

# DR. MARGARET L. DUFFY

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## EDUCATION AND EMPLOYMENT

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| <b>University of Utah</b> , Assistant Professor<br>Department of Atmospheric Science                                                                                                                           | <i>Aug 2026 – Present</i>   |
| <b>UC Davis</b> , Assistant Professor<br>Department of Land, Air, and Water Resources                                                                                                                          | <i>Nov 2025 – June 2026</i> |
| <b>UC Berkeley</b> , Chancellor’s Postdoctoral Fellow<br>Mentored by Professor William Boos                                                                                                                    | <i>Aug 2024 – Oct 2025</i>  |
| <b>National Center for Atmospheric Research</b> , Postdoctoral Fellow<br>Supervised by Dr. Brian Medeiros and Dr. Andrew Gettelman                                                                             | <i>Sept 2021 – Aug 2024</i> |
| <b>Massachusetts Institute of Technology</b> , PhD in Climate Science<br>Dissertation: “An energetic perspective on the tropical atmosphere and its response to warming”<br>Advised by Professor Paul O’Gorman | <i>2021</i>                 |
| <b>Haverford College</b> , BS in Mathematics<br>Minor in Statistics, Concentration in Scientific computing<br>Thesis: “Analysis of a simple ice sheet model”                                                   | <i>2015</i>                 |

## AWARDS AND FUNDING

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| <b>PI, Improved understanding of cloud-controlling factors</b> ,<br>NOAA MAPP, \$569,631 | <i>Pending</i>     |
| <b>UC Berkeley Chancellor’s Postdoctoral Fellowship</b>                                  | <i>2024 - 2025</i> |
| <b>Funded DEI proposal</b> , NCAR EdEC, \$4,927                                          | <i>2024</i>        |
| <b>Award for Excellence in Teaching</b> , MIT EAPS, 12.003                               | <i>2018</i>        |
| <b>Jule Charney Prize</b> , MIT EAPS                                                     | <i>2015 - 2018</i> |
| <b>Whiteman Fellow</b> , MIT EAPS                                                        | <i>2016 - 2017</i> |
| <b>Rasmussen Fellow</b> , MIT EAPS                                                       | <i>2015 - 2016</i> |

## PUBLICATIONS

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*Under review*

**Duffy, M.L.**, B. Medeiros, A. Gettelman, R. J. Wills, Atmospheric Mechanisms of the Pattern effect *ESS Open Archive*. October 25, 2025. DOI: 10.22541/essoar.176143479.94104812/v1 (Under review with *Journal of Geophysical Research: Atmospheres*)

*Published*

**Duffy, M.L.**, I.R. Simpson, B. Medeiros, J. Zhu, C.S. McCluskey, A.R. Herrington, A. Gettelman, B.L. Otto-Bliesner, J.T. Fasullo, P.H. Lauritzen, R.B. Neale, D.M. Lawrence, Is the high ECS in CESM2 degrading transient climate change projections over the 21st century?, *Journal of Advances in Modeling Earth Systems*, DOI: 10.1029/2025MS004967

Wall, C.J., D. Paynter, Y. Qin, M. Debolskiy, **M. L. Duffy**, T. Michibata, B. M. Duran, N. J. Lutsko, P-L Ma, B. Medeiros, T. Storelvmo, M. Zhao, 2025, Decomposing Cloud Radiative Feedbacks By Cloud-Top Phase, *Journal of Climate*, DOI: 10.1175/JCLI-D-24-0538

**Duffy, M.L.**, L.Y. Barnes, C.D. Wirz, M.I. Ranganathan, M.A. Freilich, E.M. Freese, E. Lalk, J. Wilcots, 2025, Factors influencing underrepresented geoscientists' decision to accept or decline a faculty job offer in the US, *Nature Communications Earth and Environment*, DOI: 10.1038/s43247-025-02052-3

Duran, B.M., C.J. Wall, N.J. Lutsko, P.-L. Ma, Y. Qin, **M.L. Duffy**, B. Medeiros, T. Michibata, M. Debolski, 2025, A new method for diagnosing effective radiative forcing from aerosol-cloud interactions in climate models, *Atmospheric Chemistry and Physics*, DOI: 10.5194/acp-25-2123-2025

Gettelman, A., T. Eidhammer, **M.L. Duffy**, D. McCoy, C. Song, D. Watson-Parris, 2024, The interaction between climate forcing and feedbacks, *JGR Atmospheres*, DOI: 10.1029/2024JD040857

Wehner, M.F., **M.L. Duffy**, M. Risser, C.J. Paciorek, D.A. Stone, P. Pall, 2024, On the uncertainty of long-period return values of extreme daily precipitation, *Frontiers in Climate*. DOI: 10.3389/fclim.2024.1343072

Bloch-Johnson, J., M.A.A. Rugenstein, M.J. Alessi, C. Proistosescu, M. Zhao, B. Zhang, A.I.L. Williams, J.M. Gregory, J. Cole, Y. Dong, **M.L. Duffy**, S.M. Kang, C. Zhou, The Green's function model intercomparison project (GFMIP) protocol, 2024, *JAMES*. DOI: 10.1029/2023MS003700

