William Gregory Blumberg

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Curriculum Vitae

PhD Candidate
CIMMS/OU School of Meteorology
120 David L. Boren Blvd.
Norman, OK 73072
Email: wblumberg@ou.edu

EDUCATION

Doctor of Philosophy, Meteorology — June 2014 - Current
University of Oklahoma, Norman, OK
Topic: Mapping the Evolution of Ingredients Relevant to Deep, Moist Convection During the Southern Great Plains Afternoon to Evening Transition
General Exam Completed January 2016
Advisor: Dr. Dave Turner (NOAA ESRL)

Master of Science, Meteorology — August 2011 - August 2013
University of Oklahoma, Norman, OK
Thesis: Developing a Statistical Thermodynamic Retrieval for Ground-Based Infrared Spectrometers
Advisors: Drs. Petra Klein (OU) and Dave Turner (NOAA ESRL)

Bachelor of Science, Meteorology — August 2007 - May 2011
University of Oklahoma, Norman, OK
Minor - Mathematics
Advisor: Dr. Kevin Kloesel (OU)

RESEARCH EXPERIENCE

Graduate Research Assistant — June 2014 – Current
Cooperative Institute for Mesoscale Meteorology Studies (CIMMS)/University of Oklahoma, Norman, OK

- Assisted in developing ground-based observation strategies for the Plains Elevated Convection At Night (PECAN) field project. Also participated in deployments of the Collaborative Lower Atmosphere Mobile Profiling System (CLAMPS).
- Performed research designed to improve the understanding of how radiosondes, Atmospheric Emitted Radiance Interferometer (AERI), and lidars instruments can be used to diagnose the ingredients relevant to deep moist convection.
- Designed and performed experiments using high-temporal resolution, ground-based instrumentation to improve our understanding of the processes that drive the rapid evolution of instability, moisture, and shear during the Southern Great Plains afternoon to evening transition.

Research Fellow — August 2013 – June 2014
CIMMS, Norman, OK

- Collaborated with Dr. Dave Turner to develop ways to enhance the speed and accuracy of the AERI optimal estimation (AERIoe) thermodynamic retrieval algorithm.
- Performed research evaluating the accuracy of different AERI retrieval methodologies in comparison to other thermodynamic profiling technologies and developed new forecasting methods using the AERI.

- Mentored one undergraduate student in a research project using AERI retrievals to assess the accuracy of planetary boundary layer parameterization schemes from convective-scale ensemble numerical weather prediction forecasts.[1]

Graduate Research Assistant January 2012 – August 2013
University of Oklahoma, Norman, OK

- Developed and tested statistical thermodynamic retrievals for the AERI, a ground-based passive infrared remote sensing system, by using linear regression, principle component analysis, and neural networks.
- Provided expertise on AERI thermodynamic retrievals to study nocturnal low-level jet streams during the student run, multi-institutional Lower Atmospheric Boundary Layer Experiment (LABLE) field experiment.

Undergraduate Research Intern Fall 2010
NOAA Storm Prediction Center, Norman, OK

- Performed interviews with National Weather Service Warning Coordination Meteorologists to document common severe weather preparedness criteria used by StormReady certified amusement parks and developed additional criteria to be applied to future amusement park StormReady certification.
- Developed a database of U.S. large venue locations to be integrated into AWIPS for the purpose of heightening forecaster situational awareness.
- Sat in and participated in forecasting shifts.

Lead CAREERS Weather Camp Evaluator Summer 2010, 2011
Howard University and Jackson State University in Washington, D.C. and Jackson, MS

- Contracted through NCAS (NOAA Center for Atmospheric Sciences) to observe the high school level NCAS Summer Weather Camps and write camp evaluation reports to be used for reporting to the National Science Foundation CAREERS grant (Award #0914676). Reports included qualitative observations of camp activities, and recommendations for how to evolve and improve future camps. Additional tasks included providing instructional support to the camp's director, Mike Mogil in order to provide immediate improvements to the camps.

