Connor Robertson

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Education

PhD - Applied Mathematics *2018 - 2023*
New Jersey Institute of Technology

BS - Applied and Computational Mathematics *2011 - 2018*
Brigham Young University

Experience

Postdoctoral Researcher *2023 - Present*
Sandia National Laboratories *Livermore, CA*

Bayesian inference for agent-based epidemic models. Developing efficient ways to align models with observed data from COVID-19 and quantify model uncertainty with Bayesian and variational inference. Includes time series analysis, random forests, gaussian processes, neural network based differential equations, Markov chain monte carlo, and Stein variational inference.

Doctoral Researcher *2019 - 2023*
New Jersey Institute of Technology *Newark, NJ*

Machine learned symbolic modeling for complex fluids. Determining the governing partial differential equation of a complex fluid system directly from experimental videos. Includes video and image processing, feature generation, sparse regression, modeling of a complex system, and aligning simulation with observation.

Graduate Student Research Awardee *2021 - 2022*
Oak Ridge National Laboratory (SCGSR) *Remote*

Recurrent neural network forecasting for bacterial growth and interactions. Modified video frame prediction recurrent neural networks to simulate interactions of mutant and natural bacterial strains to predict population and colony growth. Included video and image processing, time series analysis, and recurrent neural networks.

Co-founder *2018*
Coventina LLC. *Provo, UT*

Prediction of water main breaks for water utilities. Developed and presented data pipeline and machine learning toolkit to forecast water main breaks for public works departments in Utah County. Included data collection from various public and private sources, cleaning, imputation, regression and tree-based modeling, and physical feature creation.

Project Assistant *2016 - 2018*
Brigham Young University *Provo, UT*

Included use of network theory in operations research and statistical modeling to optimize water infrastructure in developing countries. Wrote and edited programming assignments in data science and numerical computing including: web scraping, noSQL, optimization, and linear algebra. Managed lab of Red Hat linux computers.

Qualifications and Skills

Programming Languages	**Python**, **Julia**, R, SQL, Matlab, Mathematica, C++
Open Source Contributions	**TidierPlots.jl, TidierData.jl** - implementation of R packages ggplot2, dplyr in Julia
Spoken Languages	**English**, Spanish

Honors

2023 **Outstanding Graduate Student Award,** College of Science and Liberal Arts - NJIT
2023 **Chair: Machine Learning & Optimization Seminar,** Department of Mathematical Sciences - NJIT
2023 **DSECOP Fellow,** Data Science Education Community of Practice - APS
2021 **Ahluwalia Doctoral Fellowship,** Deparment of Mathematical Sciences - NJIT
2020 **(Honorable mention) Graduate Research Fellowship Program,** National Science Foundation

Conferences

Talks

Bayesian Calibration of Stochastic Agent Based Model via PCA Based Surrogate Modeling *2024*
SIAM Conference on Uncertainty Quantification *Trieste, Italy*

Data-driven continuum modeling of active nematics via sparse identification of nonlinear dynamics *2023*
SIAM Conference on Computational Science and Engineering *Amsterdam, Netherlands*

Data-driven continuum modeling of active nematics via sparse identification of nonlinear dynamics *2022*
Annual Meeting of the APS Division of Fluid Dynamics (APS DFD) *Indianapolis, Indiana*

Data-driven continuum modeling of active nematics via sparse identification of nonlinear dynamics *2022*
Annual Meeting of the American Physical Society (APS March) *Chicago, Illinois*

Neural networks for function approximation and data-driven modeling *2021*
Machine Learning and Optimization Seminar - Department of Mathematical Sciences NJIT *Newark, New Jersey*

Facility location using Markov chains *2018*
CPMS Student Research Conference - Brigham Young University *Provo, Utah*

Efficiency of Water Distribution in Water Poor Areas of the World *2017*
Student Days - SIAM Annual Meeting *Pittsburgh, Pennsylvania*

Posters

Data-driven discovery of PDEs for active nematic systems *2022*
National Academy of Inventors - NJIT Chapter Workshop *Newark, New Jersey*

Discovering governing equations of an active nematic system using PDE-Find *2020*
GAMM Juniors' Summer School *(virtual) Magdeburg, Germany*

Aligning Self-Propelling Particles in Non-trivial Domains *2019*
Frontiers in Applied and Computational Mathematics *Newark, New Jersey*

Organization

Department of Mathematical Sciences - NJIT *2022 - 2023*
Machine Learning and Optimization Seminar Chair *Newark, New Jersey*

https://cnrrobertson.github.io/other/mlseminar/mlseminar.html

Publications

Performing Video Frame Prediction of Microbial Growth with a Recurrent Neural Network *2023*
Frontiers in Microbiology: Systems Microbiology *Click to open*

Investigating the growth of an engineered strain of Cyanobacteria with an Agent-Based Model and a Recurrent Neural Network *2021*
bioRxiv *Click to open*

Using Survey Data and Mathematical Modeling to Prioritize Water Interventions in Developing Countries *2021*
Water Resource Management *Click to open*

Professional Associations

Society for Industrial and Applied Mathematics *2017 - Present*
American Physical Society *2022 - 2024*