EDWARD STROBACH, Ph.D

Education

Ph.D.: Atmospheric Physics **2017**
University of Maryland, Baltimore County (UMBC)   Baltimore, MD, United States

Master of Science: Atmospheric Physics **2014**
University of Maryland, Baltimore County (UMBC)   Baltimore, MD, United States

Bachelor of Science: Physics **2011**
Towson University   Towson, MD, United States

Experience

Atmospheric Remote Sensing at the NOAA Chemical Sciences Laboratory
Boulder, CO   2021-Present
Research Scientist II

Responsibilities include:
- Analysis of field datasets from the Fire Influence on Global to Regional Environments and Air Quality (FIREX-AQ), Southwest Urban NOx and VOC Experiment (SUNVEx), and the California Fire Dynamics Experiment (CalFiDE)
- Publishing of novel research related to wildfire behavior and dynamics as observed from airborne and mobile ground-based platforms using a suite of observations that include Doppler lidars, in-situ chemistry packages, and infrared imaging to map heat emissions from fires
- Lead meteorologist for field deployments
- Developing collaborations and partnerships across government and academia

Environmental Modeling Center at the National Oceanic and Atmospheric Administration (NOAA)
Silver Spring, MD   2017-2021
Support Scientist II:

Tasked in assisting with diagnostics and development of the Finite Cube-Sphere dynamical core model (FV3) for the Stand-Alone Regional (FV3SAR), global, and coupled FV3 models. Specific tasks have included:

- Conducting multi-physics sensitivity tests of Planetary Boundary Layer (PBL) and microphysics (MP) schemes for different mesoscale weather phenomena
- Creating object-oriented analyses for evaluating tropical cyclones, lake effect snow events, mesoscale convective systems, and frontal boundaries for the 3-km FV3SAR
- Creating a spectral diagnostic script to assess the representativeness of equatorial Kelvin and Rossby waves, and the Madden-Julian Oscillation (MJO)
- Mentoring two high-impact projects for NCEP's summer intern program: 1) analyzing the role of MJO in moisture transport and precipitation over western CONUS; 2) a multi-physics analysis of hurricane Michael and Florence
- Assisting in determining the cause of ongoing cold biases in the FV3 model
- Carrying out a joint investigation that examines model performance with and without gravity wave drag turned on in the FV3SAR and its impact on reflections at model top
- Assisting in the developmental work of an interactive sounding tool

- Solving an ongoing spotty precipitation problem in the FV3 and proposed a fix
- Comparing identical model forecasts that were run on different machines to evaluate growth in errors with forecast hour as well as the determination of persistent regional issues
- Evaluating the impact of using different stratospheric H_2O and O_3 parameterizations on the global circulation
- Adapting plotting scripts to a new version of the Single Column Model (SCM). A report was written detailing results of the FV3-SCM and how the results compared to campaign data
- Conducting SCM experiments for a PBL scheme to examine the sensitivities and short-comings of that scheme
- Resolving a numerical instability problem in the 3-km regional model by adjusting the parameterized heating that is generated when converting from water vapor to cloud water in the GFDL microphysics scheme
- Building a verification system for air quality modeling that also includes supporting diagnostics
- Adding a shear modification to a mixing a mixing length component of a PBL scheme that proved to enhance model performance and has since been added to operations

University of Maryland, Baltimore County, Baltimore, MD   2013-2017
Research Assistant

The research that was conducted included evaluations of both model (Weather Research & Forecasting—WRF) data and observations along the Mid-Atlantic coast during the summer of 2013, and the dissemination of LIDAR data to determine the wave-turbulent features during an interaction between a coastal low-level jet (LLJ) with a downslope wind from the Appalachian Mountains. A multi-year summertime climatology was included to examine the likelihood that highly sheared flows would interact and result in drastic shifts in wind speed and direction.

- The ingestion of various data (types) to determine the multi-scale evolution surrounding the coastal LLJ-downslope wind interaction
- Applied motion corrections to the LIDAR data as it was measuring wind from a ship-borne platform
- Determined mechanisms responsible for both the coastal LLJ and downslope wind
- Accounted for the impact of both complex terrain and large-scale conditions when evaluating the importance of possible mechanisms forcing the LLJ and downslope wind
- Performed wave-turbulence budget analyses to understand dominating terms responsible for the dynamical evolution of this interaction
- Grouped various atmospheric wave phenomena based on intrinsic characteristics
- Carried out multi-year statistics of coastal LLJ and downslope wind characteristics during the summer months with reanalysis data
- Participated in field campaign efforts and assisted in instrument operations/trouble-shooting

