

Hannah M. Director

Applied Mathematics and Statistics
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Current Position

NSF Mathematical Sciences Postdoctoral Fellow Aug. 2020 - present

Colorado School of Mines

Department of Applied Mathematics and Statistics

Adviser: Douglas Nychka

*Grant: Spatiotemporal Methods for Integrating Stochastic Components
in Dynamic Sea Ice Models (\$150,000)*

Visitor

Aug. 2020 - present

National Center For Atmospheric Research

Climate and Global Dynamics Laboratory

Education

Ph.D., Statistics 2020

University of Washington, Seattle WA

Dissertation: *Space-Time Contour Models for Sea Ice Forecasting*

Advisers: Adrian E. Raftery & Cecilia M. Bitz

A.M., Statistics 2015

Harvard University, Cambridge MA

Adviser: Luke Bornn

B.S., Mathematics & Statistics 2013

University of Washington, Seattle WA

Cum laude

Honors & Awards

NSF Graduate Research Fellowship 2015 - 2020

UW Statistics Department Z.W. Birnbaum Award 2019
for Outstanding General (Research) Exam

Honorable Mention, Student Oral Presentation Awards, 2019
International Glaciology Society Sea Ice Symposium

Statistical Methods for Atmospheric & Oceanic Sciences (STATMOS) 2016, 2017
Travel Grant

Women in Statistics & Data Science Conference Travel Award 2017

UW Graduate School Top Scholar Entrance Award 2015

Phi Beta Kappa 2013

UW Statistics Department Service Award 2013

Washington (State) Scholar Award & Scholarship 2010 - 2013

Temcov Foundation Citizenship Scholarship 2010

Publications

1. **Director, H.M.**, Raftery, A.E., Bitz, C.M. (2020+) [Probabilistic forecasting of the Arctic sea ice edge with contour modeling](#). *To appear in Annals of Applied Statistics*.
2. Diamond, M.D., **Director, H.M.**, Eastman, R., Possner, A., Wood, R. (2020). [Substantial cloud brightening from shipping in subtropical low clouds](#). *AGU Advances*. (*Editors' Highlight, Media coverage by the American Geophysical Union, Mongabay, NASA Earth Observatory, UW News, and Wired.*)
3. Nie, K., Hannaford, S., **Director, H.M.**, Nishigaki, M.A., Drennan, W.R., Rubinstein, J.T. (2019). [Mandarin tone recognition in English speakers with normal hearing and with cochlear implants](#). *International Journal of Audiology*, 1-10.
4. **Director, H.M.**, Raftery, A.E., Bitz, C.M. (2017). [Improved sea ice forecasting through spatiotemporal bias correction](#). *Journal of Climate*, 30(23), 9493-9510.
5. **Director, H.M.**, Gattiker, J., Lawrence, E., Vander Wiel, S. (2017). [Efficient sampling on the simplex with a self-adjusting logit transform proposal](#). *Journal of Statistical Computation and Simulation*, 87(18), 3521-3536.
6. **Director, H.**, Bornn, L. (2015). [Connecting point-level and gridded moments in the analysis of climate data](#). *Journal of Climate*, 28(9), 3496-3510.

Conference Proceedings

7. Sego, L. Hafen, R. **Director, H.**, LaMothe R. (May 2014). Tessera: open source software for accelerated data science. *Proceedings of the Institute of Nuclear Materials Management Conference*. Portland, OR.

Submitted Manuscripts

8. **Director, H.M.**, Raftery, A.E. [Contour models for boundaries enclosing star-shaped and approximately star-shaped polygons](#). *arXiv:2007.04386*.
9. Gao, P.A., **Director, H.M.**, Bitz, C.M., Raftery, A.E. Probabilistic forecasts of Arctic sea ice thickness.

Software

- Director, H.M.**, Raftery, A.E., Bitz, C.M. (2020). [IceCast: apply statistical post-processing to improve sea ice predictions](#). R package version 3.1.0.
- Director, H.**, Vander Wiel, S., Gattiker, J. (2017). [SALT Sampler: efficient sampling on the simplex](#). R Package version 1.1.0.