TEACHING EXPERIENCE

Guest Instructor, Norman, OK

CIMMS/Warning Decision Training Division/Weathernews Inc. Training Program October 2016

- Trained Japanese visitors from Weathernews Inc. on how to incorporate the SHARPpy program into the severe weather forecasting process.
- Instructed visiting forecasters in ingredients-based forecasting and hand analysis using real-time data.

Teaching Assistant, University of Oklahoma, Norman, OK

METR 2603 - Severe and Unusual Weather Spring 2013

- Graded homework and covered classes for the primary instructor.

METR 3613 - Measurements Lab Fall 2011, 2012

- Tasks included leading undergraduate junior meteorology students through lab exercises and grading full lab reports.

METR 1014 - Introduction to Weather and Climate Lab for non-majors Spring 2011

- Developed and presented lessons regarding the weekly lab activity and graded lab reports.

Informal High School Meteorology Education Summer 2011 – Summer 2013
Independently Run Long-Distance Education Program

- Developed materials for and provided regular online forecasting and undergraduate-level meteorology education to a variety of high school students across the US. Students demonstrated their acquired meteorological knowledge by both producing forecasts and performing research[2] that was presented at AMS conferences. Mentorship and education were typically conducted using online methods (e.g., Skype and email).

Director of Development and Shift Leader
University of Oklahoma Weather Lab (OWL) Spring 2009 – Fall 2012

- Instructed and led undergraduate students during the weekly forecasting shift to understand meteorological concepts and learn a variety of forecasting techniques.
- Developed shift leader forecasting training materials. Taught a workshop session titled "Perceptions on Quantifiable Words in Forecasting."
- Created and distributed a forecasting knowledge survey for tracking student forecasting knowledge development through the OWL program.

Assistant Instructor, Jackson, MS and Washington, D.C.
CAREERS Summer Weather Camps Summer 2009, 2010, 2011

- Taught weather related materials to high school students at the Howard University and Jackson State University CAREERS Summer Weather Camp.

Instructor, Kicks Karate, Rockville, MD
Belt Level: 2nd Degree Black Belt Summer 2004 - Spring 2007

- Instructed and led karate classes for students of all belt levels from ages 4 to adult.

FORMAL PUBLICATIONS

- Wagner, T.J., K. Cook, and **W.G. Blumberg**, 2017: High temporal resolution analysis of thermodynamic and kinematic instability associated with the 13 July Nickerson, KS, tornado. *Wea. Forecasting*, in progress.
- **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. Tech.*, in progress.
- Bolton, M. J., **W.G. Blumberg**, and H. M. Mogil, 2017: An Analysis of Potential Problems and Solutions in Weather Communication with Autistic Individuals. *Cogent Psychology.* in review.
- **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.*, in press.
- **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.*, accepted.
- 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*, accepted.
- 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.*, accepted.

- **Blumberg W.G.** and D.D. Turner, 2014: The Dallas-Fort Worth Thermodynamic Profiling Experiment (DFW-TPE). *Report submitted to the National Weather Service.*

CONFERENCE PROCEEDINGS

- **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.*
- 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*
- 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*
- 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*
- 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[2]
- 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. 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[2]
- 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[2]
- 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

* indicates paper won an award.

SOFTWARE DEVELOPED AND MANAGED

SHARPpy - Sounding and Hodograph Analysis and Research Package in Python — April 2014 – Current
Written in: Python

- One of the primary developers of the SHARPpy software package. This package provides an open source code base of sounding and hodograph analysis routines to the meteorological community and is used internationally. Development involves collaborations with NWS/SPC employees. Additional co-developers include Kelton Halbert (OU) and Tim Supinie (OU/CAPS).

MWRoe - Microwave Radiometer Optimal Estimation — Feb 2014 - Current
Written in: Python

- Inherited and adapted code from Stephen Castleberry to perform the optimal estimation retrieval method on microwave radiometer data. Modifications improved optimizing the code to improve the speed and functionality of the code and adapting it to use HATPRO microwave radiometer data. Code used to retrieve thermodynamic profiles from PECAN microwave radiometers.

