Greg Blumberg

Assistant Professor of Meteorology

Department of Earth Sciences, Millersville University
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Education

University of Oklahoma — *Norman, OK*

Doctor of Philosophy in Meteorology — *June 2014 - May 2018*

- **Dissertation:** "Observations and Simulations of Moisture Changes Occurring Around Sunset at the ARM Climate Research Facility"

Masters of Science in Meteorology — *August 2011 - August 2013*

- **Thesis:** "Developing a Statistical Thermodynamic Retrieval for Ground-Based Infrared Spectrometers"

Bachelor of Science in Meteorology — *August 2007 - May 2011*

- **Minor:** Mathematics

Teaching and Research Interests

Severe convective weather, mesoscale planetary boundary layer heterogeneity and transitions, atmospheric dynamics, numerical weather prediction, coastal meteorology, land-atmosphere interactions, applied meteorology, forecasting, air quality, launch range safety and risk assessments, in-situ and remote sensing atmospheric profiling techniques, meteorological education and communication

Teaching Experience

Millersville University Department of Earth Sciences — *Millersville, PA*

Assistant Professor of Meteorology — *August 2022 - Now*

- Courses taught: The Atmosphere (ESCI 107), The Atmosphere with Lab (ESCI 109), Atmospheric Thermodynamics (ESCI 341), Atmospheric Radiative Transfer (ESCI 345), Boundary Layers and Turbulence (ESCI 448), Stats & Decision Making in Earth Sciences (ESCI 446), Meteorological Instrumentation (ESCI 447), Chemistry of the Atmosphere (ESCI 347).

University of Oklahoma School of Meteorology — *Norman, OK*

Instructor for Atmospheric Dynamics 2 (METR 3123) — *Summer 2018*

- Designed and taught a curriculum with creative and engaging lessons for an intensive 8-week summer course on atmospheric dynamics for junior-level meteorology majors. Atmospheric dynamics concepts covered include: balanced flow, circulation, vorticity, Rossby wave behavior, potential vorticity, boundary layer phenomena, and differences between the barotropic and baroclinic atmospheres. Learning outcome assessments included tests and homework.

Instructor for Introduction to Meteorology 1 Lab (METR 2011) — *Spring 2018*

- Designed and taught a curriculum for sophomore-level meteorology majors to improve critical thinking skills, reinforce meteorological concepts, and develop common skills and competency in tools (e.g., hand analysis, satellites, numerical weather prediction, programming, sounding analysis) used in the field of meteorology. Learning outcome assessments used a combination of oral and written formats (e.g., presentations and written reports).

Teaching Assistant for Severe and Unusual Weather (METR 2603) — *Spring 2013*

- Graded homework assignments and covered classes for the primary instructors. Course materials exposed non-majors to meteorological concepts focused to understanding hazardous and severe weather (e.g., winter weather, severe storms).

Teaching Assistant for Measurements Lab (METR 3613) — *Fall 2011, 2012*

- Led meteorology majors through hands-on lab exercises designed to understand various properties of instruments using breadboards, thermometers, anemometers, and tipping bucket rain gauges. Engaged students in field research projects to solidify instrument and measurement concepts. Built writing skills by assigning full-length lab reports designed to teach common writing practices used in scientific journals.

Teaching Assistant - Introduction to Weather and Climate for Non-Majors (METR 1013) — *Spring 2011*

- Developed and presented weekly lessons to teach a high-level overview of meteorological topics (e.g., fronts, mountain weather, severe storms) to non-majors at the university. Graded weekly lab reports.

Other Formal and Informal Learning Interventions

Online and in-person

Scientific Coding Workshop for the NWC REU Program — *Summer 2017, 2018*

- Instructed and developed a 1-day workshop for Dr. Daphne LaDue to teach National Weather Center (NWC) Research Experiences for Undergraduates (REU) Program participants the Python language and common concepts in scientific coding. Topics covered include understanding coding errors and syntax, statistical analysis, and plotting data.

Instructor for WDTD/CAPS Training — *October 2016, Fall 2018*

- Trained meteorologists from Japan and the Chinese Meteorological Agency on the severe weather forecasting process using ingredients-based forecasting techniques and hand analysis from real-time data.
- Designed and taught an online curriculum on integrating the output from convection allowing numerical weather prediction models with common forecasting practices to predict a variety of thunderstorm hazards.
- Leveraged the expertise of the Weather Decision Training Division (WDTD) and Center for Analysis and Prediction of Storms (CAPS) as well as Dr. Daphne LaDue's expertise on how adult and higher education impacts professional learning and cognition.