**Duffy, M.L.**, B. Medeiros, A. Gettelman, T. Eidhammer, 2024, Perturbing parameters to understand cloud contributions to climate change, *Journal of Climate*. DOI: 10.1175/JCLI-D-23-0250.1

**Duffy, M.L.** and P.A. O'Gorman, 2023, Intermodel spread in Walker circulation responses linked to spread in moist stability and radiation responses, *JGR Atmospheres*. DOI: 10.1029/2022JD037382

Ranganathan, M.I., E. Lalk, E.M. Freese, M.A. Freilich, J. Wilcots, **M.L. Duffy**, R. Shivamoggi, 2021, Trends in the representation of women amongst US geoscience faculty from 1999 to 2020: The long road towards gender parity. *AGU Advances*. DOI: 10.1029/2021AV000436

Duffy, P.B. and **M.L. Duffy**, 2021, Worst climate outcomes are still possible. *Letter, Science*, DOI: 10.1126/science.abg2720 (Letter, not peer reviewed)

**Duffy, M.L.**, P.A. O’Gorman, L.E. Back, 2020, Importance of Laplacian of low-level warming for the response of precipitation to climate change over tropical oceans, *Journal of Climate*, DOI: 10.1175/JCLI-D-19-0365.1

## INVITED PRESENTATIONS

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**UC Davis, Faculty Seminar** Perturbing parameters to understand cloud contributions to climate change (June 2026)

**UC Santa Cruz, Whole Earth Seminar** Atmospheric mechanisms of the pattern effect (May 2026)

**University of Utah, Atmospheric Sciences Seminar** Atmospheric mechanisms of the pattern effect (March 2026)

**UCLA, AOS Seminar** Atmospheric mechanisms of the pattern effect (October 2025)

**UC Irvine, Earth System Science Seminar** Atmospheric mechanisms of the pattern effect (February 2025)

**AGU Annual Meeting, Perturbed Parameter Ensembles (PPEs) for Understanding Processes and Quantifying Uncertainty in Earth System Model** Perturbing Parameters to Understand Cloud Contributions to Climate Change (December 2024)

**UC San Diego, Scripps Seminar** Mechanisms of the relationship between the pattern of global warming and climate feedbacks (October 2024)

**UC Berkeley, EPS Seminar** Mechanisms of the relationship between the pattern of global warming and climate feedbacks in CAM6 (October 2024)

**Stanford University, CLAOD Seminar** Perturbing parameters to understand cloud contributions to climate change (February 2024)

**University of Illinois Urbana-Champaign, Atmospheric Sciences Department** Perturbing parameters to understand cloud contributions to climate change (January 2024)

**Lapse rate workshop** Intermodel spread in Walker circulation responses linked to spread in moist stability and radiation responses (July 2023)

**ECS and cloud feedback virtual symposium** Perturbing parameters to understand cloud contributions to climate change (March 2023)

**University of Wyoming, Atmospheric Science Seminar** The relationship between atmospheric parameters, SST pattern, and radiative feedbacks in CAM6 (November 2022)

**University of Colorado Boulder, ATOC Colloquium** The relationship between atmospheric parameters, SST pattern, and radiative feedbacks in CAM6 (September 2022)

**University of Wisconsin Madison, AOS Seminar** Importance of Laplacian of low-level warming for the response of precipitation to climate change over tropical oceans (November 2019)

#### CONTRIBUTED PRESENTATIONS

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**CalGFD** Dynamics of extreme wet-bulb temperature events (September 2025)

**CalGFD** Mechanisms of the Pattern Effect (September 2024)

**CESM workshop** Mechanisms of the Pattern Effect in CAM6 (June 2024)

**CFMIP** Mechanisms of the Pattern Effect in CAM6 (June 2024)

**BASC Symposium with theme “Going with the Flow: AI/ML in Atmospheric Science”**  
Perturbing parameters to understand cloud contributions to climate change (March 2024)

**CESM Climate Justice Task Force** An empirical analysis of how geoscientists from underrepresented groups decide to accept or decline faculty job offers (February 2024)

**CESM Atmosphere Model Working Group Meeting** CAM6 patch experiments (February 2024)

**AGU Annual Meeting** Perturbing parameters to understand cloud contributions to climate change (December 2023)

**AGU Annual Meeting** Are departmental DEI and culture efforts working?: An empirical analysis of how geoscientists from historically-underrepresented groups make the decision to accept or decline faculty job offers (December 2023)

**CFMIP** Perturbing parameters to understand cloud contributions to climate change (July 2023)

**CESM workshop** Perturbing parameters to understand cloud contributions to climate change (June 2023)

**AMS Annual Meeting** Intermodel spread in Walker circulation responses linked to spread in moist stability and radiation responses (January 2023)

