Connor Robertson

Data Scientist

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Postdoctoral researcher specializing in computational data science. Strong foundation in mathematics, high performance computing, and software development for a variety of physical applications. Proficient in Python, Julia, R, and Matlab, and comfortable working with remote/cloud Unix systems and with reporting and visualization for non-technical stakeholders.

Experience

Postdoctoral Researcher

Sandia National Laboratories - Computational Data Science

2023 Aug. – Present Remote

- Led project to calibrate epidemiological agent-based models of COVID-19 to match historical time-series data with Bayesian inference.
- Improved computational efficiency of simulations using random forest, gaussian process, and neural ordinary differential equation modeling.
- Learned new technologies and tools in uncertainty quantification during project.

PhD Researcher

New Jersey Institute of Technology - Department of Mathematical Sciences

2019 Sep. – 2023 May Newark, NJ

- Independently executed project using symbolic sparse regression for interpretable partial differential equation modeling of active nematic fluid systems directly from video experiments.
- Developed video and image processing to extract orientation and velocity data features from video data for physics-guided feature engineering.

Graduate Student Researcher

Oak Ridge National Laboratory - Center for Nanophase and Material Science

2021 May – 2022 Jan. Remote

- Project lead to forecast growth and interaction of mutant bacterial strains with spatially-modified LSTM recurrent neural networks.
- Video and image processing to validate model performance against experimental data and to deploy on local experimental equipment.

Data Scientist

Coventina LLC -

2018 Jan. – 2018 Dec. Provo, UT

- Piloted beta project to automatically generate reports for city utilties providing forecasting of water main breaks via text and visualization to non-technical stakeholders.
- Fused internal and external data sources including soil conditions, usage, and weather to develop physics-guided features for pipe conditions.
- Developed code toolkit to balanced datasets, ensure data quality, and to provide regression and tree-based models for prediction.
- Balanced feedback and technical limitations to achieve business-aligned outcomes.

Curriculum Developer

Brigham Young University - Department of Mathematics

2016 Sep. – 2018 Apr. Provo, UT

- Collaborated with group of professors and students to develop and write Python programming assignments teaching data science and numerical computing.
- Research involved the use of network and graph theory to model optimal locations for new water infrastructure in developing countries.

Objective

Seeking to collaboratively build innovative and impactful products.

Education

New Jersey Institute of Technology

2018 - 2023 Newark, NJ

PhD in Applied Mathematics

Brigham Young University

2011 - 2018 Provo, UT

BS in Computational Mathematics

Programming Languages

Python
Julia
R
Matlab
Git

Skills/Exposure

• numpy • scipy • pandas • scikit-learn • pytorch • jax • SLURM • SQL

OSS Contributions

• TidierPlots.jl - R packages ggplot2, patchwork in Julia
• TidierData.jl - R package dplyr in Julia

Spoken Languages

• English • Spanish

Achievements/Certifications

Outstanding Graduate Student Award
• NJIT College of Science and Liberal Arts
Machine Learning Seminar Chair
• NJIT Department of Mathematical Sciences
Data Science Education Community of Practice Fellow
• American Physical Society
Ahluwalia Doctoral Fellowship
• NJIT Department of Mathematical Sciences
Graduate Research Fellowship Program
• (Honorable mention) National Science Foundation

Publications

- Bayesian calibration of stochastic agent based model via random forest
  ArXiV 2024
- Performing Video Frame Prediction of Microbial Growth with a Recurrent Neural Network
  Frontiers in Microbiology: Systems Microbiology 2023
- Investigating the growth of an engineered strain of Cyanobacteria with an Agent-Based Model and a Recurrent Neural Network
  bioRxiv 2021
- Using Survey Data and Mathematical Modeling to Prioritize Water Interventions in Developing Countries
  Water Resource Management 2021

Conferences

Talks

- Bayesian Calibration of Stochastic Agent Based Model via PCA Based Surrogate Modeling
  SIAM Conference on Uncertainty Quantification — Trieste, Italy 2024
- Data-driven continuum modeling of active nematics via sparse identification of nonlinear dynamics
  SIAM Conference on Computational Science and Engineering — Amsterdam, Netherlands 2023
- Data-driven continuum modeling of active nematics via sparse identification of nonlinear dynamics
  Annual Meeting of the APS Division of Fluid Dynamics (APS DFD) — Indianapolis, Indiana 2022
- Data-driven continuum modeling of active nematics via sparse identification of nonlinear dynamics
  Annual Meeting of the American Physical Society (APS March) — Chicago, Illinois 2022
- Neural networks for function approximation and data-driven modeling
  Machine Learning and Optimization Seminar - Department of Mathematical Sciences NJIT — Newark, New Jersey 2021
- Facility location using Markov chains
  CPMS Student Research Conference - Brigham Young University — Provo, Utah 2018
- Efficiency of Water Distribution in Water Poor Areas of the World
  Student Days - SIAM Annual Meeting — Pittsburgh, Pennsylvania 2017

Posters

- Data-driven discovery of PDEs for active nematic systems
  National Academy of Inventors NJIT — Newark, New Jersey 2022
- Discovering governing equations of an active nematic system using PDE-Find
  GAMM Juniors' Summer School — (virtual) Magdeburg, Germany 2020
- Aligning Self-Propelling Particles in Non-trivial Domains
  Frontiers in Applied and Computational Mathematics — Newark, New Jersey 2019

Organization

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

Professional Associations

Society for Industrial and Applied Mathematics (SIAM) 2017 — Present
American Physical Society 2022 — 2024