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ElizabethSmith

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CURRENT APPOINTMENT

2020–Present **National Oceanic and Atmospheric Administration**
National Severe Storms Laboratory Norman, Oklahoma
Research Meteorologist
I work as a boundary layer observationalist leading research focused on convection initiation and pre- and near-storm severe weather environments.

EDUCATION

Dec. 2018 **Doctor of Philosophy** in Meteorology University of Oklahoma
Dissertation Title: *The Great Plains Nocturnal Low-Level Jet: Spatial and Temporal Evolution*

May 2017 **Master of Science** in Meteorology–Concurrent enrollment University of Oklahoma
Non-thesis Master of Science awarded based on General Examination for Ph.D. Candidacy

May 2014 **Bachelor of Science** in Earth Science–Meteorology California University of Pennsylvania
Summa Cum Laude
Minor: Mathematics
Minor: Geographic Information Science–Emergency Management

PROFESSIONAL EXPERIENCE

2018–2020 **Cooperative Institute for Mesoscale Meteorological Studies** Norman, Oklahoma
Post-Doctoral Research Associate, Adviser: Mike Coniglio (NSSL)
I focused on development and deployment of NSSL boundary-layer profiling systems, as well as the exploration of experimental systems to advance our understanding of severe convective weather and the consideration of systems that could enhance the NOAA upper-air observing network.

2014–2018 **University of Oklahoma - School of Meteorology** Norman, Oklahoma
Graduate Research Assistant, Advisers: Dr. Petra Klein and Dr. Evgeni Fedorovich (OU-SoM)
As part of the Boundary Layer Integrated Sensing and Simulation (BLISS) group, my research focused on nocturnal low-level jets and nocturnal boundary layers using numerical simulation methods and meteorological observing platforms. I also maintained the BLISS group webpage.

2013 **National Weather Service** Cheyenne, Wyoming
NOAA Hollings Intern
I completed a research project concerning the role of two-inch soil temperatures in snowfall accumulation and worked with forecasters to understand the forecast problem and build a potential solution. I also worked on the operations floor assisting with forecasts, warnings, and community decision support. I completed two warning event simulations.

2012 **WOWK Channel 13** Charleston, West Virginia
Meteorology Intern
I worked under Chief Meteorologist Spencer Adkins assisting in preparing forecasts and weather graphics for several shows for both the Charleston viewing area and a statewide broadcast. On severe weather days, I filled in as needed and operated the Emergency Alert Crawler. I also served as a communications liaison fielding calls and online messages (social media) from the public and using the NWS Chat system.

TEACHING EXPERIENCE

2019–Present **University of Oklahoma - School of Meteorology** Norman, Oklahoma
Instructor
I lead the Boundary Layer, Urban Meteorology, and Land-Surface Processes Seminar series, which includes scheduling seminars, acting as seminar moderator, and instructing and evaluating enrolled students. In this role I have been involved with the implementation of new peer-review activities (2018) and work each semester to provide additional development opportunities for enrolled students including group research, guided reading sessions, and presentation development sessions.

2015–2018 **University of Oklahoma - School of Meteorology** Norman, Oklahoma
Teaching Assistant
I instructed and helped develop the laboratory portion of Meteorological Measurement Systems, a writing intensive junior level course in the meteorology curriculum. The laboratory uses hands on methods to teach students about calibration and observation techniques applicable to meteorology. Students also build important scientific writing skills authoring article-style lab reports. I developed new material to enhance the instruction provided on scientific writing, modernized some components of lab experiments, developed python based coding homework assignments, and offered coding and writing help sessions in addition to regular office hours. I also guest lectured in the lecture component of the course as needed.

2014 **California University of Pennsylvania** California, Pennsylvania
Adjunct Instructor
I served as an adjunct instructor for California University of Pennsylvania's Field Methods in Atmospheric Science course. The course travels across the United States enabling students to apply their forecasting skills to seek out tornadic supercell thunderstorms. The course focuses on real world application and development of forecasting skills, live demonstrations of various curriculum components, and teaching safe storm observing methods.

