Wyatt Madden M.S.

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Department of Biostatistics & Bioinformatics
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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*

Research Interests

Bayesian computation, spatio-temporal modeling, probabilistic machine learning & deep learning, data integration, Bayesian nonparametrics, variational inference and sequential Monte Carlo methods. Applications include viral surveillance, disease ecology, epidemiology and quality control.

Publications

1. 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.
2. 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.
3. 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.
4. 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.
5. 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.
6. 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

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 Salellite-Retrieved AOD for Air Quality Research *Sep 2023*
EnviBayes Workshop [Poster]
Fort Collins, CO

Professional Experience

Bozeman Disease Ecology Lab Bozeman, MT
Statistician *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.

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

Instructor, Creator *Spring 2023*
Neural Networks with PyTorch Tutorial
Department of Biostatistics and Bioinformatics, Emory University

Teaching Assistant *Fall 2022 – Spring 2023*
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 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