Independently-Run, Distance Meteorology Education and Mentorship Program — *Summer 2011 - Summer 2018*

- Developed and taught over the Internet (e.g., Skype and email) and in-person, an informal mentoring and education program to a variety of neurodiverse and underrepresented high school and undergraduate students. Topics included an introduction to undergraduate-level meteorology concepts, observing systems, analysis techniques, computer programming, writing and research skills, and weather forecasting. Through my mentoring, these students demonstrated their acquired meteorological knowledge by performing research that was presented at professional conferences and/or published in peer-reviewed journals (see citations below with * footnotes).

Lead CAREERS Weather Camp Evaluator — *Summer 2010, 2011*

- Contracted work through NCAS-M (NOAA Center for Atmospheric Sciences and Meteorology) to observe and contribute in instructing their U.S. high school level weather camp programs. Other goals included recruiting underrepresented and neurodiverse groups into meteorology and other STEM fields and helping them network with professionals at meteorology conferences. For each camp, evaluation reports were written to improve camp curriculum goals and assess learning outcomes. Reports were used in reporting to the National Science Foundation (Award #0914676).

Research Experience

NASA Goddard Space Flight Center

Greenbelt, MD

NASA Postdoctoral Program Fellow — *July 2019 - July 2022*

- Initiated transformative, internationally-relevant research demonstrating how incorporating numerical weather prediction models into distant focusing overpressure (DFO) risk assessments at space launch ranges can improve public safety and significantly reduce costly delays from undue conservatism. The capability of this work to help mitigate launch risks has attracted the attention of several funding sources in the space transportation and safety community (e.g., FAA, NASA, DoD).
- Studied atmospheric boundary layer and aerosol feedbacks from biomass burning in Southeast Asia using small Uncrewed Aerial Systems (sUAS), NASA ground-based remote sensors, and the NASA Unified Weather Research and Forecasting (NU-WRF) with chemistry (WRF-CHEM) system. Collaborated with scientists and graduate students at National Central University in Taiwan and National Oceanic and Atmospheric Administration (NOAA) as a part of NASA's Seven SouthEast Asian Studies (7-SEAS) Mission.
- Strengthened collaborations between the Goddard and Wallops campuses by building relationships based on common planetary boundary layer (PBL) observation and modeling needs between the Wallops Range Mission Management Office, regional stakeholders for the DelMarva Mesonet Project, and NASA Decadal Survey PBL Incubation activities.
- Began field work exploring the use of Advancing Earth Research Observations with Kites and Atmospheric/Terrestrial Sensors (AEROKATS) kites to enable low-cost, distributed networks of PBL thermodynamic, turbulence, trace gas, and aerosol observations.

Cooperative Institute for Mesoscale Meteorology Studies

Norman, OK

Graduate Research Assistant — *June 2014 – May 2018*

- Assisted in deploying and operating the Collaborative Lower Atmosphere Mobile Profiling System (CLAMPS) during the Plains Elevated Convection At Night (PECAN) and the Land-Atmosphere Feedback Experiment (LAFE) field projects.
- Performed research at NOAA's National Severe Storms Laboratory (NSSL) designed to improve the understanding of how radiosondes and the data fusion of ground-based remote sensors (e.g., AERI, Doppler wind lidar, Raman lidar, microwave radiometer) instruments can be used to diagnose the ingredients relevant to deep moist convection.
- Conducted experiments using observations and simulations from the Oklahoma Mesonet and ARM Southern Great Plains climate facility to gain a process-level understanding of the PBL water vapor evolution during the Southern Great Plains afternoon to evening transition.

Research Fellow — *August 2013 – June 2014*

- Enhanced the speed and accuracy of the AERI optimal estimation (AERIoe) thermodynamic retrieval algorithm.
- Published in the peer-reviewed literature the accuracy of AERI retrieval methods in comparison to other thermodynamic profiling technologies.
- Mentored undergraduate student research using AERIoe retrievals to assess the accuracy of planetary boundary layer parameterization schemes from convective-scale ensemble numerical weather prediction forecasts.

