
- CRC Press
- Risk Analysis
- IEEE Transactions on Industrial Informatics
- Natural Hazards and Earth System Sciences
- Stochastic Environmental Research and Risk Assessment
- Open Research Europe
- Sustainability
- Energies
- Atmosphere
- Water
- Journal of Hydrology
- PES Innovative Smart Grid Technologies

Research Exchange Visits

Disaster Prevention Research Institute at Kyoto University. Tetsuya Takemi, et al. July 2018.

SKILLS

- **Programming:** R, Python, Julia, R Shiny, SLURM, MPI, HTML, CSS, SQL, \LaTeX
- **Computing:** High Performance Computing, GIS Software, Linux System Administration, Systems Hardware
- **Data Science:** Predictive Analytics, Decision Support, Machine Learning, Geospatial Analysis
- **Language:** Native Speaker of English, Fluent in Japanese

AWARDS

UCONN Department of Environmental Engineering Pre-Doctoral Fellowship Spring 2018

UCONN Graduate Student Fellowship in Engaged Scholarship Spring 2016

MEDIA

1663 Magazine (2022). Fortifying for Extreme Weather. discover.lanl.gov/publications/1663/february-2022/fortifying-for-extreme-weather

Stamford Advocate (2021). ‘A very nurturing environment’: UConn aims to fuel economic growth with Stamford startup incubator. www.stamfordadvocate.com/business/article/A-very-nurturing-environment-UConn-aims-to-16001465.php

ADDITIONAL QUALIFICATIONS

Argonne Training Program on Extreme Scale Computing (ATPESC). Chicago, IL. August 2022.

Entrepreneurs Roundtable Accelerator (ERA). New York, NY. Summer 2021

Current Holder of a Department of Energy Q Clearance

PERSONAL INTERESTS

Historical Home & Automotive Restoration, 3D Printing & Making, Japanese Language & Culture, Film