Wyatt Madden M.S.

Grace Crum Rollins Room 359
Department of Biostatistics & Bioinformatics
Emory University
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EDUCATION

Emory University *2021 – Present*
Ph.D. in Biostatistics & Bioinformatics

Montana State University *2017 – 2019*
M.S. in Statistics

University of California, Santa Cruz *2011 – 2015*
Bachelor of Arts, Economics & Mathematics *With Honors*
Bachelor of Arts, Film & Digital Media *With Honors*

PROFESSIONAL EXPERIENCE

Los Alamos National Laboratory — Los Alamos, NM
Applied Machine Learning Research Fellow — *May 2024 – Aug 2024*

- Developed deep learning methods for high energy density experiments.
- Designed and implemented PyTorch model fitting pipelines for use on high performance computing clusters.

Bozeman Disease Ecology Lab — Bozeman, MT
Data Scientist — *Jan 2019 – Jul 2021*

- Researched spatio-temporal data integration techniques for viral surveillance and prediction.
- Provided statistics & machine learning consulting for international team of scientists.
- Developed R packages to automate routine statistical analysis, visualization, and wrangling.
- Designed and implemented SQL database and data pipelines, ensuring data quality and access.

Weyerhaeuser — Seattle, WA
Statistics Intern — *May 2018 – Aug 2018*

- Implemented machine learning models aimed at lowering defects in industrial processes, after diagnosing issues through exploratory visualization and analyses.
- Formulated mixed-model experimental designs.
- Developed Shiny web applications to automate data cleaning/wrangling workflows.

Accenture — Sacramento, CA
Analyst — *Jul 2016 – Apr 2017*

- Improved loan approval processes through analysis of credit profiles.

SKILLS

- **Python**: PyTorch, scikit-learn, pandas, seaborn, matplotlib
- **R**: Package development, data visualization, Bayesian computation, Tidyverse
- **Other Programming Languages**: SQL, Bash, MATLAB, LaTeX
- **Tools**: Neovim, Tmux, Git, Linux

PUBLICATIONS

1. **W. Madden**, W. Jin, B. Lopman, A. Zufle, B. Dalziel, J. Metcalf, B. D. Grenfell, and M. S. Lau, "Neural networks for endemic measles dynamics: Comparative analysis and integration with mechanistic models," *MedRxiv*, May 2024, Under Review.
2. J. Lagergren, M. Ruiz-Aravena, D. J. Becker, *et al.*, "Environmental and ecological signals predict periods of nutritional stress for eastern australian flying fox populations," *bioRxiv*, 2023, Under Review.
3. P. Eby, A. Peel, A. Hoegh, **W. Madden**, J. Giles, P. Hudson, and R. Plowright, "Pathogen spillover driven by rapid changes in bat ecology," *Nature*, pp. 1–3, Nov. 2022, Full Paper.

4. D. J. Becker, P. Eby, **W. Madden**, A. J. Peel, and R. K. Plowright, "Ecological conditions predict the intensity of hendra virus excretion over space and time from bat reservoir hosts," *Ecology Letters*, Oct. 2022, Full Paper.
5. M. S. Y. Lau, A. Becker, **W. Madden**, L. A. Waller, C. J. E. Metcalf, and B. T. Grenfell, "Comparing and linking machine learning and semi-mechanistic models for the predictability of endemic measles dynamics," *PLOS Computational Biology*, vol. 18, no. 9, pp. 1–14, Sep. 2022, Full Paper.
6. M. D. Cherne, A. B. Gentry, A. Nemudraia, *et al.*, "Severe acute respiratory syndrome coronavirus 2 is detected in the gastrointestinal tract of asymptomatic endoscopy patients but is unlikely to pose a significant risk to healthcare personnel," *Gastro Hep Advances*, vol. 1, no. 5, pp. 844–852, 2022, Full Paper.
7. A. Hoegh, A. Peel, **W. Madden**, M. Ruiz-Aravena, A. Morris, A. Washburne, and R. Plowright, "Estimating viral prevalence with data fusion for adaptive two-phase pooled sampling," *Ecology and Evolution*, vol. 11, Sep. 2021, Full Paper.
8. W. Rogers, M. Ruiz-Aravena, D. Hansen, *et al.*, "High-frequency screening combined with diagnostic testing for control of sars-cov-2 in high-density settings: An economic evaluation of resources allocation for public health benefit," *medRxiv*, 2021, Under Review.

INVITED PRESENTATIONS	Mechanism-Integrated Machine Learning for Infectious Disease Dynamics Prediction	*Oct 2024*
	High Meadows Environmental Institute Workshop	
	On the Accuracy (and Niceness) of Prediction: from Epidemics to Climate and Weather	
	Princeton, NJ	
	Machine Learning Approaches for Epidemic Modeling	*Mar 2023*
	Princeton Serology Conference	
	Princeton, NJ	
	Compartmental Models: Deterministic & Bayesian Approaches	*Nov 2020*
	Rocky Mountain Data Science	
	Bozeman, MT	
	R Studio in Action - DataFest	*Oct 2018*
	Montana ASA Chapter Meeting	
	Bozeman, MT	
CONTRIBUTED TALKS & POSTERS	Neural Network Reveals Gravitational Coupling of Endemic Measles Dynamics	*Dec 2023*
	Epidemics9 [Poster]	
	Bologna, Italy	
	Bias-Correcting Daily Satellite-Retrieved AOD for Air Quality Research	*Sep 2023*
	EnviBayes Workshop [Poster]	
	Fort Collins, CO	
INVITED PANELS	Machine Learning Panel	*Mar 2024*
	CIDMATH Retreat	
	Atlanta, GA	
CONSULTING & COLLABORATION EXPERIENCE	Collaborator	*Aug 2018 – Dec 2018*
	Statistical Consulting And Research Services (SCRS)	
	Department of Mathematical Sciences, Montana State University	
	Volunteer	*Jan 2018 – Apr 2018*
	Statistics Without Borders (SWB)	
	Under direction of Dr. Nicole Carnegie, Montana State University	
TEACHING	Teaching Assistant	*Summer 2024*
	Introduction to Machine Learning for ID Modeling	
	Summer Institute in Statistics and Modeling in Infectious Diseases, Emory University	

Instructor, Creator	*Spring 2023 – Fall 2024*

Neural Networks with PyTorch Tutorial
Department of Biostatistics and Bioinformatics, Emory University

Teaching Assistant	*Fall 2022 – Spring 2024*

INFO 534 - Applied Machine Learning
Department of Biostatistics and Bioinformatics, Emory University

Instructor	*Fall 2017 – Fall 2018*

MATH 105 - Contemporary Mathematics
Department of Mathematical Sciences, Montana State University

Awards

Patel-Naik Award (2nd Place), Emory University	*Dec 2023*
Outstanding Graduate Student Award, Montana State University	*May 2019*
Excellence in Data Visualization, ASA Data Fest - Montana State University	*Apr 2018*

Service

Emory BIOS Student Council, Pre-quals Representative	*Spring 2022 – Present*
Georgia Statistics Day 2024, Student Volunteer	*Oct 25th, 2024*
Georgia Statistics Day 2021, Student Volunteer	*Oct 11th, 2021*
Bozeman Environmental Statistics Group, Member	*2019 – 2021*
American Statistical Association Student Chapter at Montana State, Treasurer	*2018 – 2019*

Membership

American Statistical Association