

# Manda B. Chasteen

POSTDOCTORAL FELLOW II  NATIONAL CENTER FOR ATMOSPHERIC RESEARCH

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## EDUCATION

### UNIVERSITY OF OKLAHOMA

*Doctor of Philosophy, Meteorology*

Dissertation: *A Multiscale Investigation of the 26–27 April 2011 Tornado Outbreak*

2021

### UNIVERSITY OF OKLAHOMA

*Master of Science, Meteorology*

Thesis: *The Response of a Long-Lived Mesoscale Convective System to Changes in Lower Tropospheric Conditions*

2017

### UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

*Bachelor of Science, Atmospheric Sciences* — *Magna Cum Laude with Highest Distinction*

Minor: Earth, Society, and Environmental Sustainability

2014

## RESEARCH AND PROFESSIONAL APPOINTMENTS

### NATIONAL CENTER FOR ATMOSPHERIC RESEARCH

Postdoctoral Fellow II, Mesoscale & Microscale Meteorology Laboratory, *Boulder, Colorado*

2021 – Present

### NATIONAL CENTER FOR ATMOSPHERIC RESEARCH

Graduate Student Visitor, Mesoscale & Microscale Meteorology Laboratory, *Boulder, Colorado*

2020 – 2021

### NATIONAL CENTER FOR ATMOSPHERIC RESEARCH

Graduate Student Visitor, Advanced Study Program, *Boulder, Colorado*

2019

### COOPERATIVE INSTITUTE FOR MESOSCALE METEOROLOGICAL STUDIES

Graduate Research Assistant, *Norman, Oklahoma*

2017 – 2021

### UNIVERSITY OF OKLAHOMA – SCHOOL OF METEOROLOGY

Graduate Research Assistant, *Norman, Oklahoma*

2014 – 2016

### NATIONAL WEATHER SERVICE

Student Volunteer, *Norman, Oklahoma*

2015 – 2016

### UNIVERSITY OF ILLINOIS – DEPARTMENT OF ATMOSPHERIC SCIENCES

Undergraduate Research Assistant, *Urbana, Illinois*

2013 – 2014

### NATIONAL WEATHER SERVICE

Hollings Scholarship Recipient and Intern, *Gray, Maine*

2013

### NAVAL OCEANOGRAPHIC OFFICE – OCEAN PROJECTS DEPARTMENT

Physical Science Assistant, *Stennis Space Center, Mississippi*

2012

## TEACHING EXPERIENCE

### > INSTRUCTOR OF RECORD

#### METR 4433: MESOSCALE METEOROLOGY

School of Meteorology, University of Oklahoma [co-instructor]

- Developed and administered a senior-level core course in mesoscale meteorology and convective dynamics
- Designed and taught lectures on topics such as: *hodograph analysis, mesoscale instabilities, fronts, rainbands, boundary layer convection, supercell dynamics, tornadogenesis, convective hazards, and upscale convective feedbacks*
- Wrote original homework assignments, quizzes, and exams

Spring 2019

#### METR 2021: INTRODUCTION TO METEOROLOGY LABORATORY II

School of Meteorology, University of Oklahoma

- Lectured about various topics relating to introductory atmospheric dynamics
- Designed and graded applied homework assignments and weekly quizzes

Summer 2017

## > GUEST LECTURER

### **ATS 735: MESOSCALE DYNAMICS**

Fall 2023

Department of Atmospheric Science, Colorado State University

- Topics covered: *scale interactions, upscale environmental modifications from convection*

### **METR 6414: ADVANCED MESOSCALE METEOROLOGY**

Fall 2018

School of Meteorology, University of Oklahoma

- Topics covered: *density currents, gravity waves, and atmospheric bores*

### **METR 4433: MESOSCALE METEOROLOGY**, University of Oklahoma

Spring 2018

School of Meteorology, University of Oklahoma

- Topics covered: *isentropic analysis, mesoscale boundaries, boundary layer convection, and lake-effect snow*