AERIstat - AERI statistical retrieval — Jan 2012 - August 2013
Written in: Python

- Developed code to create a statistical thermodynamic retrieval for the AERI instrument that could obtain thermodynamic profiles much faster than the current physical retrieval methods. Developed as part of my master's thesis.

SELECTED GRAD COURSES

METR 5803: Advanced Forecasting Techniques — Spring 2012
Instructor: Dr. Chuck Doswell

METR 6223: Convective Clouds and Storms — Fall 2014
Instructor: Dr. Howie Bluestein

METR 5303: Objective Analysis — Fall 2014
Instructor: Dr. Fred Carr and Dr. Ming Xue

METR 5803: Applications of Meteorological Theory to Severe Thunderstorm Forecasting — Spring 2015
Instructor: Dr. Ariel Cohen, Rich Thompson, and Dr. Steven Cavallo

METR 5970: Advanced Atmospheric Radiation — Spring 2016
Instructor: Dr. Dave Turner

PROFESSIONAL DEVELOPMENT

Forum on Observing the Environment from the Ground Up	March 2016
2nd ITaRS Summer School: "Clouds and Precipitation: Observation and Processes"	September 2014
IGARSS Annual Conference	July 2014
ARM/ASR Science Meeting	March 2014
AMS Monograph on the ARM Program Reviewer	October 2013
Gordon Research Conference and Seminar: Radiation & Climate	July 2013
American Meteorological Society Annual Meeting	Yearly 2010 - 2016
American Meteorological Society Severe Local Storms	Nov 2012
AMS Weather, Climate, and Society Journal Peer Reviewer	Nov 2012
*WAS*IS Workshop*	August 2011
National Severe Weather Workshop 2011	March 2011
Texas Severe Storms Association Conference (TESSA)	March 2009-2011
13th FEMA Higher Education Conference	June 2010

STUDENTS MENTORED

Matt Bolton: long-distance research regarding integrating disabilities into Weather-Ready Nation efforts
Sam Degelia: research assistant as OU meteorology senior, 2014 - 2015[1]
Kelton Halbert: NCAS weather camp alumnus, internship from 2011 - 2013, now OU meteorology undergrad[2]
Celeste Balboni: Concord-Carlisle high school student, 2012 - 2013[2]
Lili Wallis: Concord-Carlisle high school student, 2012 - 2013[2]
Emily Mushlitz: Concord-Carlisle high school student, 2012 - 2013[2]
Joe Puma: 2010 NCAS weather camp alumnus, now at KTEN
Rachel Norris: 2011 NCAS weather camp alumnus, now OU meteorology undergrad

LEADERSHIP & SERVICE

The Learningworks Foundation Inc., Board of Directors, Member
Serve Moore, OK Tornado Cleanup, Volunteer Weather Forecaster

IAVM Severe Weather Preparedness & Planning For Public Assembly Venues Course, Planning Committee
National Weather Camp Program Planning Committee, Member
Foot's Forecast, Severe Weather Advisor and Education Consultant
Oklahoma Weather Lab, 2010-2011 Director of Development
Summer 2012 Oklahoma Mesonet Weather Camp, Invited Guest Speaker
University of Oklahoma "The Big Event", Event Forecaster
National Severe Weather Workshop 2011, Volunteer Weather Briefer
Oklahoma Weather Lab, Shift Leader and Forecaster

AWARDS

Second Place Winner, oral presentation category at the EIPT Conference Student Competition, AMS 2016 Presentation Title: *Monitoring the Evolution of Deep Convection Through the Use of Ground-Based Spectral Infrared Thermodynamic Sounders.*

Third Place Winner, poster presentation category at the NWA Conference Grad Student Competition, NWA 2015 Presentation Title: *Insights Regarding the Use of Ground-Based Spectral Infrared Thermodynamic Sounders in Forecasting Deep Convection.*

Alan R. Moller Severe Weather Education and Research College Scholarship, TESSA 2009

SPECIAL SKILLS

- Experienced in Python, Linux, R statistical packages, HTML, PHP, LaTeX, and Mathematica
- Completed Institutional Review Board required CITI Course - Social Behavioral Modules, Basic course, and an informational course in ethical human research.