

CONTACT

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CURRENT APPOINTMENTS

- 2020–Present **National Oceanic and Atmospheric Administration – National Severe Storms Laboratory** Norman, Oklahoma
Research Meteorologist
I work as an observationalist leading research on boundary layer processes relevant to convection initiation and pre- and near-storm severe weather environments. More information available on my [webpage](#).
- 2021–Present **University of Oklahoma School of Meteorology** Norman, Oklahoma
Affiliate Assistant Professor
- 2020–Present **Cooperative Institute for Severe and High-Impact Weather Research and Operations** Norman, Oklahoma
Research Fellow

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
Minors: Mathematics and 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 **NOAA Education Hollings Intern - National Weather Service** Cheyenne, Wyoming
NWS WFO CYS 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 and completed warning event simulations.
- 2012 **WOWK Channel 13** Charleston, West Virginia
Meteorology Intern
I worked under Chief Spencer Adkins on preparing forecasts and weather graphics for the Charleston viewing area and a statewide broadcast. On severe weather days, I operated the Emergency Alert Crawler, fielded calls and messages (social media) from the public and used the NWS Chat system.

TEACHING EXPERIENCE

- 2021–Present **University of Oklahoma - School of Meteorology** Norman, Oklahoma
Instructor
I developed and teach slash-listed course aimed toward graduate students and upper-level undergraduates called Advanced Observations for Lower Atmospheric Research. Students examine the observation and operation principles behind a variety of research-grade instruments. The course has no exams, with focus instead on group instruction, guest lectures, instrument demonstrations, and data-focused exercises and projects to prepare students for research careers. Course materials can be viewed [online](#).
- 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, acting as moderator, and instructing and evaluating enrolled students. I was involved with the implementation of peer-review activities (in 2018) and work to provide additional development opportunities for enrolled students.
- 2015–2018 **University of Oklahoma - School of Meteorology** Norman, Oklahoma
Teaching Assistant
I instructed and helped develop the lab portion of Meteorological Measurement Systems, a which was a writing intensive junior level course in the meteorology curriculum, teaching students about calibration and observation techniques. I developed new material to enhance instruction on scientific writing, modernized components of lab experiments, developed python coding assignments, and offered coding and writing help sessions in addition to regular office hours. I also guest lectured in the lecture component.

LEAD-AUTHOR PUBLICATIONS

*denotes student mentee author

- Smith, E. N.**, and J. T. Carlin, 2023: A multi-instrument fuzzy logic boundary-layer top detection algorithm, in preparation for Atmos. Meas. Tech.
- Smith, E. N.**, *B. R. Greene, *T. M. Bell, W. G. Blumberg, *R. Wakefield, *D. Reif, *Q. Niu, *Q. Wang, D. D. Turner, 2021: Evaluation and applications of multi-instrument boundary layer thermodynamic retrieval profiles, *Boundary-Layer Meteorol.* **181**, 95–123. doi: [10.1007/s10546-021-00640-2](https://doi.org/10.1007/s10546-021-00640-2)
- 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](https://doi.org/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](https://doi.org/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](https://doi.org/10.1007/s10652-016-9502-z)

COLLABORATIVE PUBLICATIONS

*denotes student mentee author

- Carlin, J. T., **E. N. Smith**, and *K. Giannakopoulous, 2022: Contextualizing Polarimetric Retrievals of Boundary Layer Height using State-of-the-Art Boundary Layer Profiling, in preparation for TBD AMS journal.

Adler, B, J. M. Wliczak, L. Bianco, L. Bartiteau, C. Cox, G. de Boer, I. V. Djalalova, M. R. Gallagher, J. Intrieri, T. Meyers, T. A. Myers, J. Olson, S. Pezoa, J. Sedlar, **E. N. Smith**, D. D. Turner, A. B. White, 2022: Passive remote sensing of the atmospheric boundary layer in Colorado's East River Valley during the seasonal change from snow-free to snow-covered ground, under review at JGR Atmospheres (April 2023).