## > TEACHING ASSISTANT AND TUTOR

### **METR 3231: PHYSICAL METEOROLOGY I – THERMODYNAMICS**

Fall 2015; Fall 2016

School of Meteorology, University of Oklahoma

- Graded exams, quizzes, and MATLAB homework assignments for approximately 50 students per semester

### **METEOROLOGY HELP DESK**

Fall 2014

School of Meteorology, University of Oklahoma

- Tutored sophomore through senior undergraduate students enrolled in meteorology core courses

### **ATMS 120: SEVERE AND HAZARDOUS WEATHER**

Fall 2012; Spring 2013

Department of Atmospheric Sciences, University of Illinois

- Graded homework assignments for approximately 600 students per semester

## FIELD RESEARCH EXPERIENCE

### **TARGETED OBSERVATIONS USING RADAR AND UAS IN SUPERCELLS [TORUS]**

2019

NOAA National Severe Storms Laboratory

- Coordinated radiosonde releases and operated a mobile mesonet vehicle within the preconvective environment and inflow region of supercell thunderstorms

### **RIVERS OF VORTICITY IN SUPERCELLS [RiVorS]**

2017

NOAA National Severe Storms Laboratory

- Operated the NOAA CLAMPS2 mobile observing system, which comprises multiple profiling instruments
- Released radiosondes within the preconvective environment and inflow region of supercell thunderstorms

### **ENVIRONMENTAL PROFILING AND INITIATION OF CONVECTION [EPIC]**

2017

NOAA National Severe Storms Laboratory

- Operated the NOAA CLAMPS2 mobile observing system, which comprises multiple profiling instruments
- Released radiosondes within preconvective environments

### **VERIFICATION OF THE ORIGINS OF ROTATION IN TORNADES EXPERIMENT – SOUTHEAST [VORTEX-SE]**

2017

NOAA National Severe Storms Laboratory

- Operated the University of Oklahoma RaXPol mobile Doppler radar

### **PLAINS ELEVATED CONVECTION AT NIGHT [PECAN]**

2015

National Science Foundation

- Operated the Naval Postgraduate School TWOLF mobile Doppler lidar
- Participated in research flights with the NOAA P-3 and NASA DC-8 aircraft

### **ONTARIO WINTER LAKE-EFFECT SYSTEMS [OWLeS]**

2013 – 2014

National Science Foundation

- Operated the Doppler on Wheels (DOW) mobile radars
- Performed transects of lake-effect snowbands using mobile mesonet systems
- Deployed instrumentation pods for the collection of in situ surface observations

## REFEREED PUBLICATIONS

- Prein, A.F., D. Wang, M. Ge, A. Ramos Valle, and **M.B. Chasteen**, 2024: Grid spacing sensitivity of simulated convective drafts in tropical and midlatitude mesoscale convective systems. *J. Geophys. Res. Atmos.*, in preparation.
- Chasteen, M.B.**, M. Wong, and N. Szapiro, 2024: A potential vorticity diagnostics package for MPAS-Atmosphere. *J. Adv. Model. Earth Syst.*, in review.
- Chasteen, M.B.**, and S.E. Koch, 2022: Multiscale aspects of the 26-27 April 2011 tornado outbreak, Part II: Environmental modifications and upscale feedbacks arising from latent processes. *Mon. Wea. Rev.*, **150**, 309-335.
- Chasteen, M.B.**, and S.E. Koch, 2022: Multiscale aspects of the 26-27 April 2011 tornado outbreak, Part I: Outbreak chronology and environmental evolution. *Mon. Wea. Rev.*, **150**, 337-368.
- Trier, S.B., G.R. Romine, D.A. Ahijevych, R.A. Sobash, and **M.B. Chasteen**, 2021: Relationship of convection initiation and subsequent storm strength to ensemble simulated environmental conditions during IOP3b of VORTEX-SE\_2017. *Mon. Wea. Rev.*, **149**, 3265-3287.
- Reif, D.W., H.B. Bluestein, T.M. Weckwerth, Z.B. Wienhoff, and **M.B. Chasteen**, 2020: Estimating the maximum vertical velocity at the leading edge of a density current. *J. Atmos. Sci.*, **77**, 3683-3700.
- Chasteen, M.B.**, S.E. Koch, and D.B. Parsons, 2019: Multiscale processes enabling the longevity and daytime persistence of a nocturnal mesoscale convective system. *Mon. Wea. Rev.*, **147**, 733-761.