2013 **California University of Pennsylvania** California, Pennsylvania
PLUS Instructor
The Peer Led Undergraduate Study (PLUS) program allowed me to participate as an additional instructor for CalU's Remote Sensing: Satellite & Radar course. I developed and offered one formal lecture, led weekly discussion sessions outside of the classroom, and held office hours and study sessions for students enrolled in the class.

LEAD-AUTHOR PUBLICATIONS

Smith, E. N., M. C. Coniglio, and S. M. Waugh, 2020: An intercomparsion of near-storm wind observations by Doppler Lidar and radiosondes, in preparation

Smith, E. N., D. D. Turner, and W. G. Blumberg, 2020: Applications of enhanced thermodynamic retrievals using multiple thermodynamic profiling approaches, in preparation

Smith, E. N., J. G. Gebauer, P. M. Klein, E. F. Fedorovich, J. A. Gibbs, 2020: Spatial and temporal characteristics of Great Plains nocturnal low-level jets, in preparation.

Smith, E. N., J. G. Gebauer, P. M. Klein, E. Fedorovich, and J. A. Gibbs, 2019: The Great Plains low-level jet during PECAN: observed and simulated characteristics. Mon. Wea. Rev, **147**, 1845–1869. doi:10.1175/MWR-D-18-0293.1

Smith, E. N., J. A. Gibbs, E. Fedorovich, P. M. Klein, 2018: WRF model study of the great plains low-level jet: Effects of Grid Spacing and Boundary Layer Parameterization. J. Appl. Meteor. Climatol., **57**, 2375-2397. doi:10.1175/JAMC-D-17-0361.1

Smith, E. N., E. Fedorovich, A. Shapiro, 2016: Comparison of analytical descriptions of nocturnal low-level jets within the Ekman model framework. Environ. Fluid. Mech., **17**, 485-495. doi:10.1007/s10652-016-9502-z

Smith, E. N., J. A. Gibbs, E. Fedorovich, T. A. Bonin, 2016: WRF model study of the Great Plains low-level Jet: effects of grid spacing and boundary layer parameterization, 22nd Symposium on Boundary Layers and Turbulence, Salt Lake City, UT, American Meteorological Society, 14B.1, extended abstract [Link]

SELECTED LEAD-AUTHOR PRESENTATIONS

Smith, E. N., M. C. Coniglio, and S. Waugh, 2020: TORUS Doppler lidar and radiosonde wind intercomparison, 100th Annual Meeting, Boston, MA, American Meteorological Society, poster

Smith, E. N., A. E. Reinhart, M. C. Coniglio, and C. L. Ziegler,2020 : TORUS in the clear air: pre-convection observations from a profile and transect perspective, 100th Annual Meeting, Boston, MA, American Meteorological Society, poster

Smith, E. N, P. M. Klein, E. Fedorovich, J. A. Gibbs, 2018: The Wind Above Us: Studies of the Great Plains Low-Level Jet, 1st Annual Oklahoma Women Impacting STEM and Entrepreneurship Conference, Oklahoma City, OK, poster - Outstanding Poster Award

Smith, E. N., 2018: The Great Plains nocturnal low-level jet during PECAN, Atmospheric Remote Sensing Group, Chemical Sciences Division, Earth Systems Research Laboratory, NOAA, Boulder, CO, invited talk

Smith, E. N., J. G. Gebauer, P. M. Klein, E. Fedorovich, J. A. Gibbs, 2018: Evaluating the spatial and temporal evolution of Great Plains low-level jets during PECAN using high-resolution observations and simulations, 23rd Symposium on Boundary Layers and Turbulence, Oklahoma City, OK, American Meteorological Society, 10.4, talk