*Laser, J. J. , M. C. Coniglio, P. S., Skinner, **E. N. Smith**, 2022: Doppler Lidar and Mobile Radiosonde Observation-Based Evaluation of Warn-on-Forecast System Predicted Near-Supercell Environments during TORUS 2019, Wea. Forecasting, 37 (10), 1783-1804. doi: 10.1175/WAF-D-21-0190.1

Duncan Jr., J. B., Bianco, L., Adler, B., Bell, T., Djalalova, I. V., Riihimaki, L., Sedlar, J., **Smith, E. N.**, Turner, D. D., Wagner, T. J., and Wilczak, J. M., 2022: Evaluating convective planetary boundary layer height estimations resolved by both active and passive remote sensing instruments during the CHEESEHEAD19 field campaign, Atmos. Meas. Tech., 15, 2479–2502

Butterworth, B. J., A. R. Desai, S. Metzger, P. A. Townsend, M. D. Schwartz, G. W. Petyy, M. Mauder, H. Vogelmann, ... **E. N. Smith**, ... and co-authors, 2021: Connecting Land-Atmosphere Interactions to Surface Heterogeneity in CHEESEHEAD 2019. Bull. Amer. Meteor. Soc., 102(2), E421-E445.

McFarquhar, G., **E. N. Smith**, E. Pillar-Little, ... and co-authors, 2020: Workshop on Current and Future Uses of UASs for Improved Forecasts/Warnings and Scientific Studies. Bull. Amer. Meteor. Soc., 101 (8), E1322-E1328

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., 148, 2567–2590

FUNDED & DEVELOPING RESEARCH

- 2023-2025 **PI, NOAA UxSRTO Research and Development** \$432,612 – submitted
PRODIGEE-UAS: Progressive Research and Optimization of a Durable and Independent Generation of Uncrewed Aircraft Systems
May 2023–April 2025
Antonio Segales (CIWRO, Co-PI), Tyler Bell (CIWRO, Co-PI), Joshua Gebauer, (CIWRO, Co-PI), Robert Palmer (OU, Collaborator)
The proposed work recognizes the past and present successes of the CopterSonde uncrewed aircraft system (UAS) platform and aims to advance its capability through intentional and innovative research and development to meet NOAA National Severe Storms Laboratory and partner mission objectives. The proposed research and development effort includes work in three main categories. Category 1: advance and expand the CopterSonde platform hardware and autopilot functions; Category 2: advance capabilities for immediate observation and flight data dissemination; and Category 3: develop and advance CopterSonde-supporting software and standard operating procedures (SOPs).
- 2023-2025 **Co-PI, NOAA Incubator** \$239,225 – submitted
Deep learning calibration of surface wind forecasts from the NSSL Warn-on-Forecast System
August 2023–August 2025
Corey Potvin (NSSL-PI), Monte Flora (CIWRO, Co-PI), Nathan Dahl (CIWRO, Co-PI), Joshua Gebauer (CIWRO, Co-PI), Tyler Bell (CIWRO, Co-PI)
This proposal will compile a comprehensive dataset of 10-m wind gust observations for training the convolutional neural networks (CNNs) and evaluating both the WoFS and CNN predictions. This dataset will be developed into an AI-ready, open-access dataset for use by the broader community. The proposal also aims to develop WoFS-based CNNs that substantially improve the raw WoFS wind forecasts. Finally, it will also create low-level wind analyses from fixed-site and mobile field observations collected within WoFS domains to enable deeper evaluation of the WoFS and DL model wind forecasts. The knowledge gained from these case studies could inspire additional improvements to the DL models. A major milestone will be incorporating these novel analyses into an AI-ready dataset that will be released after the project period. The proposed work leverages the growing PBL and ML/DL expertise at NSSL.