## NON-REFEREED CONFERENCE PROCEEDINGS

- Wienhoff, Z.B., **M.B. Chasteen**, and J.W. Frame, 2014: Single and dual-Doppler radar observations of a nontornadic supercell thunderstorm on 6 June 2010. *27<sup>th</sup> Conference on Severe Local Storms*, American Meteorological Society, Madison, WI.

## INVITED TALKS

- [8 January 2023] "What skills do I need to be a successful researcher in atmospheric science?" *22<sup>nd</sup> Annual Student Conference*, American Meteorological Society, Denver, CO.
- [24 May 2022] "A multiscale investigation of the 26-27 April 2011 tornado outbreak." *Central Mississippi Chapter of the National Weather Association and American Meteorological Society*, Jackson, MS.
- [29 April 2022] "My experiences at the University of Illinois and life after graduation." *Department of Atmospheric Sciences 40<sup>th</sup> Anniversary Celebration*, University of Illinois, Champaign, IL.
- [29 October 2019] "Multiscale aspects of the 26-27 April 2011 tornado outbreak." *Department of Atmospheric Science, University of Wyoming*, Laramie, WY.
- [21 October 2019] "Multiscale aspects of the 26-27 April 2011 tornado outbreak." *Department of Atmospheric Science, Colorado State University*, Fort Collins, CO.

## CONFERENCE AND WORKSHOP PRESENTATIONS

- Chasteen, M.B.**, Wong, M., 2024: A revised PV diagnostics package for MPAS-Atmosphere. *Joint WRF and MPAS Users' Workshop*, National Center for Atmospheric Research, Boulder, CO.
- Chasteen, M.B.**, Rotunno, R., 2024: A simplified model of processes leading to warm-sector deep-convection initiation. *104<sup>th</sup> American Meteorological Society Annual Meeting*, Baltimore, MD.
- Chasteen, M.B.**, Prein, A.F., Wang, D., and M. Ge, 2023: Examining the sensitivity of simulated midlatitude and tropical mesoscale convective systems to horizontal grid spacing. *2023 ARM/ASR Joint PI Meeting*, Rockville, MD.
- Chasteen, M.B.**, Prein, A.F., Wang, D., and M. Ge, 2023: Examining the sensitivity of simulated midlatitude and tropical mesoscale convective systems to horizontal grid spacing. *20<sup>th</sup> Conference on Mesoscale Processes*, American Meteorological Society, Madison, WI.
- Chasteen, M.B.**, Koch, S.E., Rotunno, R., and G.S. Romine, 2023: Mesoscale processes leading to warm sector convection initiation during the 27 April 2011 afternoon supercell outbreak. *20<sup>th</sup> Conference on Mesoscale Processes*, American Meteorological Society, Madison, WI.