University of Oklahoma School of Meteorology *Norman, OK*

Graduate Research Assistant *January 2012 – August 2013*

- Developed and tested statistical thermodynamic retrievals for the AERI using linear regression, principle component analysis, and machine learning concepts.
- Published analyses of the AERI thermodynamic retrievals and nocturnal boundary layer during the student run, multi-institutional Lower Atmospheric Boundary Layer Experiment (LABLE) field experiment.

NOAA Storm Prediction Center *Norman, OK*

Undergraduate Research Intern *Fall 2010*

- Performed qualitative research on common severe weather preparedness criteria StormReady certified amusement parks and developed new criteria to be applied to future amusement park StormReady certification.
- Compiled a database of U.S. large venue locations to be integrated into AWIPS for the purpose of heightening forecaster situational awareness and impact-based forecasts.

Peer Reviewed Publications

Espinoza, A., J. Chastang, and **W. G. Blumberg**, 2023: Deploying an Educational JupyterHub for Exploratory Data Analysis, Visualization, and Running Idealized Weather Models on the Jetstream2 Cloud, *Science Gateways 2023 Conference Proceedings*, accepted.

Blumberg, W. G., and A. M. Fadl, 2022: Effects of atmospheric heterogeneity on distant focusing overpressure risk assessments at coastal launch sites. *Journal of Space Safety Engineering*, 9, 528–540, https://doi.org/10.1016/j.jsse.2022.09.002.

Wagner, T. J., D. D. Turner, T. Heus, and **W. G. Blumberg**, 2022: Observing Profiles of Derived Kinematic Field Quantities Using a Network of Profiling Sites. *Journal of Atmospheric and Oceanic Technology*, 39, 335–351, https://doi.org/10.1175/JTECH-D-21-0061.1.

Smith, E. N., B. R. Greene, T. M. Bell, **W. G. Blumberg**, R. Wakefield, D. Reif, Q. Niu, Q. Wang, and D. D. Turner, 2021: Evaluation and applications of multi-instrument boundary-layer thermodynamic retrievals, *Boundary-Layer Meteorology*, **181**, 95-123, doi:10.1007/s10546-021-00640-2.

Bolton, M. J.*, **W. G. Blumberg**, L. K. Ault, H. M. Mogil, and S. H. Hanes, 2020: Initial evidence for increased weather salience in autism spectrum conditions, *Weather, Climate, and Society*, **12**, 293-307, doi:10.1175/WCAS-d-18-0100.1.

Blumberg, W. G., D. D. Turner, S. Cavallo, J. Basara, A. Shapiro, and J. Gao, 2019: An analysis of the processes affecting rapid near-surface water vapor increases during the afternoon to evening transition in Oklahoma, *J. Appl. Met. Climo.*, **58**, 2217-2234, doi:10.1175/JAMC-D-19-0062.1

Turner, D. D. and **W. G. Blumberg**, 2018: Improvements to the AERIoe Thermodynamic Profile Retrieval Algorithm, *IEEE Sel. Top. Appl. Earth Obs. Remote Sens.*, doi:10.1109/JSTARS.2018.2874968.

Blumberg, W. G., T. J. Wagner, D. D. Turner, and J. Correia Jr., 2017: Quantifying the accuracy and uncertainty of diurnal thermodynamic profiles and convection indices from the Atmospheric Emitted Radiance Interferometer, *J. Appl. Met. Climo.*, **56**, 2747-2766, doi:10.1175/JAMC-D-17-0036.1

Blumberg, W. G., K. T. Halbert *, T. A. Supinie, P. T. Marsh, R. L. Thompson, and J. A. Hart, 2017: SHARPpy: An open source sounding analysis toolkit for the atmospheric sciences, *Bull. Amer. Met. Soc.*, **98**, 1625-1636, doi:10.1175/BAMS-D-15-00309.1

Blumberg, W. G., D.D. Turner, U. Loehnert, and S. Castleberry, 2015: Ground-based temperature and humidity profiling using spectral infrared and microwave observations. Part II: Retrieval performance in all-sky conditions, *J. Appl. Met. Climo.*, **54**, 2305-2319, doi:10.1175/JAMC-D-15-0005.1