2023-2025	<p>Co-PI, NOAA/WPO Mesonet BL Observations/Innovative Observing Technologies</p> <p><i>Venturing Into the Vertical: Optimizing Boundary Layer Profiling in Mesonets</i></p> <p>August 2023–July 2025</p> <p>Joshua Gebauer (CIWRO, PI), Tyler Bell (CIWRO, Co-PI), Antonio Segales, (CIWRO, Co-PI)</p> <p>study proposes to conduct research that will facilitate the development of a vital boundary layer profiling mesonet, often referred to as a 3D mesonet, that could fill the boundary layer data gap in current observation networks. This project will perform observing system simulation experiments (OSSEs) using high-quality observation simulators to study the optimal design of a 3D mesonet. The results from the OSSEs will then be used to design field deployments of boundary layer profiling instrumentation to prototype a 3D mesonet during high-impact weather events. This project will provide insights about optimal design of 3D mesonets and value-added products that can be used when adding boundary-layer profiling capabilities to existing mesonets.</p>	\$599,102 – submitted
2022-2023	<p>Co-PI, NOAA - DOE Inter-agency Agreement Year 2</p> <p><i>American Wake Experiment (AWAKEN)</i></p> <p>February 2022–October 2023</p> <p>David D. Turner (GSL, PI)</p> <p>This is an extension of the same work from AWAKEN IAA year 1, but now actually supports deployment of instruments. The CLAMPS2 facility deploys to the DOE-ARM extended facility 36 to sample flow undisturbed by turbine wakes. These funds have been arriving nearly 1 year late, but the work has been executed in a timely and successful manner. I lead the deployment and overseeing of the instrumentation and partnership with OU and LLNL collaborators.</p>	\$24,500
2022-2024	<p>PI, NOAA VORTEX-USA – CLAMPS + UAS</p> <p><i>Deployment of CLAMPS + UAS Network-in-Network Profilers</i></p> <p>Tyler Bell (CIWRO, Co-PI), Tony Segales(CIWRO, Collaborator)</p> <p>Challenging environments in the SE US require innovation in observational strategies and analysis methods, which this project aims to do. By coupling state-of-the-art ground-based profilers with novel uncrewed aircraft system (UAS) platforms we strive to explore new methods of measuring properties critical to high-impact and life-threatening weather conditions in the southeastern United States: low-level wind shear, low-level thermodynamics, horizontal moisture flux or advection, buoyancy, turbulence properties, and more. Note that these observations will be collected in parallel with the PERiLS effort, and should provide additional benefit to those PIs.</p>	
2022-2024	<p>Co-PI, NSF – ARISE</p> <p><i>Assessment of Renewable energy ImpactS on the Environment</i></p> <p>Julie Lundquist (CU-Boulder, Lead PI), Petra Klein(OU-Local PI)</p> <p>The proposed regional-scale deployment of instrumentation will enable the first comprehensive assessment of the regional impacts of wind plants,located in north-central Oklahoma, a region with over 7000 wind turbines in several distinct clusters. These observations will help to quantify and improve our understanding of how wind plant wakes behave under varying environmental conditions over the diurnal cycle, and how the wakes impact the evolution of the atmospheric boundary layer (ABL). Further, simulations of individual wind plants indicate that wakes have the potential to affect the propagation of weather features like thunderstorm outflow boundaries and frontal passages.</p>	\$800,000 – failed
2020-2022	<p>Co-PI, DOE/OSBER/ASR – IPAQS-WBL</p> <p><i>Idealized Planar-Array Study for Quantifying Spatial heterogeneity in warm boundary layers</i></p> <p>Eric Pardyjak (Univ. Utah, PI), Marc Calaf (Univ. Utah, Co-PI), Jeremy Gibbs (NSSL, Co-PI)</p> <p>The effects independently generated by surface roughness, thermal, and moisture surface heterogeneities interact with each other, leading to the formation of persistent secondary circulations (PSCs) that significantly perturb the atmospheric boundary layer, including the SEB closure. In this work, we aim to understand how different sources of heterogeneity interact when combined together in comparison to single sources of heterogeneity acting in isolation. We further hypothesize that the development of PSCs can be included in numerical weather prediction (NWP) and climate models by modifying atmospheric surface layer (ASL) and planetary boundary layer (PBL) schemes by using either deterministic dispersive fluxes or physically-based stochastic perturbation (PSP) schemes. The goal of this project is to leverage the experience and knowledge recently gained by the PIs through the first IPAQS to develop new knowledge about the impacts of surface heterogeneities (i.e. roughness, heat, and moisture).</p>	\$400,000 – failed

