Jimmy Hickey

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Education

Ph.D. Statistics 2019 - 2024
M.S. Statistics 2019 - 2020
North Carolina State University
Thesis: *Bayesian Transfer Learning Methods with Uncertainty Quantification*

B.S. Computer Science; B.S. Physics; B.A. Mathematics 2014 - 2018
Winona State University
Minors: Statistics, Data Science

Skills

Languages: Python, R, Julia, C/C++, Bash, Java, SQL

Tools & Frameworks: PyTorch, TensorFlow, CUDA, Linux, HPC Environments, Git

Methods: Transfer Learning, Generative AI, Machine Learning, Uncertainty Quantification, NLP/LLMs

Soft Skills: Statistical Consulting, Teaching, Data Visualization, Interdomain Communication

Professional Experience

Machine Learning Researcher 2019 - present
Duke Clinical Research Institute

- Lead development and publication of a flexible **machine learning** method improving predictive performance and interpretability of time-to-event outcomes (see publication 2).
- Extend this method to consider multivariate outcomes (see publication 6).
- Develop novel transfer learning methods addressing demographic bias in predictive modeling (see publication 1).

Statistics Researcher 2019 - present
North Carolina State University

- Create a source free Bayesian transfer learning method improving predictive performance with **uncertainty quantification** (see publication 3).
- Extend this method to consider multivariate outcomes and multiple target data sets (see publications 4 and 5).
- Implement state-of-the-art transfer learning methods in Python, R, and Julia.
- Implement **Generative AI** models to compare method performance (see publication 7).
- Present work at conferences and events to diverse audiences.

Statistical Scientist 2020 - 2024
Sandia National Laboratories

- Optimized statistical computing methods, reducing computational complexity by a factor of $O(n^2)$.
- Supported national defense using RNNs and deep learning for signal processing.
- Modeled trajectories for engineering applications using functional data analysis.

Lead Consultant 2020 - 2023
NCSU Statistics in the Community

- Secured clients for a pro bono consulting group.
- Mapped unmet need to allocate donated furniture and analyzed school system data for unmet adolescent need. [report]
- Developed interpretable metrics for donation lag times. [report]
- Analyze newsletter data to improve click-through and subscriber retention. [report]
- Visualized data and predictive results in reports and presentations given to non-statistical clients.
- Manage and mentor new consultants.

Tutor 2016 - 2022
Winona State University & North Carolina State University

- Tutored students in computer science, statistics, physics, and mathematics.
- Assisted the highest number of students per year at Winona State University.
- Provided one-on-one and small group tutoring, and classroom teaching.

Genomic Systems Programmer Analyst 2018 - 2019
Mayo Clinic

- Developed variant annotation and microbiome pipelines for researchers and clinicians.
- Optimized bioinformatics algorithms to parallelize for high-performance computing (HPC).
- Create onboarding procedures for new hires.

Software Engineer 2016 - 2018
Digi International

- Build firmware for microcontrollers and routing devices.
- Write automated unit, integration, and system tests for multiple teams.
- Participate in an agile development environment.

Technical Support 2015 - 2016
Winona State University

- Help faculty, staff, and students with technical problems over the phone and onsite.
- Troubleshoot both hardware and software issues.

Publications

1. C Hong, M Liu, D M Wojdyla, **J Hickey**, M Pencina, R Henao (2024). Trans-Balance: Reducing Demographic Disparity for Prediction Models in the Presence of Class Imbalance. *The Journal of Biomedical Informatics* [manuscript]
2. **J Hickey**, R Henao, M Pencina, D M Wojdyla, M Engelhard (2024). Adaptive Discretization for Event PredicTion (ADEPT). *AISTATS* [manuscript]
3. **J Hickey**, J P Williams, E C Hector (202x). Transfer Learning with Uncertainty Quantification: Random Effect Calibration of Source to Target (RECaST). R&R at *The Journal of Machine Learning Research* [arXiv]
4. **J Hickey**, E C Hector, J P Williams (202x). Online Bayesian Transfer Learning with Uncertainty Quantification with Multiple Outcomes. *In Progress*
5. **J Hickey**, R Henao, M Pencina, D M Wojdyla, M Engelhard (202x). Multivariate Outcome Classification Through Learned Hyperplanes. *In Progress*
6. **J Hickey**, D Elsheimer (2020) Performance Comparison of Generative Adversarial Network Variants [manuscript]

Professional Presentations

1. Adaptive Discretization for Event PredicTion (ADEPT). *AISTATS Poster Presentation*. May 2024
2. Transfer Learning with Uncertainty Quantification: Random Effect Calibration of Source to Target (RECaST). *Joint Statistical Meeting Oral Presentation*. August 2023
3. Transfer Learning with Uncertainty Quantification: Random Effect Calibration of Source to Target (RECaST). *North Carolina State University Graduate Research Symposium Poster Presentation*. April 2023
4. Trans-Balance: Reducing Demographic Disparity for Prediction Models in the Presence of Class Imbalance. *Duke University Oral Presentation*. April 2023
5. Transfer Learning with Uncertainty Quantification: Random Effect Calibration of Source to Target (RECaST). *ENAR Poster Presentation*. March 2023
6. Improving Event Time Prediction by Learning to Partition the Timeline. *Duke University Oral Presentation*. March 2023
7. Improving Event Time Prediction by Learning to Partition the Timeline. *North Carolina State University Oral Seminar*. September 2022
8. Transfer Learning with Uncertainty Quantification: Random Effect Calibration of Source to Target (RECaST). *Joint Statistical Meeting Poster Presentation*. August 2022

Service

- Session Chair *ENAR* 2023
- Student Representative *NCSU Statistics Seminar Committee* 2022-2023
- Graduate Mentor *NCSU Summer Institute in Biostatistics* 2022
- President *NCSU Statistics Graduate Student Association* 2020-2022
- Organizer *NCSU Virtual Datathon* (article) 2021
- Organizer *NCSU College of Science Research Symposium* 2021
- Organizer *NCSU Statistics Prospective Student Visit Day* 2020
- Organizer *NCSU Deep Learning Reading Group* 2019-2020
- Vice President *WSU Women in Computer Science Club* 2017-2018
- Student Representative *WSU Dean's Advisory Council* 2017-2018
- President *WSU Physics Club* 2015-2018

Honors and Awards

- Paige Plagge Graduate Award for Citizenship *NCSU Statistics Department* 2021
- Outstanding Graduate in Computer Science *WSU* 2018
- Outstanding Graduate in Physics *WSU* 2018

- Outstanding Graduate in Mathematics *WSU* 2018
- Outstanding Student Leader Nominee *WSU* 2018
- 1st Place *Midwest Undergraduate Data Analytics Competition* 2018
- Best College Overall *ASA Police Data Challenge* (link to competition) 2018
- Top 5 Undergraduate *MinneAnalytics Data Analytics Competition* 2017