

Hannah M. Director

Applied Mathematics and Statistics
Colorado School of Mines
1500 Illinois St.
Golden, CO 80401

Web: www.stat.washington.edu/~direch
Email: hdirector7@gmail.com

Current Position

NSF Mathematical Sciences Postdoctoral Fellow Aug. 2020 - present
Department of Applied Mathematics and Statistics
Colorado School of Mines
Adviser: Douglas Nychka
*Grant: Spatiotemporal Methods for Integrating Stochastic
Components in Dynamic Sea Ice Models (\$150,000)*

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

National Science Foundation 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. 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.*)
2. 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.
3. **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.
4. **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.
5. **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

6. 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.

Preprints

7. **Director, H.M.**, Raftery, A.E., Bitz, C.M. Probabilistic forecasting of the Arctic sea ice edge with contour modeling. *Revised and Resubmitted. Annals of Applied Statistics*.
8. **Director, H.M.**, Raftery, A.E. Contour models for boundaries enclosing star-shaped and approximately star-shaped polygons. *Submitted*.
9. Gao, P.A., **Director, H.M.**, Bitz, C.M., Raftery, A.E. Probabilistic Forecasts of Arctic Sea Ice Thickness. *Submitted*.

Software

- Director, H.M.**, Raftery A.E., Bitz, C.M (2019). *IceCast: apply statistical post-processing to improve sea ice predictions*. R package version 2.1.0.
- 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 - present
UW Program on Climate Change student steering committee	Sep. 2018 - present
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

Primary research adviser for Joyce (Zihui) Zhang	Oct. 2018-present
UW undergraduate researching sea ice forecast performance 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	
---	--

Session Chair

Joint Statistical Meetings, Denver, CO. <i>Beyond the VAR: Advances in Spatial and Spatio-Temporal Modeling for Climate and Environmental Data</i>	July 2019
---	-----------