2020-2022	<p>Collaborator, NOAA/WPO – UAS and High Impact Weather</p> <p><i>Analysis and OSEs of UAS observations for improved high impact weather forecasts</i></p> <p>Nusrat Yussof (CIMMS/NSSL, PI), Phil Chilsom (OU), Katie Wilson (CIMMS/NSSL), Tyler Bell (CIMMS/NSSL), Elizabeth Pillar-Little (OU), Todd Lindley (NWS), Stephen Bieda (NWS), Chris Fiebrich (OKMesonet)</p> <p>This study proposes to demonstrate the utility of the affordable Uncrewed Aerial System (UAS) observing technologies for the analysis and prediction of adverse weather phenomena resulting from springtime supercell storms, summertime mesoscale convective systems, and winter storms. Specifically, this study will build UASs and deploy them in the central United States to collect vertical profiles of pre-storm and during-storm environments. The collected UAS temperature, moisture, and wind observations of the planetary boundary layer (PBL) will be analyzed via NWP observing system experiments, assimilated in NSSL's Warn on Forecast System, and explored with National Weather Service (NWS) forecasters.</p>	\$575,000
2020-2021	<p>Co-PI, NOAA - DOE Inter-agency Agreement Year 1</p> <p><i>American Wake Experiment (AWAKEN)</i></p> <p>February 2020–October 2021</p> <p>David D. Turner (GSL, PI), Alan Brewer (CSL, Co-PI), Kathy Lantz (GML, Co-PI), Joseph Olson (CIRES/GSD, Co-PI), James Wilczak (PSL, Co-PI)</p> <p>AWAKEN will focus on understanding how the wakes from turbines in a wind farm affect the overall efficiency of wind farm, and how this depends on atmospheric conditions. This field campaign will be conducted at / near the DOE Atmospheric Radiation Measurement (ARM) site in north-central Oklahoma. NOAA staff will contribute to AWAKEN by helping to refine the experimental design of the field campaign, developing and deploying a highly mobile truck-based wind lidar, and providing expertise on ground-based thermodynamic profiling.</p>	\$12,500
2021	<p>PI, NOAA/OAR/OWAQ – Boundary Layer Continued Support</p> <p><i>SPLASH--SAIL and continued PBL Analyses</i></p> <p>Jan 2021–October 2021</p> <p>Tyler Bell (CIMMS, Co-PI)</p> <p>This project supports completing analysis of data collected during the CHEESHEAD deployment period (see funded research: NOAA/OAR/OWAQ – Boundary Layer). In addition, this funding supports the deployment of CLAMPS2 to Crested Butte, CO as part of the SPLASH-SAIL campaign in 2021. This cross-NOAA-lab endeavor aims to analyze these observations with a variety of research foci. NSSL will focus evaluating PBL evolution and comparing it to datasets in other locations and seasons.</p>	\$117,000
2020-2022	<p>Co-PI, DOE/OSBER/ASR – TRACER--CUBIC</p> <p><i>Coastal Urban Boundary-layer Interactions with Convection (CUBIC)</i></p> <p>June 2021–June 2024</p> <p>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)</p> <p>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.</p>	\$300,000
2020-2021	<p>Co-PI, CIMMS Director's Discretionary Research Fund – Boundary Layer Height</p> <p><i>Evaluating Polarimetric Retrievals of Boundary Layer Height Using State-of-the-Art Boundary Layer Profiling</i></p> <p>July 2020–June 2021</p> <p>Jacob Carlin (CIMMS, PI)</p> <p>This project supports data collection and analysis to evaluate a proposed method of BL height detection from operational WSR-88D dual-polarization radar (Banghoff et al. 2018). Using state-of-the-art boundary layer profilers, the proposed method will be evaluated beyond synoptic times. Additionally data collection at varying sites and distance-from-radar will enable some additional insight into the method's performance.</p>	\$37,000