University of Maryland, Baltimore County, Baltimore, MD   2011-2013
Teaching Assistant

In charge of carrying out the following tasks:

- Instructing and assisting in various physics lab topics
- Setting up experiments and trouble-shooting on site
- Leading mini-lectures
- Hosting individual or group tutoring
- Administering tests
- Grading students

Towson University, Towson, MD   2010-2011
Learning Assistant

Assisting in:

- In-class guidance
- One-on-one tutoring

Skill/Qualifications

Computational Skills
- Python—7 years, advanced
- Matlab—5 years, advanced
- Unix, 6 years, advanced
- Fortran, 2 years, seasoned

Data Analysis
- Statistical analysis
- Correlation statistics
- Spectral analysis
- Data compositing/mining
- Scale analysis
- Regression analysis
- Integration techniques
- Multi-variable graphics
- Graphical analysis
- Image compositing
- Multi-language code scripting
- Object-oriented analysis

Other
- Excellent oral and written communication
- Highly creative
- Highly motivated and disciplined
- Broad knowledge in various topics of meteorology and oceanography
- Capable of leading, organizing, and coordinating
- Requires little guidance
- Adaptable
- Experience as a forecast modeler
- Well versed in various topics related to theoretical meteorology

Publications/Technical Reports

- Strobach, E. J., Brown, S. S., Carroll, B. J., Coggon, M., Pichugina, Y. L., Baidar, S., Brewer, W. A., "*An Air Quality and Boundary Layer Dynamics Analysis of the Los Angeles Basin Area During the Southwest Urban NOx and VOCs Experiment (SUNVEx)*" Atmospheric Chemistry and Physics (Under preparation)
- Strobach, E. J., Carroll, B. J., Valero, M. M., Brown, S. S., Baidar, S., Brewer, W. A., "A Case Study Featuring the Time Evolution of a Fire-Induced Plume Jet Over the Rum Creek Fire: Mechanisms, Processes, and Dynamical Interplay" *JGR: Atmospheres* (Under preparation)
- Strobach, E. J., Brewer, W. A., Carroll, B. J., Pichugina, Y. Baidar, S., Senff, C. J., "Addressing Plume Rise and the In-Plume Velocity Core Structure from Three Wildfires During FIREX-AQ" *JGR: Atmospheres* (submitted)
- Strobach, E. J., Brewer, W. A., Senff, C. J., Baidar, S., McCarty, B., "Isolating and Investigating Updrafts Induced by Wildland Fires Using an Airborne Doppler Lidar During FIREX-AQ." *JGR: Atmospheres* 128.2 (2023)
- Pichugina, Y. L., Banta, R. B., Brewer, W. A., Turner, D. D., Wulfmeyer, V. O., Strobach, E. J., Baidar, S., Carroll, B. J., "Doppler Lidar Measurements of Wind Variability and LLJ Properties in Central

Oklahoma During the August 2017 Land-Atmosphere Feedback Experiment." *Journal of Applied Meteorology and Climatology* (2023)

- Campbell, P. C., Tang, Y., Lee, P., Baker, B., Tong, D., Saylor, R., Stein, A., Huang, J., Huang, H., Strobach, E., McQueen, J., Pan, L., Stajner, I., Sims, J., Delgado, J. T., Jung, Y., Yang, F., Spero, T. L., Gilliam, R. C., "Development and Evaluation of an Advanced National Air Quality Forecasting Capability Using the NOAA Global Forecast System Version 16." *Geoscientific Model Development* 15.8 (2022)
- Strobach, E., "A Single Column Model Evaluation of Mixing Length Formulations and Constraints for the sa-TKE-EDMF Planetary Boundary Layer Parameterization." *Weather and Forecasting* (2022)
- Black, T. L., et al. "A Limited Area Modeling Capability for the Finite-Volume Cubed-Sphere (FV3) Dynamical Core and Comparison with a Global Two-Way Nest." *Journal of Advances in Modeling Earth Systems* 13.6 (2021): e2021MS002483.
- Strobach, E., Sparling, L. C., Rabenhorst, S., Demoz, B., "Impact of Inland Terrain on Mid-Atlantic Offshore Wind and Implications for Wind Resource Assessment: A Case Study", *Journal of Applied Meteorology and Climatology* 57.3 (2018): 777-796
- Lundquist, J., Wilczak, J., Ashton, R., Bianco, L., Brewer., A. W., Choukulkar, A., Clifton, A., Debnath, M., Delgado, R., Freidrich, K., Gunter, S., Hamidi, A., Iungo, G., Kaushik, A., Cosovic, B., Langan, P., Lass, A., Lavin, E., Lee, J., McCaffery, K., Newsom R., Noone, D., Oncley, S., Quelet, P., Sandberg, S., Schroeder, J., Shaw, W., Sparling, L. C., St. Martin, C., St. Pe, A., Strobach, E., Tay, K., Vanderwende, B., Weickmann, A., Wolfe, D., Worsnop, R., "Assessing State-of-the-Art Capabilities for Probing the Atmospheric Boundary Layer: The XPIA Field Campaign", *Bulletin of the American Meteorological Society* 98.2 (2017): 289-314.
- Sparling, L., Williams, B., Strobach, E., Margotta, M., "Assessment of NOAA's Radiometrics MP-3000A
- Microwave Radiometer Used in a Survey of Maryland's Wind Energy Area", Technical Report to the Maryland Energy Administration, February 2014.
- Sparling, L., Rabenhorst, S., Williams, B., Delgado, R., Strobach, E., Boicourt, B., Bailey, B., "Building a Science-Based Foundation for Assessing the Offshore Wind Resource in Maryland" Proceedings, European Wind Energy Association, 2013.

