

EDUCATION

Georgia Institute of Technology

AUG 2019 – DEC 2025

Ph.D. / M.S. in Computational Science and Engineering

Atlanta, Georgia

Ph.D. Thesis: **Unveiling Hidden Pathology Dynamics: Controlled Bio-Mechanistic Generative Modeling of Disease Progression**

Master's Thesis: **Using WiFi Mobility Data for Modeling Covid-19 on Universities' Campuses.**

Presbyterian College

JULY 2016 – MAY 2019

B.S. in Economics (GPA: 3.95/4.00)

Clinton, South Carolina

TECHNICAL SKILLS

Languages: Python, Matlab, R, C++, JavaScript, SQL

Developer Tools: VS Code, Jupyter, Git, Linux, GitHub, Brazil

Platforms: PyTorch, Tensorflow, Hadoop, Spark, PostgreSQL, RedShift, AWS (Step Functions, S3, Batch), CDK

Optimization: Numerically iterative methods, Linear/integer/convex/online optimization

Generative Models: LLMs, Variational Bayesian models, Diffusion Models, Time-series forecasting

Others: LLM-agents, Reinforcement Learning, Stochastic Optimal Control

EXPERIENCE

Tesla

FEB 2026 – PRESENT

Senior Machine Learning Engineer, Reliability Engineering

Palo Alto, CA

- Researching and developing LLMs-based evaluation benchmarks for AI-enabled Design Failure Mode Analysis (DFMEA) of Tesla's energy and charging products.
- Researching and developing fault tree analyses from FMEA data using LLM-constructed knowledge graphs that infer causal relationships among potential failure modes.
- Researching and developing physics-informed machine learning models to unlock decision making on prognostics and targeted design actions based on predictive life models to drive the future of intelligent Tesla products.

Amazon

MAY 2025 – AUG 2025

Applied Scientist Intern, Amazon Extra Large (AMXL)

Bellevue, WA

- Developed and deployed a neural latent ODE model for station-level delivery forecasts with uncertainty quantification on attainment rates.
- Evaluated the model on all week+1 forecasts datasets, outperforming baseline model by 8 out of 9 parcel types and estimated to save \$7M on operational costs over 6 months for AMXL networks.
- Productionized the pipeline via AWS Step Functions with EC2 Batch, adopted by the Demand Planning Team.
- **Tech:** PyTorch, AWS (Step Functions, S3, Batch), CDK, SQL, Docker, Athena

Tesla

SEP 2023 – DEC 2023

Data Scientist Intern, Charging Data and Modeling

Palo Alto, CA

- Built weekday-matching logic for energy demand shift modeling, improving holiday forecast accuracy by 30%.
- Created a changepoint detection method using Fisher ratio and AUC-based thresholding, improving precision by 10%.

- **Tech:** PySpark, SQL, Pandas, Scikit-learn, Numpy, Scipy

Berkeley Lab

Research Scientist Intern, Building Technology Area

MAY 2023 – AUG 2023

Berkeley, CA

- Researched meta-learning for time series modeling of thermal dynamics using Ecobee smart home data [1].
- Experiments showed lower training cost and strong interpretability of physics-based behaviors.
- **Tech:** PyTorch, Scikit-learn

SELECTED PROJECTS

Bio-Mechanistic Generative Models — PyTorch, Gurobi

MAY 2024 – PRESENT

- Robust reconstruction of noisy epidemics with discrete network diffusion [2].
- Variational inference for evolving connectomes under neurodegeneration [3].
- Score-based generative modeling of pathological progression with stochastic optimal control [4].

Empirical WiFi Networks [5] — NetworkX, PySpark, Mesa

2020 – 2021

- Developed data pipeline for campus WiFi mobility data to simulate COVID-19 spread.
- Built agent-based models for policy simulations with hyperparameter tuning.

REFERENCES

- [1] Xie, Jiajia, Han Li, and Tianzhen Hong: *A lifelong meta-learning approach for learning deep grey-box representative thermal dynamics models for residential buildings*. Energy and Buildings, page 114408, 2024.
- [2] Xie, Jiajia, Chen Lin, Xinyu Guo, and Cassie S Mitchell: *Source robust non-parametric reconstruction of epidemic-like event-based network diffusion processes under online data*. Big Data and Cognitive Computing, 9(10):262, 2025.
- [3] Xie, Jiajia, Raghav Tandon, and Cassie S Mitchell: *Network diffusion-constrained variational generative models for investigating the molecular dynamics of brain connectomes under neurodegeneration*. International Journal of Molecular Sciences, 26(3):1062, 2025.
- [4] Xie, Jiajia, Chen Lin, Xinyu Guo, James J Lah, and Cassie S Mitchell: *Closed-loop network dynamics reveals non-monotonic vulnerability signatures in alzheimer's disease*. In Review by NPJ Dementia, 2026.
- [5] Das Swain, Vedant, Jiajia Xie, Maanit Madan, Sonia Sargolzaei, James Cai, Munmun De Choudhury, Gregory D Abowd, Lauren N Steimle, and B Aditya Prakash: *Empirical networks for localized covid-19 interventions using wifi infrastructure at university campuses*. Frontiers in Digital Health, 5:1060828, 2023.
- [6] Xie, Jiajia, Christin J Salley, Neda Mohammadi, and John E Taylor: *Online confirmation-augmented probabilistic topic modeling in cyber-physical social infrastructure systems*. In Proceedings of the 10th ACM International Conference on Systems for Energy-Efficient Buildings, Cities, and Transportation, pages 390–397, 2023.
- [7] Rodriguez, Alexander, Anika Tabassum, Jiaming Cui, Jiajia Xie, Javen Ho, Pulak Agarwal, Bijaya Adhikari, and B Aditya Prakash: *Deepcovid: An operational deep learning-driven framework for explainable real-time covid-19 forecasting*. In Proceedings of the AAAI Conference on Artificial Intelligence, volume 35, pages 15393–15400, 2021.
- [8] Cramer, Estee Y, Evan L Ray, Velma K Lopez, Johannes Bracher, Andrea Brennen, Alvaro J Castro Rivadeneira, Aaron Gerding, Tilmann Gneiting, Katie H House, Yuxin Huang, et al.: *Evaluation of individual and ensemble probabilistic forecasts of covid-19 mortality in the united states*. Proceedings of the National Academy of Sciences, 119(15):e2113561119, 2022.

- [9] ElSherief, Mai, Koustuv Saha, Pranshu Gupta, Shrija Mishra, Jordyn Seybolt, Jiajia Xie, Megan O'Toole, Sarah Burd-Sharps, and Munmun De Choudhury: *Impacts of school shooter drills on the psychological well-being of american k-12 school communities: a social media study*. Humanities and Social Sciences Communications, 8(1):1–14, 2021.