2020-2021	<p>PI, NOAA/OAR/OWAQ – Boundary Layer Analysis \$117,000</p> <p><i>Chequamegon Heterogeneous Ecosystem Energy-balance Study Enabled by a High-density Extensive Array of Detectors (CHEESEHEAD) Analysis</i></p> <p>February 2020–January 2021</p> <p>Petra M. Klein (OU School of Meteorology, Co-PI), Michael C. Coniglio (NSSL, Co-PI), Tyler Bell (CIMMS, Co-PI)</p> <p>This project supports analysis of data collected during the CHEESEHEAD deployment period (see funded research: NOAA/OAR/OWAQ – Boundary Layer).</p>
2019-2021	<p>PI, NOAA/OAR/OWAQ – VORTEX-SE \$293,423</p> <p><i>Defining the capabilities of boundary layer profiling systems for operations in the southeastern United States</i></p> <p>September 2019–September 2021</p> <p>Michael C. Coniglio (NSSL, Co-PI), Sean M. Waugh (NSSL, Co-PI), David D. Turner (ESRL, Collaborator)</p> <p>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.</p>
2019	<p>PI, NOAA/OAR/OWAQ – Boundary Layer \$141,750</p> <p><i>Chequamegon Heterogeneous Ecosystem Energy-balance Study Enabled by a High-density Extensive Array of Detectors (CHEESEHEAD) Data Collection</i></p> <p>April 2019–September 2019</p> <p>Petra M. Klein (OU School of Meteorology, Co-PI), Michael C. Coniglio (NSSL, Co-PI), Pamela Heinselman (NSSL, Co-PI), Doug Kennedy (NSSL, Collaborator)</p> <p>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.</p>

STUDENT MENTORING & PERSONNEL MANAGEMENT

2022–Present	<p>Lydia Bunting, CIWRO/NSSL CIWRO/NSSL</p> <p><i>Mentor</i></p> <p>I support and 'daily manage' a full-time CIWRO research associate. This research associate is affiliated with many projects and is primarily a data manager for CLAMPS and other boundary-layer observation systems.</p>
2022–Present	<p>Antonio Segales, CIWRO CIWRO</p> <p><i>Informal/Untitled Mentor</i></p> <p>I support a full-time CIWRO research engineer associated with the CopterSonde UAS. This position is not directly supported by NSSL at this time but the CopterSonde platform is a critical to the success of NSSL research projects. As such I have filled the otherwise un-filled/un-provided role of technical supervisor for this research engineer. This includes assisting in understanding how to form job roles, daily-months task followups on projects, etc.</p>
2022–Present	<p>Michelle Spencer, University of Oklahoma School of Meteorology/CIWRO/NSSL</p> <p><i>Advisor</i></p> <p>I co-advise one PhD student, funded to work at OU-SoM in collaboration with NSSL on the funded TRACER-CUBIC project. The student is co-adviced by Dr. Petra Klein, OU School of Meteorology. The student will use state-of-the-art observations and high resolution numerical simulations to study sea breezes and urban boundary layer effects and work to understand complex interactions, including potential impacts to convection initiation.</p>