- Chasteen, M.B.**, M. Wong, and G.S. Romine, 2023: Efforts to balance the potential vorticity budget in MPAS. *Joint WRF and MPAS Users' Workshop, National Center for Atmospheric Research, Boulder, CO.*
- Chasteen, M.B.**, and S.E. Koch, 2022: Multiscale process interactions and upscale feedbacks during the 26–27 April 2011 tornado outbreak. *30<sup>th</sup> Conference on Severe Local Storms*, American Meteorological Society, Santa Fe, NM.
- Chasteen, M.B.**, and S.E. Koch, 2020: Mesoscale processes influencing convective morphology during the 26–27 April 2011 tornado outbreak. *30<sup>th</sup> Conference on Weather Analysis and Forecasting (WAF)/26<sup>th</sup> Conference on Numerical Weather Prediction (NWP)*, American Meteorological Society, Boston, MA.
- Chasteen, M.B.**, T.J. Galarneau, M. Krocak, and Z. Brooke Zibton, 2020: Environmental nuances and convective morphology during the 30 April 2017 tornado outbreak in the Southeastern United States. *30<sup>th</sup> Conference on Weather Analysis and Forecasting (WAF)/26<sup>th</sup> Conference on Numerical Weather Prediction (NWP)*, American Meteorological Society, Boston, MA.
- Galarneau, T.J., **M.B. Chasteen**, and M. Krocak, 2020: Short-term prediction of QLCS mesovortices in the Southeast United States on 30 April 2017. *30<sup>th</sup> Conference on Weather Analysis and Forecasting (WAF)/26<sup>th</sup> Conference on Numerical Weather Prediction (NWP)*, American Meteorological Society, Boston, MA.
- Chasteen, M.B.**, and S.E. Koch, 2019: Multiscale processes influencing convective morphology during the 26-27 April 2011 tornado outbreak. *VORTEX-SE Science Workshop*, Huntsville, AL.
- Chasteen, M.B.**, and S.E. Koch, 2019: Mesoscale disturbances during the 26-27 April 2011 tornado outbreak. *18<sup>th</sup> Conference on Mesoscale Processes*, American Meteorological Society, Savannah, GA.
- Chasteen, M.B.**, Z. Brooke Zibton, and M. Krocak, 2019: The 30 April 2017 tornadic QLCS in the Southeast. *ASP Summer Colloquium*, National Center for Atmospheric Research, Boulder, CO.
- Chasteen, M.B.**, and S.E. Koch, 2019: Scale-interactive processes in the evolution of multiepisode tornado outbreaks in the Southeastern U.S. *Special Symposium on Mesoscale Meteorological Extremes: Understanding, Prediction, and Projection*, American Meteorological Society, Phoenix, AZ.
- Chasteen, M.B.**, and S.E. Koch, 2018: An investigation of mesoscale processes and convective morphology on 27 April 2011. *29<sup>th</sup> Conference on Severe Local Storms*, American Meteorological Society, Stowe, VT.
- Chasteen, M.B.**, S.E. Koch, and D.B. Parsons, 2018: Multiscale processes leading to the development and longevity of a mesoscale convective system. *29<sup>th</sup> Conference on Severe Local Storms*, American Meteorological Society, Stowe, VT.
- Chasteen, M.B.**, 2017: An investigation of mesoscale processes and convective morphology on using a convective-permitting ensemble. *VORTEX-SE Science Workshop*, Huntsville, AL.
- Chasteen, M.B.**, and D.B. Parsons, 2017: The response of a long-lived mesoscale convective system to changes in lower-tropospheric conditions. *17<sup>th</sup> Conference on Mesoscale Processes*, American Meteorological Society, San Diego, CA.
- Chasteen, M.B.**, and D.B. Parsons, 2016: The response of a long-lived mesoscale convective system to changes in boundary layer stability. *28<sup>th</sup> Conference on Severe Local Storms*, American Meteorological Society, Portland, OR.
- Chasteen, M.B.**, and D.B. Parsons, 2016: WRF simulations of a long-lived MCS: model sensitivity. *17<sup>th</sup> Annual WRF Users' Workshop*, National Center for Atmospheric Research, Boulder, CO.
- Chasteen, M.B.**, and D.B. Parsons, 2015: Evolution of 6 October 2014 nocturnal convection owing to changing boundary layer stability and dynamical lifting. *16<sup>th</sup> Conference on Mesoscale Processes*, American Meteorological Society, Boston, MA.
- Chasteen, M.B.**, 2014: Comparative dynamic and thermodynamic characteristics of nontornadic New England thunderstorm environments. *13<sup>th</sup> Annual Student Conference*, American Meteorological Society, Atlanta, GA.
- Chasteen, M.B.**, 2013: Comparative dynamic and thermodynamic characteristics of nontornadic New England Thunderstorm Environments. *NOAA Office of Education Science and Education Symposium*, Silver Spring, MD.