Bonin, T. A., **W. G. Blumberg**, P. M. Klein, and P. B. Chilson, 2015: Thermodynamic and turbulence characteristics of the Southern Great Plains nocturnal boundary layer under differing turbulent regimes. *Boundary-Layer Meteorology*, **157**, 401-420, doi:10.1007/s10546-015-0072-2

Klein P., T. A. Bonin, J. F. Newman, D. D. Turner, P. B. Chilson, C. E. Wainwright, **W. G Blumberg**, S. Mishra, M. Carney, E. P. Jacobsen, and R. K. Newsom, 2014: The 2012 lower atmospheric boundary layer experiment. *Bull. Amer. Met. Soc.*, **96**, 1743-1764, doi:10.1175/BAMS-D-132-00267.1

* a co-author who was an undergraduate mentee.

Funded Research

Validation of SODAR/RASS retrievals with Rawinsonde Measurements 2023 *1 Aug 2023 - 31 Jul 2024*

Contractor *Award Amount: $9,996*

- Funding Agency: Allegheny County Health Department
- Led 16-hour campaign with 3-4 Millersville undergraduates to launch weather balloons to validate the Allegheny County Health Department Scintec SODAR/RASS instrument.

Investigation of Microphysics and Precipitation for Atlantic Coast-Threatening Snowstorms (IMPACTS) *01 Nov 2022 - 30 Nov 2023*

Principal Investigator *Award Amount: $57,545*

- Funding agency: NASA Earth Venture Suborbital Program
- Principal Investigator for Millersville University's radiosonde deployment during the NASA IMPACTS 2023 field project. Coordinated approximately 30 undergraduate students in field deployments to release weather balloons during winter weather.

A Combined Passive-Active, Multi-Sensor Approach to Earth's Planetary Boundary Layer (PBL) Sounding

01 Apr 2022 - 31 Mar 2025

Co-Investigator

Award Amount: $619,573

- Funding agency: NASA Science Mission Directorate Research Opportunities in Space and Earth Sciences (ROSES)
- Research merging both active and passive space-borne instrumentation using machine learning techniques to understand potential paths for improving PBL sounding technologies.

Advancing Capabilities for Systems Analysis of PBL and Its Interactions with the Earth System

01 May 2022 - 30 Apr 2025

Co-Investigator

Award Amount: $654,922

- Funding Agency: NASA Science Mission Directorate Research Opportunities in Space and Earth Sciences (ROSES)
- Testing data assimilation methods of ground-based PBL thermodynamic profilers and PBL height observations using WRF-DART.

Conference Proceedings

Martrich, S. R.*, R. Argenti*, K. Elliot, and **W. G. Blumberg**, 2023: Lagrangian drift sensor for tornado research in the Northeast and Great Plains. 22nd Annual Student Conference, Denver, CO, USA.

Argenti, R.*, S. R. Martrich*, K. Elliot, and **W. G. Blumberg**, 2023: Development of a low-cost probe for deployment in tornado circulation by drone by undergraduates. 22nd Annual Student Conference, Denver, CO, USA.

Cahoe, R.*, S. R. Martrich*, R. Argenti*, K. Elliot, and **W. G. Blumberg**, 2023: Case Study of the Quasi-linear Convective System through Central Pennsylvania on August 30th, 2022. 22nd Annual Student Conference, Denver, CO, USA.

Leppo, S. R.*, S. R. Martrich*, R. Argenti*, K. Elliot, and **W. G. Blumberg**, 2023: Unconventional Means of Funding for Undergraduate Severe Storms Field Research. 22nd Annual Student Conference, Denver, CO, USA.

Blumberg, W. G., and A. M. Fadl, 2021: Effects of environmental heterogeneity on distant focusing overpressure risk assessments at coastal space ports, 11th International Association for the Advancement of Space Safety Conference, virtual, USA.

Blumberg, W. G., and A. M. Fadl, 2020: Consequences of Meteorological Assumptions on DFO in Complex Terrain, 127th Range Safety Working Group, virtual, USA.

Blumberg, W. G., and A. M. Fadl, 2020: Effects of spatiotemporal variability on Distance Focused Overpressure (DFO). 126th Range Safety Working Group, virtual, USA.