Smith, E. N., P. M. Klein, E. Fedorovich, J. A. Gibbs, J. G. Gebauer, 2018: The Great Plains Low-Level Jet during PECAN: Observed and Simulated Characteristics, Special Symposium on PECAN, Austin, TX, American Meteorological Society, 2.5, talk

Smith, E. N., J. A. Gibbs, E. Fedorovich, P. M. Klein, 2017: The Great Plains low-level jet during PECAN: initial comparisons of profiling observations with WRF model predictions, 28th Conference on Weather Analysis and Forecasting/24th Conference on Numerical Weather Prediction, Seattle, WA, American Meteorological Society, 12B.3., talk - 1st place

Smith, E. N., J. A. Gibbs, E. Fedorovich, T. A. Bonin, 2016: WRF model study of the Great Plains low-level Jet: effects of grid spacing and boundary layer parameterization, 22nd Symposium on Boundary Layers and Turbulence, Salt Lake City, UT, American Meteorological Society, 14B.1, talk

SELECTED COLLABORATIVE WORKS

*denotes student mentee author

*Spencer, M. R., **E. N. Smith**, P. M. Klein, 2020: Contribution to convection initiation by heterogeneity within the nocturnal low-level jet, paper in preparation. (Predecessor paper available online here)

McFarquhar, G., **E. N. Smith**, E. Pillar-Little, K. Brewster, P. Chilson, T. Lee, S. Waugh, N. Yussouf, X. Wang, M. Xue, G. de Boer, J. Gibbs, C. Fiebrich, B. Baker, J. Brotzge, F. Carr, H. Christopherson, M. Fengler, P. Hall, T. Hock, A. Houston, R. Huck, J. Jacob, R. Palmer, P. Quinn, M. Wagner, Y. Zhang, D. Hawk, 2020: Workshop on Current and Future Uses of UASs for Improved Forecasts/Warnings and Scientific Studies, Bull. Amer. Meteor. Soc., paper submitted

Potvin, C. K., P. S. Skinner, K. A. Hoogewind, M. C. Coniglio, J. A. Gibbs, A. J. Clark, M. L. Flora, A. E. Reinhart, J. R. Carley, **E. N. Smith**, 2020: Assessing systematic impacts of PBL schemes in the NOAA Warn-on-Forecast System. Mon. Wea. Rev., paper submitted.

Coniglio, M. C., **E. N. Smith**, D. D. Turner, 2020: Doppler Wind Lidar in the Inflow of Supercells: Synthesis of Observations from Mini-MPEX and TORUS2019, Severe Local Storms Symposium, Boston, MA, American Meteorological Society, poster

*Laser, J., P. S. Skinner, M. C. Coniglio, **E. N. Smith**, 2020: Evaluation of the Warn-on-Forecast System with Doppler Lidar and Radiosonde Observations from TORUS2019, 10th Conference on Transition of Research to Operations, Boston, MA, American Meteorological Society, poster

*Meister, N. C., *J. T. Cuellar, **E. N. Smith**, D. Reif, 2020: Doppler Lidar Observations of the Vertical Velocity Preceding Thunderstorm Outflow over the Great Plains, 19th Annual Student Conference, Boston, MA, American Meteorological Society, poster

Potvin, C. K., P. S. Skinner, K. A. Hoogewind, M. C. Coniglio, J. A. Gibbs, A. J. Clark, M. L. Flora, A. E. Reinhart, J. R. Carley, **E. N. Smith**, 2020: Assessing systematic impacts of PBL schemes in the NOAA Warn-on-Forecast System, 10th Conference on Transition of Research to Operations, Boston, MA, American Meteorological Society, talk

Reinhart, A. E., **E. N. Smith**, C. L. Ziegler, C. C. Weiss, 2020: TORUS in the Clear Air: Pre-convection Observations from an Airborne and Mobile Radar Perspective, Severe Local Storms Symposium, Boston, MA, American Meteorological Society, poster

