ROBERT MICHAEL FROST

he/him/his
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EDUCATION

M.S., Meteorology **June 2024 – Present**
University of Oklahoma, Norman, OK

B.S., Meteorology, *Magna Cum Laude* **August 2020 – May 2024**
University of Oklahoma, Norman, OK
Completed courses in calculus, differential equations, statistics, chemistry, physics, communication, and GIS in addition to meteorology with a 3.85 GPA.

RESEARCH INTERESTS

Boundary-layer meteorology, deep moist convection, Doppler lidar, numerical modeling, radar meteorology, supercell thunderstorms, tornadogenesis

RESEARCH EXPERIENCE

Graduate Research Assistant **June 2024 – Present**
Advanced Radar Research Center (ARRC), School of Meteorology, University of Oklahoma, Norman, OK
Advised by Drs. David Bodine and Tian-You Yu. Investigating the influence of turbulent coherent structures on tornadogenesis using mobile Doppler lidar, mobile radar platforms, and numerical modeling.

Senior Capstone Project **August 2023 – December 2023**
School of Meteorology, University of Oklahoma, Norman, OK
Mentored by Drs. Addison Alford and James Ruppert. Investigated the microphysical differences between tornadic tropical cyclone supercells which do and do not produce lightning. Involved manipulating WSR-88D radar data and visualizing the time evolution of updraft characteristics. Utilized Python, Pyart, and Numpy.

William M. Lapenta Intern **June 2023 – August 2023**
National Oceanic and Atmospheric Administration (NOAA), Global Systems Laboratory (GSL), Boulder, CO
Mentored by Drs. Jeff Beck, Gerard Ketefian, and Ligia Bernardet. Evaluated verification of different convective parameterization schemes with the NOAA's Unified Forecast System Short Range Weather (SRW) Application. Utilized Linux and Shell scripting to run the SRW application on convective cases. Processed model output using Python, Xarray, and Pygrib. Plotted comparisons between cases using the Matplotlib and Cartopy packages.

Undergraduate Researcher **November 2022 – May 2024**
School of Meteorology, University of Oklahoma, Norman, OK
Advised by Dr. James Ruppert. Exploring the role the radiative diurnal cycle played on Tropical Storm Erin's overland intensification in 2007 using the Weather Research and Forecast (WRF) model, ERA5 reanalysis, and weather radar. Utilizing Bash scripting, Python, Xarray, Numpy, and Pyart to run experiments and manipulate data. Plotting output with Matplotlib and Cartopy to visualize physical processes.

Undergraduate Researcher **September 2021 – May 2024**
School of Meteorology, University of Oklahoma, Norman, OK
Advised by Dr. Scott Salesky. Investigating effects of non-stationary forcing on convective boundary layer structures using large eddy simulations. Preparing manuscripts for publication and presenting at national scientific conferences. Editing FORTRAN programs to implement non-stationary surface forcing to simulations. Running simulations using Linux and shell scripting. Processing data with Python and Xarray. Plotting output with Matplotlib to visualize turbulence statistics and dynamics.

RELATED EXPERIENCE

Student Volunteer/Shadowing **December 2023**

National Weather Service, Norman, OK

Shadowed NWS Meteorologists at the Norman Weather Forecast Office. Consisted of learning about the NWS hiring process, day-to-day duties, forecast practices, and collaboration with other forecasters and offices.

Boundary Layer Integrated Sensing and Simulation (BLISS) **February 2022 – Present**

School of Meteorology, University of Oklahoma, CIWRO, NSSL

Active member of the BLISS research group. Participant of regular group meetings to help brainstorm new scientific strategies, attend seminars on atmospheric boundary layer (ABL) research, and network with professionals in my field. Attending training on equipment like Unmanned Aircraft Systems, Doppler Lidar, and other tools used for ABL measurements.

Student Operator/Quality Assurance Assistant **April 2021 – May 2023**

Oklahoma Mesonet, Oklahoma Climatological Survey, Norman, OK

Worked with up to 9 other students in Operations to ensure 120 Mesonet sites across Oklahoma communicated and transmitted data properly. Utilized Linux systems and loggernet to track communication history and assess issues with sites. Performed quality assurance on incoming meteorological data by comparing rainfall measurements with radar estimates, viewing trends in instrument measurements, and viewing station meteograms to find non-meteorological influence on data. Answered phone calls and emails from the general public to assist them with finding data and answer and questions they had.

PUBLICATIONS

Frost, R., B.R. Greene, and S.T. Salesky: The Effects of Non-stationary Forcing on Large-scale Structures in the Convective Boundary Layer. *Boundary-Layer Meteorology*, in preparation.

CONFERENCE PRESENTATIONS

Frost, R., B.R. Greene, and S.T. Salesky, 2022. The Effects of Nonstationary Forcings on Organization and Turbulent Transport in the Convective Boundary Layer. *AGU Fall Meeting. Chicago, IL*. December 12-16, 2022.