Blumberg, W. G., S. C. Tsay, A. Loftus, U. Jeong, D. B. Wolff, and A. M. Fadl, 2020: Ongoing and Future NASA SMARTLabs PBL Studies in Coastal and Polluted Environments, Atmospheric Boundary Layer Processes: Accomplishments to Date and Future Research Endeavours, Boston, MA, USA.

Blumberg, W. G., and A. M. Fadl, 2019: Understanding the Impact of Meteorological Spatiotemporal Variability on Distant Focusing Overpressure Risk, A21S - Sounds of the Solar System: Geophysical and Planetary Acoustics Papers, San Francisco, CA, USA.

Santanello, J. A. Jr., S. Q. Zhang, D. D. Turner, P. Lawston, and **W. G. Blumberg**, 2019: PBL Thermodynamic Profile Assimilation and Impacts on Land-Atmosphere Coupling, Atmospheric Processes, San Francisco, CA, USA.

Wagner, T. J., **W. G. Blumberg**, D. D. Turner, T. A. Bonin, A. Choukulkar, A. Brewer, R. K. Newsom, and V. Wulfmeyer, 2018: Characterizing Water Vapor Advection During LAFE with Thermodynamic and Kinematic Profilers, 23rd Symposium on Boundary Layer and Turbulence, Oklahoma City, OK, USA.

Bonin, T. A., D. D. Turner, R. K. Newsom, L. K. Berg, **W. G. Blumberg**, A. Behrendt, V. Wulfmeyer, A. Choukulkar, R. M. Banta, Y. Pichugina, C. J. Senff, R. M. Hardesty, and W. A. Brewer, 2018: Observed Characteristics of the Boundary-Layer Evolution during Evening Transitions in North-Central Oklahoma, 23rd Symposium on Boundary Layer and Turbulence, Oklahoma City, OK, USA.

Blumberg, W. G., and D. D. Turner, 2018: Demystifying the 6 o'clock Magic Phenomenon: Environmental Changes during the Southern Great Plains Afternoon to Evening Transition, San Diego, CA, USA.

Bolton, M. J.*, **W. G. Blumberg**, H. M. Mogil, and L. K. Ault, 2018: Exploring Differences in Weather Knowledge and Perceptions in Autistic and Non-Autistic Individuals, Sixth Symposium on Building a Weather-Ready Nation: Enhancing Our Nation, Austin, TX, USA.

Blumberg, W. G. and D. D. Turner, 2017: Observations of the Afternoon to Evening Transition Occurring Within the Southern Great Plains Severe Convective Environment. Special Symposium on Severe Local Storms: Observation Needs to Advance Research, Prediction, and Communication, Seattle, WA, USA

Blumberg, W. G. and T. A. Supinie, 2017: Adding Difficulty in Weather Forecasting Challenges to Enhance Learning. 26th Symposium on Education, Seattle, WA, USA

Bolton, M.*, G. Wise* and **W. G. Blumberg**, 2016: Color Blindness in the Weather Enterprise: Discussion, and a Look at Solutions. National Weather Association's 41st Annual Meeting, Norfolk, VA, USA

Blumberg, W. G., T. J. Wagner, and D. D. Turner, 2016: Monitoring the Evolution of Deep Convection Through the Use of Ground-Based Spectral Infrared Thermodynamic Sounders. 32nd Conference on Environmental Information Processing Technologies, New Orleans, LA, USA.[1]

Wagner, T. J., and **W. G. Blumberg**, 2016: Near-continuous Profiling of Atmospheric Stability During Severe Weather Events. 20th Conference on Integrated Observing and Assimilation Systems for the Atmosphere, Oceans, and Land Surface (IOAS-AOLS), New Orleans, LA, USA.