**AMS Annual Meeting** Parametric sensitivity of cloud feedbacks in CAM6 (January 2023)

**CFMIP** Processes setting the spread in cloud-radiative feedbacks in a perturbed parameter ensemble (July 2022)

**Pattern Effect Workshop** Investigating the spread in cloud-radiative feedbacks in a perturbed parameter ensemble (May 2022)

**AGU Annual Meeting** An energetic evaluation of the response of the Walker circulation to warming (December 2021)

**AGU Annual Meeting** Relating the gross moist stability to SST and SST gradients (December 2021)

**AMS Tropical** An energetic evaluation of the response of the Walker circulation to warming (May 2021)

**AMS Tropical** Relating the gross moist stability to SST and SST gradients (May 2021)

**AMS Annual Meeting** Influence of entrainment on the response of the Walker circulation to warming (January 2020)

**AMS AOFD** Importance of convergence driven by the Laplacian of low-level temperature for the response of precipitation to climate change over tropical oceans (June 2019)

**Northeast Tropical** Precipitation response to climate change over tropical oceans: Importance of changes in surface convergence driven by near-surface temperature gradients (June 2019)

**Harvard Climate Conference** Precipitation response to climate change over tropical oceans: Importance of changes in surface convergence driven by near-surface temperature gradients (April 2019)

**AGU Annual Meeting** Precipitation response to climate change over tropical oceans: Importance of changes in surface convergence driven by near-surface temperature gradients (December 2018)

**Lorenz Center Workshop on Water and Climate Change** Precipitation response to climate change over tropical oceans: Importance of changes in surface convergence driven by near-surface temperature gradients (June 2018)

**Graduate Climate Conference** Understanding the response of tropical rainfall to climate change (November 2017)

**AMS Annual Meeting** Quantification of uncertainty in return values of extreme precipitation events in the western US (January 2015)

## TEACHING

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**Guest Lectures** Colorado State University, Atmospheric Science, ATS 781 *Fall 2021*

**Teaching Practice Certificate Program** MIT Teaching and Learning Lab *Spring 2021*

**Teaching Assistant**

MIT 12.885/12.385, Science, Politics, and Environmental Policy (TA rating 6.4/7) *Fall 2018*

MIT 12.003, Introduction to Atmosphere, Ocean, and Climate Dynamics *Fall 2017*

**TA Days workshop** MIT Teaching and Learning Lab *2017*

**Tutor** Haverford College, Calculus Resource Center *2012, 2013, 2015*

**Student Grader**

Haverford College MATH 105, Applied Modeling with Calculus *2013, 2015*

Haverford College MATH 103, Introduction to Probability and Statistics *2014*

## MENTORING AND RESIDENTIAL LIFE

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**Undergraduate research mentor:** Sarah Weidman (MIT '21) (co-advised with Professor O'Gorman) *Summer 2019*

**Mentor** EAPS mentoring program *2017 - 2019*

**Graduate Residence Tutor/Advisor** MIT McCormick Hall (undergraduate women's residence hall) *2016 - 2020*

## SERVICE AND OUTREACH

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**Media coverage** New York Times (quote, May 30<sup>th</sup>, 2025), Scripps News (live interview, May 29<sup>th</sup>, 2025), PBS Here's the Deal (quote, May 27<sup>th</sup>, 2025), KGNU (live radio, May 27<sup>th</sup>, 2025), New Scientist (quote, Sept 2<sup>nd</sup>, 2024)

**The Weather and Climate Livestream**, co-organizer, 100-hour YouTube livestream in response to federal funding cuts *May 28 – June 1 2025*

**Session co-convenor**, Parameter estimation, CESM workshop *June 2023*

**Reviewer**, Journal of Climate, Journal of the Atmospheric Sciences, JAMES, GRL, Science Advances, NSF Climate and large-scale dynamics

**MIT Abstracts**, Nord Anglia Education, invited speaker *April 2021*

**Wx challenge** *2019 - 2021*

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|------------------------------------------------------------------------------|--------------------|
| <b>Graduate student advisory group to PAOC faculty search committee</b>      | <i>2019 - 2020</i> |
| <b>PAOC Colloquium committee</b> member; Founder, EAPS career discussions    | <i>2018 - 2020</i> |
| <b>Girls day</b> at MIT Museum volunteer                                     | <i>Nov 2019</i>    |
| <b>Keys to Empowering Youth</b> Society for Women Engineers, invited speaker | <i>Oct 2016</i>    |

#### TRAINING AND SKILLS

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| <b>Machine Learning Bootcamp</b> NCAR                                                                                                            | <i>Nov 2023</i> |
| <b>Researchers Involved in Human Subjects Research</b> CITI                                                                                      | <i>May 2023</i> |
| <b>Teaching Practice Certificate Program</b> MIT Teaching and Learning Lab<br>Lesson Planning, Microteaching, Inclusive teaching, Subject design | <i>2021</i>     |
| <b>Programming languages</b> Python, MATLAB                                                                                                      |                 |
| <b>Climate model simulations</b> Community Earth System Model (CESM), Geophysical Fluid Dynamics Lab (GFDL) idealized moist GCM                  |                 |