## HONORS, AWARDS, AND RECOGNITION

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|---|------|
| NCAR Early Career Scientists Assembly [ECSA] Travel Funding Financial Award                               | 2022 |
| AMS Board for Early Career Professionals Spotlight Series: "Perspectives from Early Career Professionals" | 2020 |

Outstanding Student Poster Award, 30 <sup>th</sup> Conference on WAF/26 <sup>th</sup> Conference on NWP, AMS Annual Meeting	2020
NCAR Advanced Study Program Graduate Student Fellowship	2019
Ogura Award for Outstanding Senior in the Department of Atmospheric Sciences	2014
Ogura Outstanding Undergraduate Research Award	2014
American Meteorological Society Karen Hauschild Friday Scholarship	2013
University of Illinois Liberal Arts and Sciences Clarence E. Brehm Scholarship	2013
National Oceanic and Atmospheric Administration Ernest F. Hollings Scholarship	2012
Dr. Bill Williams Endowment Scholarship in Meteorology	2012
Edmund J. James Scholar, University of Illinois	2011 – 2014
Frederick P. Whiddon Scholar, University of South Alabama	2011 – 2012
Armed Forces Communications and Electronics Association General Emmett Paige Scholarship	2011
Edwardsville Dirty Dozen Scholarship	2010

## LEADERSHIP AND PROFESSIONAL SERVICE

NCAR   UCAR   UCP Summer Student Research Poster Symposium, Evaluator	2023
30 <sup>th</sup> AMS Conference on Severe Local Storms, Program Committee Member, Session Chair, and Presentation Judge	2022
AMS Women in Atmospheric Science Luncheon, Breakout Discussion Moderator	2022
Student and Early Career Conference on Severe Local Storms, Organizer and Panel Discussion Moderator	2021
University of Illinois "ATMS 391: Professional Development" Course, Public Sector Panelist	2021
"The World Through My Eyes" AMS Webinar Series, Panelist	2020
Severe Local Storms Symposium, 100 <sup>th</sup> AMS Annual Meeting, Session Chair	2020
AMS STAC Severe Local Storms Committee, Member and Glossary Subcommittee Chair	2019 – Present
VORTEX-SE Meso18-19 Field Project Planning Team, Member	2018 – 2019
School of Meteorology Faculty Website Committee, Graduate Student Representative	2018
National Weather Center REU Program, Student Presentation Session Chair	2018
School of Meteorology Summer Met Days, Graduate Student Panelist	2018
17 <sup>th</sup> AMS Annual Student Conference, Poster Judge	2018
University of Oklahoma Libraries Student Advisory Council, Graduate Student Representative	2017 – 2018
University of Oklahoma Graduate Student Fees Analysis, Spearhead	2016 – 2017
15 <sup>th</sup> AMS Annual Student Conference, Graduate Student Recruiter for the School of Meteorology	2016
School of Meteorology Visiting Student Weekend, Travel Coordinator	2015 – 2017
School of Meteorology Student Affairs Committee, Secretary	2015 – 2016
School of Earth, Society, and Environment Research Review Planning Committee, Member	2013 – 2014
AMS Annual Meeting, Student Assistant	2012 – 2013
<b>PROPOSAL REVIEWER:</b> National Oceanic and Atmospheric Administration	2023 – Present
<b>JOURNAL ASSOCIATE EDITOR:</b> Monthly Weather Review	2023 – Present
<b>JOURNAL PEER REVIEWER:</b> Journal of Atmospheric Science, Monthly Weather Review, Journal of Climate, Weather and Forecasting, Quarterly Journal of the Royal Meteorological Society	2019 – Present