*Spencer, M. R., **E. N. Smith**, P. M. Klein, 2020: Exploring Great Plains Nocturnal Low-Level Jet Heterogeneity and Connections to Convection Initiation, 20th Symposium of Meteorological Observation and Instrumentation, Boston, MA, American Meteorological Society, talk

Bell, T. M., P. M. Klein, **E. N. Smith**, J. Gebauer, and D. D. Turner, 2017: Nocturnal Boundary-Layer Phenomena Observed at a Complex Site During the Perdigão Experiment, AGU Fall Meeting Abstracts, San Francisco, CA, American Geophysical Union, A23J-08, talk

FUNDED RESEARCH

2020-2021 **PI, NOAA/OAR/OWAQ – Boundary Layer Analysis** $117,000
Chequamegon Heterogeneous Ecosystem Energy-balance Study Enabled by a High-density Extensive Array of Detectors (CHEESEHEAD) Analysis
Submitted January 2020
Petra M. Klein (OU School of Meteorology, Co-PI), Michael C. Coniglio (NSSL, Co-PI), Tyler Bell (CIMMS, Co-PI)
This project will support analysis of data collected during the CHEESHEAD deployment period (see funded research: NOAA/OAR/OWAQ – Boundary Layer). This cross-NOAA-lab endeavor aims to analyze these observations with a variety of research foci. NSSL will focus on locally developed simulation approaches and a detailed analysis of a 2-day severe linear storm event on 19-20 July 2019 in central WI. This project together with CHEESEHEAD Data Collection funding will support a graduate student.

2019-2021 **PI, NOAA/OAR/OWAQ – VORTEX-SE** $293,423
Defining the capabilities of boundary layer profiling systems for operations in the southeastern United States
September 2019–September 2021
Michael C. Coniglio (NSSL, Co-PI), Sean M. Waugh (NSSL, Co-PI), David D. Turner (ESRL, Collaborator)
This project uses previously collected boundary layer profile observations from multiple years of VORTEX-SE in three research areas: observation data will be used to evaluate the boundary layer profiling platforms themselves, inform future deployments of such platforms, evaluate the existing tools often used in public forecast and warning operations, and document rapidly evolving pre-convective environments in the southeastern US. This project funds a full time research assistant and an undergraduate student.

2019 **PI, NOAA/OAR/OWAQ – Boundary Layer** $141,750
Chequamegon Heterogeneous Ecosystem Energy-balance Study Enabled by a High-density Extensive Array of Detectors (CHEESEHEAD) Data Collection
April 2019–September 2019
Petra M. Klein (OU School of Meteorology, Co-PI), Michael C. Coniglio (NSSL, Co-PI), Pamela Heinselman (NSSL, Co-PI), Doug Kennedy (NSSL, Collaborator)
This project supports the deployment of both CLAMPS platforms in northern Wisconsin as part of a targeted network of high-quality observing systems that fully characterize the surface conditions over model grid scales and the overlying atmosphere up to 3 km would provide the kind of information that allows a more descriptive understanding of the processes that drive the exchange of energy and mass between the land and the atmosphere.

DEVELOPING RESEARCH

2020-2022 **Co-PI, DOE/OSBER/ASR – TRACER/CUBIC** $300,000

Coastal Urban Boundary-layer Interactions with Convection (CUBIC)

To be submitted March 2020

Petra M. Klein (OU School of Meteorology, PI), Jeremy A. Gibbs (CIMMS, Co-PI), Elizabeth N. Smith (NSSL, Co-PI), Timothy J. Wagner (Co-PI, Univ. Wisconsin), Michael C. Coniglio (NSSL, Collaborator), David D. Turner (ESRL, Collaborator)

The proposal supports the collection of continuous, high-resolution data sets that provide information about the spatial variability of boundary layer processes and thermal circulation patterns in a highly urbanized, coastal region. The boundary-layer observations will add significant value to the convective cloud observations collected during the already funded TRACER project. The observations will be supplemented by numerical simulations and integrated data products to allow us to address several research questions surrounding urban, and sea-breeze effects on boundary layer development and convection initiation.