Frost, R., B.R. Greene, and S.T. Salesky, 2023. The Effects of Non-stationary Forcing on Large-scale Structures in the Convective Boundary Layer. *AGU Fall Meeting. San Francisco, CA*. December 11-15, 2023.

Frost, R., J. Beck, G. Ketefian, M.A. Harrold, and L. Bernardet, 2024. The Impacts of the Grell-Freitas Scheme on Short-Range Forecasts of the April 19, 2023 Convective Event. *104th AMS Annual Meeting. Baltimore, MD*. January 28 - February 1, 2024.

Frost, R., S.J. Southward, C.W. Welty, A.A. Alford, and J.H. Ruppert Jr., 2024. An Analysis of Tropical Cyclone Supercells with Variable Electrification. *104th AMS Annual Meeting. Baltimore, MD*. January 28 - February 1, 2024.

Welty, C.W., **R. Frost**, and J.H. Ruppert Jr., 2024. Analysis on Tropical Storm Erin (2007) and the Diurnal Cycle in Post-Landfall Tropical Cyclones. *104th AMS Annual Meeting. Baltimore, MD*. January 28 - February 1, 2024.

Frost, R., C.W. Welty, and J.H. Ruppert Jr., 2024. The Influence of the Great Plains Low Level Jet on Tropical Storm Erin's (2007) Overland Intensification. *36th Conference on Hurricanes and Tropical Meteorology. Long Beach, CA*. May 6 - May 10, 2024.

Welty, C.W., **R. Frost**, and J.H. Ruppert Jr., 2024. The Role of Diurnal Cloud-Radiative Forcing on the Overland Intensification of Tropical Storm Erin (2007). *36th Conference on Hurricanes and Tropical Meteorology. Long Beach, CA*. May 6 - May 10, 2024.

AWARDS & RECOGNITION

First Place, Best Student Oral Presentation **January 2024**
14th Conference on the Transition of Research to Operations at the 104th Annual Meeting of the American Meteorological Society

William M. Lapenta Intern **Summer 2023**
National Oceanic and Atmospheric Administration

Dr. Edwin & Lottie Kessler Memorial Endowed Scholarship Recipient **April 2022, 2023, & 2024**
University of Oklahoma, School of Meteorology

First Year Composition Writing Award **April 2022**
University of Oklahoma, Department of English

President's Honor Roll **Spring 2021, Fall 2021, Spring 2023, & Fall 2023**
University of Oklahoma
Recognition for obtaining a 4.0 semester GPA

Dean's Honor Roll **Fall 2020, Spring 2022, Fall 2022, & Spring 2024**
University of Oklahoma
Recognition for obtaining a 3.5 or greater semester GPA

TECHNICAL SKILLS

Proficient	Python, LaTeX, Microsoft Office, NetCDF
Experience with	FORTRAN, Numerical Modeling, GitHub, Unix
Field Equipment	Radiosondes, Doppler LiDAR, OU Coptersonde

FIELD CAMPAIGN PARTICIPATION

LIFT Project **June 2024 – Presesnt**
University of Oklahoma, ARRC, NOAA, NSSL, CIWRO
Operating a mobile doppler lidar system to sample low-level inflow in tornadoes and supercells. This data collection is associated with my master's research.

Detecting and Evaluating Low-level Tornado Attributes (DELTA) **February 2024 – April 2024**
University of Oklahoma, NOAA, NSSL, CIWRO
Assisted with mobile mesonet truck operations to sample tornadic storms in the United States.

Propagation, Evolution, and Rotation in Linear Storms (PERiLS) **February 2023 – May 2023**
University of Oklahoma, NOAA, NSSL, CIWRO
Assisted with mobile Doppler LiDAR and Coptersonde UAS operations to sample rotation associated with Quasi-Linear Convective Systems in the southeastern United States.

SWOT/NISAR Corner Reflector Project **June 2022 – May 2023**
NASA JPL, Oklahoma Mesonet
Assisted in building and maintaining calibration reflectors for the National Aeronautics and Space Administration (NASA) Surface Water and Ocean Topography (SWOT) and NASA-ISRO SAR (NISAR) satellite missions in western Oklahoma and Texas. Performed metrology measurements to extreme precision to ensure accurate measurements by NASA's satellite systems.

Targeted Observations by Radar and UAS of Supercells (TORUS) **June 2022**
University of Oklahoma, NOAA, NSSL, CIWRO
Assisted the far-field sounding team with launching balloon soundings during field operations to study supercell environments. Aided with navigation, decision making, and ensuring safety for the team in high stress environments.