## COLLOQUIA, WORKSHOPS, AND PROFESSIONAL DEVELOPMENT

Joint WRF and MPAS Users' Workshop, National Center for Atmospheric Research	2024
Earth System Predictability Across Timescales Workshop, National Center for Atmospheric Research	2024
Machine Learning Bootcamp Introductory Course, National Center for Atmospheric Research	2023
Early Career Professional Development Workshop, University Corporation for Atmospheric Research	2023
Career Development Retreat for Postdocs, National Center for Atmospheric Research	2023
UFS Physics Workshop, National Center for Atmospheric Research	2023
Joint WRF and MPAS Users' Workshop, National Center for Atmospheric Research	2023
Dask Python Parallel Computing Tutorial, National Center for Atmospheric Research	2023
Trustworthy Artificial Intelligence for Environmental Science [TAI4ES] Summer School, NSF AI Institute for Research on Trustworthy AI in Weather, Climate, and Coastal Oceanography [AI2ES]	2022

Hazardous Weather Testbed Spring Forecasting Experiment, NOAA Storm Prediction Center & National Severe Storms Laboratory	2022
Bias Training Workshop, AdvanceGEO and American Geophysical Union	2021
Managing Bias Training for Employees, University of Oklahoma	2020
Diversity: Inclusion in the Modern Workplace Training for Employees, University of Oklahoma	2020
Diversity, Equity, and Inclusion Training for Students, University of Oklahoma	2020
VORTEX-SE Workshop, University Corporation for Atmospheric Research	2019
Model for Prediction Across Scales [MPAS] Tutorial, National Center for Atmospheric Research	2019
"Quantifying and Communicating Uncertainty in High-Impact Weather Prediction", ASP Colloquium, National Center for Atmospheric Research	2019
Professional Ethics Training – Responsible Conduct of Research, National Center for Atmospheric Research	2019
Predictability and Uncertainty in Models and Retrievals Workshop, CIMMS	2018
VORTEX-SE Workshop, University Corporation for Atmospheric Research	2017
17 <sup>th</sup> Annual WRF Users' Workshop, National Center for Atmospheric Research	2016
Plains Elevated Convection at Night [PECAN] Planning Meeting, National Center for Atmospheric Research	2015
LGBTQ Ally Training, University of Oklahoma	2015
Professional Ethics Training – Responsible Conduct of Research, University of Oklahoma	2015

## OUTREACH AND VOLUNTEER ACTIVITIES

Corden Pharma Boulder Valley School District Regional Science Fair, Judge	2020 – 2024
Letters to a Pre-Scientist, Pen Pal	2021
Targeted Observations Using Radar and UAS in Supercells Media Day, Participant	2019
Copeville, Texas, EF2 Tornado Disaster Relief, Debris Cleanup	2015
Plains Elevated Convection at Night Media Day, Participant	2015
Gifford, Illinois, EF3 Tornado Disaster Relief, Debris Cleanup	2013
Boy Scouts of America Weather Merit Badge, Course Instructor	2013

## MENTORSHIP ACTIVITIES

Ayman Elyoussoufi – UCAR SOARS Protégé, Computing Mentor	2022
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## COMPUTING AND TECHNICAL SKILLS

**SOFTWARE AND COMPUTING:** Python [proficient], NCL [proficient], MATLAB [proficient], LaTeX [proficient], Adobe Illustrator [proficient], Unix/Linux [working knowledge], Fortran [working knowledge], Git/GitHub [working knowledge], NCEP Unified Post Processing [UPP] System [working knowledge], high-performance computing systems [working knowledge]

**ATMOSPHERIC MODELS:** Model for Prediction Across Scales [MPAS] Atmospheric Model [proficient], Weather Research and Forecasting [WRF] Model [proficient], Cloud Model 1 [CM1] [proficient], Hybrid Single Particle Lagrangian Integrated Trajectory [HYSPLIT] Model [proficient]

**MODEL DEVELOPMENT:** MPAS

**MODEL OUTPUT:** WRF, MPAS, CM1, GFS, NAM, RUC, RAP, HRRR, ERA5, HYSPLIT

**DATA FORMATS:** netCDF, GRIB, GRIB2, HDF5, JSON, SHP, CSV, ASCII

## PROFESSIONAL MEMBERSHIPS

National Postdoctoral Association	2022 – Present
American Meteorological Society	2010 – Present