- 2022–Present **Joshua Gebauer, CIWRO/NSSL** CIWRO/NSSL
Mentor
 I support and 'daily manage' a full-time CIWRO research scientist associated with the VORTEX-USA CLAMPS+UAS project. The researcher focuses on evaluation, development, and analysis of networked observations and value-added products.
- 2022–Present **Matt Ammon, CIWRO** School of Meteorology/CIWRO
Supervisor
 I supervise Matt on a short-term project to complete several in-depth case studies of CLAMPS observation cases from 2016-2019 years of VORTEX-SE.
- 2021–Present **Victor Alvarez, University of Oklahoma** CIWRO
Supervisor
 I supervise Victor work to update, modernize, and visualize the CLAMPS historical archive. This work also includes a rebuild of the CLAMPS webviewer tool. Victor works with the CLAMPS data management team to rebuild a modern web tool to visualize both archive and real-time CLAMPS data.
- 2021–Present **Isaac Medina, University of Oklahoma** NWC REU/NSSL
Mentor/Supervisor
 Initially I acted as Isaac's mentor in the NWC REU program during summer 2021. His project compared dual-pol radar, fuzzy-logic based CLAMPS, and UAS boundary-layer height estimates. When REU ended, I hired Isaac on through the NSSL Director's Office program to support students from underrepresented communities. In this capacity, Isaac works on a VORTEX-SE project using CLAMPS and operational model data.
- 2020–Present **Arianna Jordan, University of Oklahoma** School of Meteorology/CIMMS/NSSL
Advisor
 I co-advise one PhD student, funded to work at OU-SoM in collaboration with the Pacific Northwest National Laboratory. The student is co-adviced by Dr. Petra Klein, OU School of Meteorology and Sonia Wharton, Pacific Northwest National Laboratory. The student will use state-of-the-art observations and high resolution numerical simulations to study boundary layers in the vicinity of large wind energy farms to understand complex interactions, including potential impacts to convection initiation.
- 2020–Present **Tyler Bell, CIWRO/NSSL** School of Meteorology/CIWRO/NSSL
Supervisor/Mentor
 I support and manage a full-time CIMMS research associate turned research scientist initially funded 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 allowed the employee to complete pursuit of a doctoral degree.
- 2019–Present **Tyler Pardun, University of Oklahoma** School of Meteorology/CIMMS/NSSL
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.
- 2021–2023 **Marshall Baldwin, University of Oklahoma** CIWRO
Supervisor
 I supervised Marshall work to update, modernize, and visualize the CLAMPS historical archive.
- 2020–2022 **Nolan Meister, University of Oklahoma** School of Meteorology/CIMMS/NSSL
Advisor
 Via funding awarded through the CHEESEHEAD analysis award, I advise one masters student. The student works on quantification of boundary layer characteristics during CHEESEHEAD and analysis of a 2-day severe linear storm event. This case study includes state-of-the-art observation analysis and evaluation of the NSSL Warn On Forecast System's performance. The student is co-funded and co-adviced by Dr. Petra Klein, OU School of Meteorology.
- 2021 **Dana Pawlowski, East Carolina University** National Weather Center REU
Mentor/Supervisor
 I remotely-mentored Dana Pawlowski on a project using CLAMPS data to complete an in-depth case study on a discrete mode convection case. This work extended on and verified previous work by a student, Tyler Pardun, and gave him an opportunity to help mentor.

- 2020–2022 **Katie Giannakopoulos, University of Oklahoma** School of Meteorology
Supervisor
 I oversee and help manage an undergraduate student researcher through my role as Co-I on the 2020 CIMMS DDRF funding with Jacob Carlin. This student works with CLAMPS and dual-pol radar data to help us understand capabilities of each platform to retrieve boundary layer height.
- 2019–2021 **Jordan Laser, University of Oklahoma** School of Meteorology/CIMMS/NSSL
Adviser
 I act as an unofficial, but involved member on the advisory 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.
- 2019–2020 **Nolan Meister and James Cuellar, University of Oklahoma** School of Meteorology
Capstone Mentor
 I currently mentor a senior 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.
- 2019–2020 **Marisa Nuzzo and Maci Gibson, University of Oklahoma** School of Meteorology
Capstone Mentor
 I currently mentor a senior 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.
- 2019–Present **Michelle Spencer, Metropolitan State Univ. Denver** National Weather Center REU
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. Michelle has completed her BS and is now in the MS program at Univ. Wisconsin Milwaukee. We continue to collaborate to advance the work, resulting in an AMS presentation and a planned article submission.