Blumberg, W. G. and D. D. Turner, 2015: Insights Regarding the Use of Ground-Based Spectral Infrared Thermodynamic Sounders in Forecasting Deep Convection. National Weather Association's 40th Annual Meeting, Oklahoma City, OK, USA[1]

Bolton, M.*, and **W. G. Blumberg**, 2015: Learning Disorders (LD) in the Meteorological Community: Implications for Communication and Education. National Weather Association's 41st Annual Meeting, Oklahoma City, OK, USA[1]

Halbert, K. T.*, **W. G. Blumberg**, and P. Marsh, 2015: SHARPpy: Fueling the Python Cult. 5th Symposium on Advances in Modeling and Analysis Using Python, Phoenix, AZ, USA[1]

Yuhas, J. A., **W. G. Blumberg**, K. Halbert*, M. Yalch*, T. Ruggiero*, E. Mushlitz*, M. Stropkay*, J. Bailey-Wells*, O. Braunstein*, and S. Nadler*, 2015: A University/High School Forecasting Classroom. 24nd Symposium on Education, Austin, TX, USA

Harrison, D.*, Z. A. Roux*, A. McGovern, and **W. G. Blumberg**, 2015: Promoting a Weather Ready Nation Through Serious Games. 24nd Symposium on Education, Austin, TX, USA

Wagner, T. and **W. G. Blumberg**, 2015: Ground-based Infrared Sounders: A New Look at Their Capabilities for Operational Meteorologists. 19th Conference on Integrated Observing and Assimilation Systems for the Atmosphere, Oceans, and Land Surface (IOAS-AOLS), Phoenix, AZ, USA

Turner, D. D. and **W. G. Blumberg**, 2014: A Future Ground-based Network of Thermodynamic Boundary Layer Profilers: The Infrared Spectrometer Option. The World Weather Open Science Conference, Montreal, Quebec, Canada

Blumberg, W. G. and D. D. Turner, 2014: Benefits of Ground-Based AERI Retrievals in Operational Forecasting. IGARSS, Quebec City, Quebec, Canada

Bonin, T. A., P. M. Klein, P. B. Chilson, J. F. Newman, **W. G. Blumberg**, and D. D. Turner, 2014: Analysis of Turbulence and Thermodynamics Associated with Low-Level Jets. AMS 21st Symposium on Boundary Layers and Turbulence, Leeds, United Kingdom

Turner, D. D., **W. G. Blumberg**, N. Anderson, and A. Dzambo 2014: Characterizing the Structure of the Boundary Layer with AERI and Doppler Lidar. ASR PI Meeting, Potomac, MD, USA

Blumberg, W. G., D. D. Turner, and P. Klein, 2013: Developing a Statistical Thermodynamic Profiling Retrieval for the AERI. Gordon Research Conference for Radiation and Climate, New London, NH, USA

Blumberg, W. G., P. Klein, and D. D. Turner, 2013: Developing a Statistical Thermodynamic Profiling Retrieval for the AERI. 17th Conference on Integrated Observing and Assimilation Systems for the Atmosphere, Oceans, and Land Surface, Austin, TX, USA.

Yuhas, J. A., **W. G. Blumberg**, K. Halbert*, C. Balboni*, L. Wallis*, and E. Mushlitz*, 2013: The Concord-Carlisle High School / Oklahoma University Forecasting Group - An experiment in teaching through social media. 22nd Symposium on Education, Austin, TX, USA

Halbert, K. T.* and **W. G. Blumberg**, 2013: Forecasting and Analysis in Python: So Easy, a Caveman Can Do It. 3rd Symposium on Advances in Modeling and Analysis Using Python, Austin, TX, USA

Halbert, K. T.* and **W. G. Blumberg**, 2012: Utilizing Divergence Tendency in Forecasting Convective Initiation. 26th Conference on Severe Local Storms, Nashville, TN, USA[2]

Blumberg, W. G., S. Malla, D. V. Morris and H. M. Mogil, 2012: Evaluating a Nationwide Summer Weather Camp Program. 21st Symposium on Education, New Orleans, LA, USA

Blumberg, W. G., K. A. Kloesel, and R. Edwards, 2011: Investigations of hazardous weather preparedness at amusement parks. 2011 National Severe Weather Workshop, Norman, OK, USA

Blumberg, W. G., K. A. Kloesel, and R. Edwards, 2011: Investigations of hazardous weather preparedness at amusement parks. 10th Annual Student Conference, Seattle, WA, USA

Bain, A. L., K. D. Sherburn, N. R. Ramsey, and **W. G. Blumberg**, 2011: Oklahoma Weather Lab: An opportunity for operational meteorology for students at the University of Oklahoma. 10th Annual Student Conference, Seattle, WA, USA

Lopes, R., **W. G. Blumberg**, C. B. Rubin, D. Neal, K. Stevens, 2010: Using Social Media in Disaster Preparedness and Response Breakout Session. 13th Annual Emergency Management Higher Education Conference, Emmitsburg, MD, USA

[1] paper won an award.
* undergraduate or high school co-author.