STUDENT MENTORING & PERSONNEL MANAGEMENT

2020–Present **University of Oklahoma - CIMMS** Norman, Oklahoma

Supervisor

I support and manage a full-time CIMMS research associate researcher through my NOAA/OWAQ/VORTEX-SE grant. The researcher focuses on evaluation, development, and support of thermodynamic retrieval algorithms and data system workflows. In this case, this employment opportunity also allows the employee to continue pursuing a doctoral degree. Employee: Tyler Bell, OU-CIMMS

2019–Present **University of Oklahoma - CIMMS** Norman, Oklahoma

Supervisor

I support and manage an undergraduate student researcher through my NOAA/OWAQ/VORTEX-SE grant. The student works on gathering, quality checking, and synthesizing boundary layer observations collected during multiple years of VORTEX-SE deployments and collaborates with the research team to conduct research supporting the grant's goals. Student employee: Tyler Pardun, University of Oklahoma

2019–Present **University of Oklahoma - School of Meteorology/CIMMS/NSSL** Norman, Oklahoma

Ad hoc Adviser

I act as an unofficial, but involved member on the committee of a OU SoM MS student. Since rules require SoM Faculty to be in the majority, adding me to the committee in a formal capacity would make the committee unnecessarily large. I do however serve in an advisory role assisting this student with the use of mobile Doppler lidar data in a storm-scale ensemble model verification experiment and guiding education in observation collection and application principles. Student: Jordan Laser, University of Oklahoma

2019–Present **University of Oklahoma - School of Meteorology** Norman, Oklahoma

Capstone Mentor

I currently mentor a senor capstone team on a project focused on the mechanisms supporting updraft generation ahead of outflow boundaries using TORUS lidar observations. Co-mentor: Dylan Reif, University of Oklahoma, Students: Nolan Meister and James Cuellar, University of Oklahoma

2019–Present **University of Oklahoma - School of Meteorology** Norman, Oklahoma

Capstone Mentor

I currently mentor a senor capstone team on a project focused on evaluating the relationship between hodograph shape and supercell and environmental characteristics. Co-mentor: Matt Flournoy, University of Oklahoma, NSSL, Students: Marisa Nuzzo and Maci Gibson, University of Oklahoma

2019–Present **University of Oklahoma - National Weather Center REU** Norman, Oklahoma

Mentor

I mentored an undergraduate student on a summer research project focused on the connections between nocturnal low-level jets and convection initiation during the 2019 REU. We continue to collaborate to advance the work, resulting in an AMS presentation and a planned article submission. Student: Michelle Spencer, Univ. Wisconsin Milwaukee (prev: Metropolitan State Univ. Denver)

FIELD WORK

2019-Present **Targeted Observation by Radars and UAS of Supercells** CIMMS/National Severe Storms Laboratory
Field Scientist
I helped in development (including hardware and software design) and lead deployment of a platform enabling NSSL mobile single- and dual-lidar observations in the vicinity of storms. This role includes independent leadership and management roles including mentoring students, advising PI team on pre-convection deployments, coordinating mobile lidar deployments, field-coordination of the full field team during pre-convection deployments, and creating and disseminating final observation data and deployment summaries for NSSL mobile lidar and sounding units.

2017 **Perdigão** OU School of Meteorology
Field Scientist
During this field campaign, I served as group lead for the OU team operating a profiling system (mini-CLAMPS) and assisted NCAR in releasing radiosondes to measure atmospheric flow in complex terrain over a double hill in Perdigão, Portugal.

2016 **Mini-Mesoscale Predictability Experiment (mini-MPEX)** National Severe Storms Laboratory
Field Scientist
During this field campaign, I operated a mobile profiling platform (NOAA-NSSL CLAMPS2) and released radiosondes to observe near- and far-field environments near severe supercell thunderstorms in TX and OK.