FIELD WORK

- 2022-2023 **AWAKEN** DOE/NOAA/National Severe Storms Laboratory
NSSL/OU Profiling Lead
 I contributed by planning and executing the AWAKEN CLAMPS missions, which include deploying both CLAMPS1 and CLAMPS2 in northern Oklahoma. This mission included collaboration with DOE laboratories (e.g., LLNL, PNNL, NREL) and private wind energy companies (land owners). Other NOAA labs came to visit the CLAMPS sites during AWAKEN 2022.
- 2022 **TRACER** DOE/NOAA/National Severe Storms Laboratory
NSSL Profiling Lead
 I contributed as the NSSL profiling PI and led the CLAMPS planning and execution of deployment of the CLAMPS2 platform to Houston, TX. I also assisted with the CopterSonde mission and the GeoCarb mission while on site. The execution of the CLAMPS mission required local collaboration to facilitate hurricane deployments and collaboration with the OU CLAMPS team and the Univ. of Wisconsin SPARC team.
- 2022-2023 **PERiLS** NOAA/NSF/National Severe Storms Laboratory
NSSL Profiling Lead
 I contributed as the NSSL profiling PI, led the CLAMPS planning and execution of deployment, and entirely led and managed the CopterSonde project (including NOAA UAS processes). I worked as part of the PI team during the field season, and we executed 3/4 IOPs with 100+ CopterSonde flights and nearly complete CLAMPS uptime. Locally I designed and led field safety training and toolkits.

- 2021-2022 **SPLASH** OAR/National Severe Storms Laboratory
Lead
 I led the NSSL-side of planning, execution, and collaboration for our participation in the SPLASH campaign. This was a technically difficult project as it included deploying CLAMPS in Crested Butte, CO (10K ft) from October-January. This work continues the cross-OAR lab collaborations.
- 2021 **CLAMPS-EOL Collaboration** OU/CIMMS/National Severe Storms Laboratory
Science Lead
 I led an effort to design a month long deployment of the CLAMPS-1 facility to the Marshal field site in Boulder, CO in collaboration with EOL. This deployment provides opportunity to support EOL's progress toward LOTOS and build new collaborations between EOL and the BLISS boundary layer communities.
- 2021 **BLISS-FUL** OU/CIMMS/National Severe Storms Laboratory
Field and Science Lead
 I led an effort to design, propose and execute a month long test deployment of boundary layer sensors that NWC community members have for testing, evaluation, science, and training, called the BLISS Field Universalization Lab. This effort included opportunities for students to submit their own IOP requests to try their hand at planning field missions.
- 2021–2022 **UAS Damage Survey Project** CIMMS/National Severe Storms Laboratory
Field Support Scientist
 In support of a NSSL/CIMMS project deploying uncrewed aircraft to image and collect measurements over tornado paths, I deployed multiple times to the southeast US. These deployments included traditional damage survey work, collaboration with the NWS, interaction with the public, and understanding and cooperation with implementation of state-of-the-art platforms.
- 2021 **VORTEX-SE/PERiLS** National Severe Storms Laboratory
Field Planning Lead
 While field deployments were delayed due to COVID-19, I moved into a leading role in considering and planning boundary layer profiling deployments for future missions. This work involves working with academic and research partners from several institutions.
- 2020 **CIMMS DDRF - Boundary Layer Height** CIMMS/National Severe Storms Laboratory
Field Lead
 In support of PI Carlin's CIMMS DDRF proposal, I led the design, organization, and deployment of two mobile boundary layer profiling platforms across three sites (one stays stationary, one re-deploys at a new site) for a 4-week mission. This role included oversight and management in addition to technical expertise, data collection, and data management. I also developed new algorithms for BL height detection for this deployment.
- 2019-2022 **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 led 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.
- 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.
- 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.

