Dr. Peter Watson

SUMMARY

Dr. Watson is a Postdoctoral Researcher at the University of Connecticut, where he works on projects that quantify the impacts that weather can have on infrastructural systems with an emphasis on the electrical power grid. Using a blend of data science, machine learning, 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, international cooperation, and creating practical solutions and information that address real problems.

EDUCATION

Doctor of Philosophy   University of Connecticut
Environmental Engineering (GPA: 4.024)   January 2022

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

Master of Science   University of Connecticut
Environmental Engineering (GPA: 4.04)   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   University of Chicago
Environmental Studies (GPA: 3.42)   June 2006

PROFESSIONAL EXPERIENCE

Postdoctoral Researcher
University of Connecticut, Storrs CT   January 2022 – Current

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

Guest Scientist
Los Alamos National Laboratory, Los Alamos NM   January 2022 – Current

SUMMARY: Contining development of a large scale power outage prediction system for the Continental United States.

Chief Technical Officer
Whether Inc, Stamford CT   January 2021 – October 2021

SUMMARY: Served as technical lead for a start-up company looking for new applications for impact models.

Chief Executive Officer

Whether Inc, Stamford CT   June 2020 – January 2021

SUMMARY: Managed a start-up company engaged in developing a technical proof-of-concept based on in-house intellectual property.

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 a start-up company engaged in finding a market for weather-related predictive analytics.

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 retail power 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 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 ENGAGMENT

President

Japan Society of Greater Hartford, Glastonbury CT   January 2020 – Current

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

FUNDING

Principle Investigator

PEER-REVIEWED ARTICLES

A Framework for Predicting High Impact Weather-Related Outage Events. PL Watson, A Spaulding, M Koukoula, and EN Anagnostou. Weather and Climate Extremes. [Submitted December 2021]

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

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

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

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

Dynamic Modeling of Power Outages Caused by Thunderstorms. B Alpay, D Wanik, PL Watson, et al. Forecasting (2020). DOI: 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

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

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

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

PATENTS

System and Method for Damage Assessment and Restoration PL Watson, D Cerrai, EN Anagnostou. US20200160283A1. U.S. Patent and Trademark Office. Filed November 2019. Granted May 2022.

CONFERENCES & PRESENTATIONS

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.

A Modeling Framework for Predicting the Impacts of Extreme Weather Events on Power Infrastructure PL Watson, A Spaulding, M Koukoula, 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 Anagnstou. 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 Koukoula, 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

Reviewer for Academic Journals

- Risk Analysis
- Open Research Europe
- Journal of Hydrology
- IEEE Transactions on Industrial Informatics
- Natural Hazards and Earth System Sciences
- Stochastic Environmental Research and Risk Assessment

Research Exchange Visits
Disaster Prevention Research Institute at Kyoto University. Tetsuya Takemi, et al. July 25th to August 3rd 2018.

SKILLS

- **Programming:** R, Python, R Shiny, SLURM, MPI, HTML, CSS, SQL, LaTeX
- **Computing:** High Performance Computing, 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