Teaching Experience

Teaching Assistant

Apr. 2018 - Jun. 2018

Introduction to Statistical Machine Learning
University of Washington
Instructor: Daniela Witten

Tutor

Apr. 2013 - Jun. 2013, Sep. 2016 - Jun. 2017

Statistics Tutor & Study Center
University of Washington
Supervisor: June Morita

Professional Experience

Graduate Research Assistant

Jan. 2015 - Aug. 2015, Jul. 2017 - Aug. 2017

Los Alamos National Laboratory
Statistical Sciences Group

National Security Intern

May 2014 - Aug. 2014

Pacific Northwest National Laboratory
Applied Statistics & Computational Modeling

Risk Analysis Intern

Jun. 2012 - Sep. 2012

The Boeing Company
Environment, Health, & Safety

Invited Presentations

Contour Models for Sea Ice Forecasting

School of the Environment & Department of Statistical Sciences
University of Toronto. Toronto, ON.

Feb. 2020

Department of Statistics & Data Science
University of Texas at Austin. Austin, TX.

Jan. 2020

Probabilistic Contour Models of the Arctic Sea Ice Edge

School of Aquatic and Fisheries Sciences Quantitative Seminar
University of Washington. Seattle WA.

Nov. 2019

Contributed Oral Presentations

<i>Probabilistic Forecasting of the Arctic Sea Ice Edge</i> International Glaciology Society Sea Symposium. Winnipeg, MB. (Honorable Mention, Student Oral Presentation Awards)	Aug. 2019
<i>Probabilistic Contour Models of the Sea Ice Edge</i> Joint Statistical Meetings. Denver, CO.	Aug. 2019
<i>Bias Correction of Sea Ice Predictions</i> Joint Statistical Meetings. Vancouver, BC. Polar Prediction Workshop. Montreal, QU.	Aug. 2018 May 2018
<i>Modeling the Models: Using Statistics to Improve Forecasts</i> Program on Climate Change Spring Symposium University of Washington. Seattle, WA.	May 2018
<i>Interactive Inference for Spatial Image Analysis.</i> Joint Statistical Meetings. Seattle, WA.	Aug. 2015

Contributed Poster Presentations

<i>Bias Correction of Sea Ice Predictions</i> Women in Statistics and Data Science Conference, La Jolla, CA. Polar Prediction Workshop, Palisades, NY. American Geophysical Union Fall Meeting, San Francisco, CA.	Oct. 2017 May 2016 Dec. 2016
<i>Connecting Point-level and Gridded Data in the Analysis of Climate Extremes</i> New England Statistics Symposium, Boston, MA.	Apr. 2014

Leadership

UW Women in Biostatistics and Statistics leadership team	Sep. 2018 - Jun. 2020
UW Program on Climate Change student steering committee	Sep. 2018 - Jun 2020
American Meteorological Society Committee on Probability and Statistics	Jan. 2017 - Jan 2019
UW Statistics graduate student representative to faculty	Sep. 2017 - Aug. 2018
Harvard Graduate Women in Science & Engineering board	Sep. 2013 - Dec. 2014

Mentoring

Panelist on ASA Committee on Funded Research Webinar “NSF Graduate and Postdoctoral Fellowships: Opportunities & Advice”	Sep. 2020
Primary research adviser for Joyce (Zihui) Zhang, a UW undergraduate researching sea ice forecast performance	Oct. 2018-Aug. 2020
Presentation on “Making the Most of Your Statistics Major” at UW Statistics Undergraduate Orientation	Oct. 2019
UW Statistics Ph.D. program peer mentor	Sep. 2018 - Sep. 2019

Reviewer

Earth and Space Science, Geophysical Research Letters, Quarterly Journal of the Royal Meteorological Society, Weather and Forecasting	
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Session Chair

Joint Statistical Meetings, Denver, CO.

July 2019

*Beyond the VAR: Advances in Spatial and Spatio-Temporal Modeling
for Climate and Environmental Data*