2015 **Plains Elevated Convection At Night (PECAN)** OU School of Meteorology
Field Scientist
During this field campaign, I operated a mobile profiling platform (OU-NSSL CLAMPS1) and released radiosondes to observe nocturnal environments important to understanding nocturnal convection in the Great Plains of the United States such as mesoscale convective systems, bores, convection initiation, and low-level jets.

DIVERSITY, INCLUSION, AND EQUITY WORK

I place high value on the need for institutional and community efforts to increase diversity, inclusion, and equity in STEM spaces. I have highlighted my own work in this area separate from other service efforts here. I did not include related training in this section, but it can be found in the Professional Training section below.

2019–2020 **TORUS Training Development** CIMMS/NSSL
I worked with the TORUS PI-team ahead of field-deployment to develop training procedures and provide clear documentation of unacceptable behavior, repercussions, and reporting procedures.

2019 **EPSCoR-OK Women in Science Conference Demo Leader** SoM/CIMMS/NSSL
I worked with a team of SoM, CIMMS, and NSSL women at the grade 6-12 Women in Science Conference, where girls could engage in hands-on science activities, learn first-hand about science and technology career opportunities from Oklahoma's top female scientists and engineers, and receive college preparation information from Oklahoma college, university and outreach representatives.

2019 **Guest on Yes! Science Show** The Show Starts Now Studios
I was brought in as a special guest for Season 3 Episode 4 of the Yes! Science Show, which aims to show science is for EVERYONE by highlighting scientists from often underserved groups and allowing them to speak about their work, experiences, challenges, and steps to success. My interview is available online here.

2019 **National Weather Center Protocol** National Weather Center
Authored a document for participants in National Weather Center partner activities intended to prevent negative behaviors including harassment, discrimination, and assault and provide support to any potential victims of such behavior. This document was approved by the OU Legal office and is now used by all NWC partners.

2018–2020 **Diversity and Inclusion Committee** CIMMS
Member of the founding committee

2017–Present **Classroom Outreach**
I video chat (via Skype-A-Scientist) or visit with several K–12th grade classrooms across the US. I like working with younger students, as I believe recruitment to science must start before high school. In these efforts, I identify myself as a female identifying first-generation college graduate from a rural, blue-collar upbringing to highlight diversity in what scientists look like and that science needs people from all walks-of-life.

2017 **Women in the School of Meteorology** OU School of Meteorology
Conducted a survey reviewing women's experiences in the SoM for Academic Performance Review and to assist administration in efforts to improve the experience of women in science.

TECHNICAL SKILLS

Python (proficient) , MATLAB (proficient) , LaTeX (proficient), Weather Research and Forecast (WRF) Model (proficient), HTML (working knowledge), Unix (working knowledge), ArcGIS (working knowledge), HPC platforms (working knowledge)

HONORS AND AWARDS

2019	**Douglas Lilly Paper Award (for 2019 MWR Publication)**	OU School of Meteorology
2018	**Outstanding Poster Award**	Oklahoma Women Impacting STEM and Entrepreneurship Conference
2017	**Director's Recognition for Service to the Department**	OU School of Meteorology
2017	**First Place Student Oral Presentation, 24th Conference on NWP**	American Meteorological Society
2016	**Faculty Recognition for Outstanding Performance as a Graduate Student**	OU School of Meteorology
2014–2015	**Lockheed Martin Graduate Fellowship**	American Meteorological Society
2013	**Michael A Roberts, Jr. Undergraduate Scholarship**	American Meteorological Society
2013	**NOAA Science and Education Symposium Award**	National Oceanic and Atmospheric Administration
2012–2014	**NOAA Ernest F. Hollings Scholarship**	National Oceanic and Atmospheric Administration
2012	**Phillips Family Scholarship**	National Weather Association
2010-2014	**Presidential Scholar**	California University of Pennsylvania

