DR. MARGARET L. DUFFY

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EDUCATION AND EMPLOYMENT

UC Davis, Assistant Professor *Nov 2025 – present*
Department of Land, Air, and Water Resources

UC Berkeley, Chancellor's Postdoctoral Fellow *Aug 2024 – Oct 2025*
Mentored by Professor William Boos

National Center for Atmospheric Research, Postdoctoral Fellow Sept *2021 – Aug 2024*
Supervised by Dr. Brian Medeiros and Dr. Andrew Gettelman

Massachusetts Institute of Technology, PhD in Climate Science *2021*
Dissertation: "An energetic perspective on the tropical atmosphere and its response to warming"
Advised by Professor Paul O'Gorman

Haverford College, BS in Mathematics *2015*
Minor in Statistics, Concentration in Scientific computing
Thesis: "Analysis of a simple ice sheet model"

AWARDS AND FUNDING

PI, Improved understanding of cloud-controlling factors, Pending
NOAA MAPP, $569,631

UC Berkeley Chancellor's Postdoctoral Fellowship *2024 -*

Funded DEI proposal, NCAR EdEC, $4,927 *2024*

Award for Excellence in Teaching, MIT EAPS, 12.003 *2018*

Jule Charney Prize, MIT EAPS *2015 - 2018*

Whiteman Fellow, MIT EAPS *2016 - 2017*

Rasmussen Fellow, MIT EAPS *2015 - 2016*

PUBLICATIONS

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*)

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? *ESS Open Archive*. January 24, 2025. DOI: 10.22541/essoar.173775739.93027483/v1 (Under review with *Journal of Advances in Modeling Earth Systems*)

Published

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 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

UC Santa Cruz, Whole Earth Seminar (scheduled for May 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

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

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

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

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

Graduate student advisory group to PAOC faculty search committee *2019 - 2020*

PAOC Colloquium committee member; Founder, EAPS career discussions *2018 - 2020*

Girls day at MIT Museum volunteer *Nov 2019*

Keys to Empowering Youth Society for Women Engineers, invited speaker *Oct 2016*

TRAINING AND SKILLS

Machine Learning Bootcamp NCAR *Nov 2023*

Researchers Involved in Human Subjects Research CITI *May 2023*

Teaching Practice Certificate Program MIT Teaching and Learning Lab *2021*
Lesson Planning, Microteaching, Inclusive teaching, Subject design

Programming languages Python, MATLAB

Climate model simulations Community Earth System Model (CESM), Geophysical Fluid Dynamics Lab (GFDL) idealized moist GCM