Dissertation

"THE IMPACT OF COASTAL TERRAIN ON OFFSHORE WIND AND IMPLICATIONS FOR WIND ENERGY" investigates an interaction between a coastal Low-Level Jet (LLJ) and downslope wind in Maryland's Wind Energy Area offshore. This thesis focuses on the forcing mechanisms responsible for initiating both wind regimes, the boundary layer evolution and small-scale response during the interaction between a LLJ and downslope wind, and developing a climatology for both wind regimes and whether the conditions that lead to both a LLJ and downslope wind are predictable.

Presentations

- Strobach, E. J., Carroll, B. J., Brewer, W. A., Senff, C. J., Baidar, S,. "Characterizing Updraft and Plume Properties Spanning the FIREX-AQ and CalFiDE Field Campaigns" (May 2023—35th Conference on Agricultural and Forecast Meteorology/14th Fire and Forest Meteorology Symposium/6th Conference on Biogeosciences)

- Strobach, E. J., Carroll, B. J., Brewer, W. A., McCarty, B., Makowiecki, A., Holloway, M., Marchbanks, R., Zucker, M., Noyes, K., Kahn, R., Senff, C., "Physical Insights into Boundary Layer Processes Spanning FIREX-AQ and CalFiDE" (January 2023—103rd Annual AMS)
- Strobach, E. J., Brewer, W. A., Senff, C., Baidar, S., McCarty, B. "Isolating and Investigating Updrafts Induced by Wildland Fires Using an Airborne Doppler Lidar During FIREX-AQ" January 2023—103rd Annual AMS)
- Strobach, E. J., Verreken, B., Carroll, B. J., Brewer, W. A., Li, M., McDonald, B., Angevine, W., Gamarro, H., McCarty, B., Pichugina, Y. L., Zhu, Q., Baidar, S., Schwantes, R., Wang, S., Banta, R., Brown, S., "Measurements from Stationary and Mobile Platforms Over the Los Angeles Basin to Comprehensively Evaluate the Weather Research and Forecasting Model During SUNVEx" (December 2022—AGU 2022)
- Strobach, E., Brewer W. A., McCarty, B., Makowiecki, A., "Isolating and Disseminating Core Updraft Structures for the 2019 FIREX-AQ Campaign using Observations from an Airborne Doppler Lidar" (June 2022—30th ILRC)
- Strobach, E., "A Multi-Physics Evaluation of the Nested FV3 and Stand Alone Regional (SAR) During a Backdoor Cold Front" (January 2019)
- De Solo, S., Strobach, E., Alpert, J., "A Preliminary Investigation of Atmospheric Rivers: Analyzing Difference in Tropical Moisture Transport for a Medium Range Forecast" (January 2019)
- Strobach, E., Sparling, Sparling, L. C., "Investigations of a Doppler LIDAR on a Moving Platform" (January 2016)
- Strobach, E., Sparling, L.C., "Measurements of an Offshore Mid-Atlantic Low-Level Jet Using a Pulsed Doppler LIDAR from a Moving Platform" (January 2015).
- Strobach, E., Sparling, L. C., "Measuring Offshore Wind with a Doppler Wind Lidar from a Moving Platform" (March 2014).
- Ongoing research related to attenuation from extragalactic sources at Washingtion D.C. (January 2014).
- Capstone poster project related to attenuation from extragalactic sources at Towson University (May 2011).

Societies/Affiliations

- A member of the American Meteorological Society (AMS) since 2014