Mentoring

Honors Thesis Supervisor

Wes Taylor, "Effects of the Solar Eclipse in Single Column Model Evolution" *Expected SP2024*

Keelie Steiner, "An Analyis of Particulate Matter of the Size 2.5 Microns and Public Health in Mae Hong Son, Thailand and a Review of Air Quality Legislation" *Expected SP2024*

Allison Krantz, "A Case Study of the Fire Generated Tornadic Vortex from the Mosquito Fire" *Completed SP2023*

Informal Mentoring

Shane Martrich, Millersville Undergraduate, 2022
Eric Allen: NASA Intern for Wallops Flight Facility, Summer 2020
Matt Bolton: NCAS-M weather camp alumnus, 2015 - 2018
Sam Degelia: research assistant as OU meteorology senior, 2014 - 2015
Kelton Halbert: NCAS-M weather camp alumnus, 2011 - 2013
Olivia Braunstein: Morristown-Beard School, 2013 - 2015
Sam Nadler: Morristown-Beard School, 2013 - 2015
Celeste Balboni: Concord-Carlisle high school student, 2012 - 2013
Lili Wallis: Concord-Carlisle high school student, 2012 - 2013
Emily Mushlitz: Concord-Carlisle high school student, 2012 - 2013
Joe Puma: NCAS-M weather camp alumnus, 2010 - 2013
Rachel Norris: NCAS-M weather camp alumnus, 2013 - 2016

Leadership and Service

APSCUF Academic Policies Committee	Member (Term 2023 - 2025)
Department of Earth Sciences Assessment Committee	Chair (Term 2023 -)
2023 Millersville Meteorology Faculty Search Committee	Member (Term 2022 - 2023)
NASA Goddard Association of Postdoctoral and Early Career Scholars	Member
Range Commanders' Council DFO Common Standards Working Group	Member, meteorology subject matter expert
AMS Nationwide Network of Networks Committee	Member
2016, 2017 Spring OWL General Meeting	Developed and led forecasting challenges
Serve Moore, OK Tornado Cleanup	Volunteer Weather Forecaster
National Weather Camp Program Planning Committee	Member
Foot's Forecast	Severe Weather Advisor and Education Consultant
Oklahoma Weather Lab (OWL)	Director of Development, 2010-2011
National Severe Weather Workshop 2011	Volunteer Weather Briefer

Software Development

3D-DFO Prototype System

Prototype for performing 3D-weather-aware distant focusing overpressure risk assessments *March 2022 – Current*

- This software package (written in C++ and Python) is a prototype for an operational implementation of a 3D-weather-aware risk assessment system for the distant focusing overpressure phenomena at launch sites. It is described in the Blumberg and Fadl, 2022 JSSE paper and has been released to members of the range safety community for evaluation and testing. Real-time predictions are currently available to this community via the Millersville University Department of Earth Sciences computing cluster.

SHARPpy

Sounding and Hodograph Analysis and Research Package in Python *April 2014 – Current*

- SHARPpy provides an open-source set of sounding and hodograph analysis routines to the meteorological community. It is used worldwide and the package has been has been referenced nearly 100 times in the peer-reviewed literature. SHARPpy development involves collaborations with NOAA Storm Prediction Center forecasters and is co-developed with Kelton Halbert (CIWRO/SPC) and Tim Supinie (NOAA/SPC).

MWRoe/AERIoe

Optimal estimation retrievals for ground-based microwave and IR sensors *April 2013 – May 2018*

- MWRoe/AERIoe are retrieval algorithms using the optimum estimation method to solve for the thermodynamic profiles, cloud properties, and trace gas concentrations from ground-based active and passive sensors. Developed with Dave Turner (NOAA/ESRL) and described in Turner and Blumberg (2019). These two algorithms have been integrated into and succeeded by the TROPoe software package.

Languages: Python, IDL, FORTRAN, C++, C

Honors and Awards

NASA SED Diversity, Inclusion, and Equity Award	August 2021
NASA Postdoctoral Fellowship	July 2018 - present
Alan R. Moller Severe Weather Education/Research Scholarship	March 2009