Marie C. McGraw, PhD

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Current Position

08/2022 - present	**Research Scientist I** Cooperative Institute for Research in the Atmosphere (CIRA), Colorado State University, Fort Collins, CO, USA Current research topics: machine learning and tropical cyclones, uncertainty quantification, AI and ethics, AI education

Education

10/2015 - 03/2019	**Ph.D., Atmospheric Science**, Colorado State University, Fort Collins, CO, USA.
06/2013 - 10/2015	**M.S., Atmospheric Science**, Colorado State University, Fort Collins, CO, USA
09/2008 - 06/2012	**B.Sc., Mechanical and Ocean Engineering**, Massachusetts Institute of Technology, Cambridge, MA, USA

Previous Experience

01/2023-03/2023	**Visiting scholar**, Data-Driven Atmospheric and Water Dynamics Group, University of Lausanne, Lausanne, Switzerland. **Host:** Prof. Tom Beucler
06/2019 - 06/2021	**Postdoctoral Research Associate**, Cooperative Institute for Research in the Atmosphere, Colorado State University, Fort Collins, CO, USA
06/2019 - 06/2021	**Postdoctoral Research Associate**, University of Washington, Seattle, WA, USA
06/2013 - 05/2019	**Graduate Research Assistant**, Colorado State University, Fort Collins, CO, USA

Selected Publications (14 total)

9. V. Eyring, W.D. Collins, and coauthors (inc. **M. McGraw**) (2024): Pushing the Frontiers in Climate Modeling and Analysis with Machine Learning. *Nature Climate Change*, **14**, 916-928, `https://doi.org/10.1038/s41558-024-02095-y`.

8. McGovern, A., A. Bostrom, **M. McGraw**, R.J. Chase, D.J. Gagne II, I. Ebert-Uphoff, K. Musgrave, and A. Schumacher (2024): Identifying and Categorizing Bias in AI/ML for Earth Sciences, *Bull. Amer. Meteorol. Soc.*, **105**, `https://doi.org/10.1175/BAMS-D-23-0196.1`.

7. Haynes, K., R. Lagerquist, **M. McGraw**, K. Musgrave, and I. Ebert-Uphoff (2023): Creating and evaluating uncertainty estimates with neural networks for environmental-science applications. *Artificial Intelligence for Earth Systems*, **1**, `https://doi.org/10.1175/AIES-D-22-0061.1`.

6. **McGraw, M.C.**, E. Blanchard-Wrigglesworth, R.P. Clancy, and C.M. Bitz (2022): Understanding the predictability of Arctic sea ice loss on subseasonal timescales. *J. Climate*, **35**, doi:10.1175/JCLI-D-21-0301.1.

5. **McGraw, M.C.** and E.A. Barnes (2020): New Insights on Subseasonal Arctic-Midlatitude Causal Connections from a Regularized Regression Model. *Journal of Climate*, doi:10.1175/JCLI-D-19-0142.1.

4. **McGraw, M.C.**, C.F. Baggett, C. Liu, and B.D. Mundhenk (2019): Changes in Arctic moisture transport over the North Pacific associated with sea ice loss. *Climate Dynamics*, doi:10.1007/s00382-019-05011-9.

3. Samarasinghe, S., **M.C. McGraw**, E.A. Barnes, and I. Ebert-Uphoff (2019): A study of links between the Arctic and the midlatitude jet-streams using Granger and Pearl causality. *Environmetrics,* doi:10.1002/env.2540.

2. **McGraw, M.C.**, and E.A. Barnes (2018): Memory matters: A case for Granger causality in climate variability studies. *J. Climate*, **31,** doi:10.1175/JCLI-D-17-0334.1.

1. **McGraw, M.C.**, E.A. Barnes, and C. Deser (2016): Reconciling the observed and modeled Southern Hemisphere circulation response to volcanic eruptions. *Geophys. Res. Lett.,* doi:10.1002/2016GL069835.

Selected Presentations

Invited

Seminar, ITU "AI for Good" Seminar Series, 03/2023. *AI for Tropical Meteorology: Challenges and Opportunities*. T. Beucler and **M.C. McGraw**.

Presentation, Aspen Global Change Institute Workshop on Earth System Modeling with Machine Learning and Big Data, 06/2022. *Causality and Interpretability*. **McGraw, M.C.**, and I. Ebert-Uphoff.

Seminar, Data-Driven Atmospheric and Water Dynamics Group, University of Lausanne, Switzerland, 04/2022. *Machine learning and tropical cyclone forecasting.* **McGraw, M.C.**, K.D. Musgrave, and I. Ebert-Uphoff.

Submitted

36th AMS Conference on Hurricanes and Tropical Meteorology, Long Beach, CA. *Exploring Tropical Cyclone Structure and Evolution with AI-based Synthetic Passive Microwave Data.* **McGraw, M.C.**, K. Haynes, K.D. Musgrave, C.J. Slocum, I. Ebert-Uphoff, and J.A. Knaff.

22nd AI Conference, AMS Annual Meeting, Denver, CO, USA. *Using AI To quantify Uncertainty on Tropical Cyclogenesis.* Baldwin, M.R., C. Slocum, and **M. McGraw**.

Tackling Climate Change with Machine Learning Workshop, NeurIPS 2022, remote. *Statistical adjustment of decadal climate predictions using deep learning.* Sospreda-Alfonso, R., Exenberger, J., Dang, K., and **M.C. McGraw** (spotlight presentation).

American Geophysical Union Annual Meeting, 12/2020, remote. *Extreme sea ice loss on subseasonal timescales in S2S forecast models* (poster). **McGraw, M.C.**, E. Blanchard-Wrigglesworth, R.P. Clancy, and C.M. Bitz.

Teaching, Mentoring, & Service

Mentoring: Angelie Nieves Jiménez (graduate student, 2022-present); Marshall Baldwin (undergraduate, summer 2022); Julia Shates (undergraduate, summer 2014); ClimateChangeAI summer school (2022)

Diversity, Equity, and Inclusion: Member, Diversity, Equity, and Inclusion Committee, University of Washington (2019-2021)

Professional Service: Session chair for American Meteorological Society AI Conference in 2023, 2024; program committee member for 'Tackling Climate Change with Machine Learning" Workshop at NeurIPS 2024; reviewer for 10+ peer-reviewed scientific publications (including *Journal of Climate*, *Geophysical Research Letters*, *Bulletin of the American Meteorological Society.*, and *Nature Climate Change*); panel and ad-hoc reviewer for the National Science Foundation.