PROFESSIONAL SERVICE

2020–Present **Associate Editor** American Meteorological Society
Monthly Weather Review

2016–Present **Peer-reviewer**
Boundary layer meteorology, Monthly Weather Review, Quarterly Journal of the Royal Meteorological Society, Journal of Applied Meteorology and Climatology, Tellus

2018–2019 **Student Conference Volunteer** American Meteorological Society
Poster competition judge

2017 **Graduate Studies Committee** OU School of Meteorology
Student representative for Direct-Track Ph.D. documentation in the Graduate Student Handbook

2016–2018 **Student Affairs Committee** OU School of Meteorology
Doctoral representative. I planned two large fundraiser event for the NWC community and developed a student-focused professional development series in this role.

2016–2017 **Faculty Search Committee** OU School of Meteorology
Student representative to the search committee for two new faculty hires

2015–2019 **Boundary-Layer, Urban Meteorology, and Land-Surface Processes Seminar Series** OU School of Meteorology
Co-Convener and webpage manager

2013–2016 **Local Chapter Affairs Committee** American Meteorological Society
Member(2013-2015), Chair(2016) serving to connect and enhance local chapters of the AMS.

VOLUNTEER SERVICE

2019–Present **Board of Trustees** National Weather Museum and Science Center
I serve as member of National Weather Museum and Science Center board of trustees, guiding the vision and future of the museum, and recruiting volunteers.

2018–Present **Museum Docent** National Weather Museum and Science Center
I volunteer at the National Weather Museum and Science Center giving tours to patrons and assisting with museum upkeep and events.

PROFESSIONAL TRAINING

2020 **Office of Diversity and Inclusion's Unlearning Series** University of Oklahoma
The "Unlearning" series is intended to help the campus community have safe and meaningful conversations about differences, to increase awareness of personal and community bias, and to promote inclusion at work and in the classroom. The 4-part series includes Unlearning Racism, Ableism, Sexism, and Classism.

2019 **Leadership Skills for Success in the Scientific Workforce** Earth Science Women's Network
Supported by NOAA, UCAR/NCAR, and CU-Boulder, this 2.5 day workshop was intended for people who identify as women and are employed in the sciences, especially those employed in scientific agencies and scientific organizations. Workshop topics included understanding your own strengths and weaknesses, strategies for effective communication, team building to promote motivation and trust, guidance in giving and receiving feedback, articulating your personal value, and strategies for identifying and overcoming challenges to becoming a more effective leader. This workshop offered a unique opportunity for women across scientific disciplines and career levels to build their leadership and management skills.

2019 **Addressing Bias in Professional Relationships: From the Office to the Field** Association of Polar Early Career Scientists
This webinar format short training covered discussion of bias (particularly experienced by women) in science careers and tools to address it both as a target and as a bystander.

2019 **'Our Voice' Active Bystander Training** University of Oklahoma
The mission of the Our Voice campaign is to educate the campus community on the realities of gender-based violence and how to intervene when they encounter problematic behavior or instances of sexual harassment, sexual assault, dating violence, or stalking.

2015 **LGBTQ Ally Training** University of Oklahoma
Completing LGBTQ Ally training provides the awareness, knowledge, and skills to confront injustice and advocate for equality, while supporting all persons, regardless of perceived or actual sexual orientation, gender identity, or gender expression, who are experiencing discrimination in the OU community.

2015 **Professional Ethics Training – Responsible Conduct of Research** University of Oklahoma
This two-day workshop was developed by NIH- and NSF-funded researchers in OU's Center for Applied Social Research. It provides graduate students with realistic, work-based strategies for identifying and resolving complex ethical dilemmas.

2015 **ARM Summer Training and Scientific Applications event** US Dept. of Energy - ARM
Organized by the Atmospheric Radiation Measurement (ARM) Climate Research facility, this summer training provided theoretical and practical instruction on instruments from the Southern Great Plains site and encouraged innovative methods for using ARM facilities to address complex scientific inquiries.