TRAINING AND CERTIFICATIONS

NOAA Online Environmental, Safety and Sustainability Awareness Course **May 2023**
NOAA, Lapenta Internship Program
Required training for NOAA employees taken before starting Lapenta Internship. Focuses on safe online and sustainable practices in office and at work.

sUAS Night Operations, Best Practices **Spring 2023**
Federal Aviation Administration
Completed in preparation for the Propagation, Evolution, and Rotation in Linear Storms (PERiLS) field campaign, required to participate in UAS operations. Consists of recordings detailing best practices and regulations for operating UAS at night, which can be necessary during PERiLS operations.

Spring Forecast Workshop **Spring 2023 & 2024**
Warning Decision Training Division (WDTD), Oklahoma Weather Lab
Workshop on how to use the NWS Advanced Weather Interactive Processing System (AWIPS) with hands on experience issuing storm warnings on a severe weather case study. Contained overviews of WDTD's activities, how AWIPS works, NWS warning criteria, and how to issue warnings to protect the public from high impact weather.

Diversity, Equity, and Inclusion (DEI) Education & Training **Spring & Fall 2022**
OU College of Atmospheric and Geographic Sciences
3 session training series focused on Understanding DEI in the Geosciences & Identity Foundations, Microaggressions and Microinterventions, and Demystifying the Reporting Process & DEI as Professional Development.

2021 Fieldwork Toolkit Leadership Training Series **Spring 2022**
University of California-Riverside
Completed in preparation for the Targeted Observations by Radar and UAS of Supercells (TORUS) field campaign. Consists of recordings covering Creating, Enforcing, and Promoting Safe Fieldwork Culture: Strategies Aimed at Protecting Diverse Researchers, Building a Better Fieldwork Future Workshop: Preventing Harassment & Assault in the Field, Risk management and strategies in field settings, and Mental Health in the Field: Best Practices and Pitfalls.

NWS SKYWARN Advanced Storm Spotter Training **Fall 2021**
National Weather Service, Norman, Oklahoma
Consisted of safe storm spotting techniques, severe storm and supercell meteorology, how to make storm reports, and properly identify storm characteristics in the field.

SERVICE AND EXTRACURRICULAR ACTIVITIES

President **June 2023 – June 2024**
Oklahoma Weather Lab (OWL), School of Meteorology, University of Oklahoma
Lead officer of OWL, OU's student forecasting organization, which has 70 members who attend daily forecast shifts and monthly meetings with speakers from the field of atmospheric science. Working to create diversity, equity, inclusion, and justice efforts within OWL by boosting representation of under-represented groups in geoscience. Collaborating with widely organizations like the National Weather Service (NWS), the NWS Storm Prediction Center, the National Severe Storms Laboratory, and the NWS Warning Decision Training Division.

Vice President **June 2022 – June 2023**
Oklahoma Weather Lab, School of Meteorology, University of Oklahoma
Second ranking officer of OWL. Handled leadership duties and management of the officer board, budgeting, social media presence. Lead fundraising efforts through merchandise sales to boost student activities and a hurricane fundraiser for victims of Hurricane Ian and Fiona, raising over $3700. Planned meetings with speakers from the NWS Norman, Oklahoma office, NWS Storm Prediction Center, and Central Michigan University.

Student Ambassador **March 2022 – May 2024**
University of Oklahoma, School of Meteorology

Assisting the department in educating prospective students of opportunities available in the program. Involves attending outreach events, speaking on student panels, and welcoming incoming School of Meteorology students. Answering questions students have about living on campus, course workload, organizations in the School of Meteorology, and job opportunities in research and field work.

Officer Board Member **June 2021 – June 2022**

Oklahoma Weather Lab, School of Meteorology, University of Oklahoma

Co-Deputy Director of Broadcast Media of OWL. Maintained OWL's social media accounts on a daily basis, improving weather communication techniques online and boosting OWL's exposure to new students. Assisted in fundraising efforts and merchandise designing, which raised enough to fund OWL for the school year. Created new broadcast media techniques for forecast shifts and opportunities for students to try broadcast meteorology.

Forecast Shift Leader **Fall 2021 & Spring 2023**

Oklahoma Weather Lab, School of Meteorology, University of Oklahoma

Lead weekly forecast shifts, which include writing technical weather forecast discussions, recording forecast podcasts for 106.9 FM in Key West, Florida, writing social media posts, and teaching fellow students about weather phenomena and forecast techniques.

Active Member **January 2021 – Present**

OU Student Chapter of the American Meteorological Society and National Weather Association

Participant in organization events and community service. Partook in OU Big Event (Spring 2021, 2022, & 2023), Adopt-A-Family (December 2022) which raised over $1000 for a family in need, and the Weather Friends, who lead outreach events to schools and children in the local area to teach them safe weather practices.

OU Nightly **January 2021 – April 2022**

University of Oklahoma, Gaylord College of Journalism and Mass Communication

On air weather anchor for OU's live nightly student news broadcast. Used Baron Lynx to create visually appealing and clear weather forecast graphics for TV audiences.

Professional Memberships

American Geophysical Union, American Meteorological Society