2023	Implicit Bias Training Completed the training	NOAA Lapenta Mentor Training
2022	Working Group for Promoting Safety and Inclusivity during Fieldwork Contributed materials and to meetings as I was able. Shared NSSL's experience.	NOAA ODIAC
2022	Fieldwork Initiative to Stop Sexualized Trauma (FISST Training) Completed the training	NOAA WVPR
2022	Fieldwork Toolkit Leadership Training Series Completed the webinar series	UC Riverside-Online
2022	Fieldwork Training Implementation Championed and administered the first required project wide fieldwork training regarding interpersonal safety topics.	NSSL/OU/CIWRO
2021	Women of AG&S Panel and Discussion Panelist and leader on Women in Fieldwork and Beyond	OU
2020–Present	Letters to a Pre-scientist Pen-pal letter writer	OU
2020–Present	College of Atmospheric and Geographic Science Diversity and Inclusion Council Affiliate member and NSSL liaison	OU
2020–Present	NSSL Diversity and Inclusion Sustainability Team (NDIST) Member. This team was formed as part of the NSSL Diversity and Inclusion Plan.	NSSL
2019–2020	TORUS Training Development 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.	CIMMS/NSSL
2019	EPSCoR-OK Women in Science Conference Demo Leader 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.	SoM/CIMMS/NSSL
2019	Guest on Yes! Science Show 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 .	The Show Starts Now Studios
2019	National Weather Center Protocol 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.	National Weather Center
2018–2020	Diversity and Inclusion Committee Member of the founding committee	CIMMS
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 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.	OU School of Meteorology

TECHNICAL SKILLS

NOAA UAS Mission Commander, FAA Certificated UAS Pilot, certified on all NSSL operated UAS platforms, 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

2022	OAR EEO/Diversity Award for a Group -- EEO Advisory Committee	NOAA OAR
2020	OAR EEO/Diversity Award for Exemplary Service	NOAA OAR
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	Group Lead Boundary Layer Integrated Sensing and Simulation (BLISS) cross-institution group. Re-founded, organized, and currently co-lead the effort. See White Paper.	National Weather Center
2022–Present	Editor-Subject Matter Expert Bulletin of the American Meteorological Society	American Meteorological Society
2021–Present	Associate Editor Journal of Atmospheric Science	American Meteorological Society
2020–Present	Associate Editor Monthly Weather Review	American Meteorological Society
2022	Faculty Search Committee BL/Dynamics Open Rank, BL Observations Asst.	OU School of Meteorology
2020–Present	Alternate Representative for NSSL OAR EEO Advisory Committee	NOAA
2020–Present	Associate Editor Monthly Weather Review	American Meteorological Society
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 Poster competition judge	American Meteorological Society
2017	Graduate Studies Committee Student representative for Direct-Track Ph.D. documentation in the Graduate Student Handbook	OU School of Meteorology

2016–2018	Student Affairs Committee Doctoral representative. I planned two large fundraiser event for the NWC community and developed a student-focused professional development series in this role.	OU School of Meteorology
2016–2017	Faculty Search Committee Student representative to the search committee for two new faculty hires	OU School of Meteorology
2015–2019	Boundary-Layer, Urban Meteorology, and Land-Surface Processes Seminar Series Co-Convener and webpage manager	OU School of Meteorology
2013–2016	Local Chapter Affairs Committee Member(2013-2015), Chair(2016) serving to connect and enhance local chapters of the AMS.	American Meteorological Society

VOLUNTEER SERVICE

2020–2022	NSSL Book Club Lead I designed and continue to lead a book club for NSSL employees, which serves both to foster community and to approach and discuss important themes such as race, gender, class, and other intersectional experiences.	NSSL
2019–Present	Board of Trustees 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.	National Weather Museum and Science Center
2018–Present	Museum Docent I volunteer at the National Weather Museum and Science Center giving tours to patrons and assisting with museum upkeep and events.	National Weather Museum and Science Center

PROFESSIONAL TRAINING

2021	NOAA Working Well Together Summit This multi-day summit offered education on elevating workplace culture so it is free of intolerance, harassment, and unacceptable behaviors. The goal was to provide the tools to not only improve workplace culture but also chart a course toward your own wellness.	NOAA Workplace Violence Prevention Response
2021	2021 NOAA Leadership Seminar ECQ2: Leading People. This core qualification involves the ability to lead people toward meeting the organization's vision, mission, and goals. Inherent to this ECQ is the ability to provide an inclusive workplace that fosters the development of others, facilitates cooperation and teamwork, and supports constructive resolution of conflicts.	NOAA Human Capital Services
2020	Office of Diversity and Inclusion's Unlearning Series 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.	University of Oklahoma
2019	Leadership Skills for Success in the Scientific Workforce 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.	Earth Science Women's Network

- 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.