# Brian C. Filipiak

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## Education

**University of Connecticut** **Storrs, CT**
*Doctor of Philosophy (PhD) in Environmental Engineering* *Jan 2023 – Present*

- Research focus: Improving weather-related power outage forecasting caused by winter weather
- Research funded by Eversource Energy Center, NASA
- NASA FINNEST Proposal Funded: Refinement of Snow Microphysics and Density Forecasting Using GPM Ground Validation Observations and NU-WRF

**State University of New York at Albany** **Albany, NY**
*Master of Science in Atmospheric Science* *Aug 2020 – Dec 2022*

- Thesis: Probabilistic Winter Mixed Precipitation Forecasts Utilizing a Random Forest in New York
- Research funded by NOAA CSTAR grant

**University of Rochester** **Rochester, NY**
*Bachelor of Science, Magna Cum Laude, Environmental Science* *Aug 2016 - May 2020*

- Climate Science track; Certificate in Community Engaged Scholarship

## Research Experience

**University of Connecticut** **Storrs, CT**
*Research Assistant, Dr. Marina Astitha and Dr. Diego Cerrai* *Jan 2023 – Present*

- Investigate the efficacy of NASA's Regional Earth Modeling System, NU-WRF, for 10 winter storms in different regions across the United States with a particular focus on the radiation and microphysics schemes developed at NASA
- Compare radar-derived, gauge-corrected quantitative precipitation estimates from Stage IV and MRMS to weighing precipitation gauges during the cool season to improve understanding how the products compare and when they can be applied, particularly during winter weather
- Evaluate 10 different Snow-to-Liquid Ratio algorithms for 14 winter storms in the Northeast United States to identify what algorithm performs best as well as the factors that can impact performance
- Analyze the impact of initial and boundary conditions on Weather Research and Forecasting (WRF) model simulations for Northeast United States snowstorms to understand what variables impact precipitation processes and totals during winter storms
- Collaborate with NASA GPM Ground Validation and associated researchers to carry out winter precipitation field campaign including forecasting for two Intense Observing Periods utilizing an Unmanned Aerial System
- Prepare, evaluate, and manage data collected from NASA field campaign to be used for future research
- Provided weather expertise to improve development of machine learning models for power outage prediction for multiple electrical utility companies (Eversource, Exelon, and Dominion Energy)
- Issued over 150 operational power outage forecasts for Eversource Energy
- Developed and executed summer research internship plan in 2024 and 2025 for both undergraduate and high school students, which included varied exposure to data analysis and quality control for published research projects

**State University of New York at Albany** **Albany, NY**
*Research Assistant, Dr. Kristen Corbosiero, Dr. Andrea Lang, Ross Lazear, and Dr. Nick Bassill* *Aug 2020 – Dec 2022*

- Collaborated with the National Weather Service (NWS) on NOAA CSTAR grant
- Focused on improving prediction of uncertain winter precipitation types by utilizing machine learning to assimilate multiple data sources used by forecasters
- Developed and maintained a random forest machine learning algorithm to identify winter precipitation types: rain, snow, freezing rain and sleet
- Utilized citizen science (CoCoRaHS) reports to help identify precipitation type events from 2017-2020
- Partnered with NWS stakeholders to review cases of uncertain winter precipitation events; strategized on random forest algorithm implementation and operational product design to display research results
- Fostered relationships for open lines of communication between NWS collaborators and UAlbany research team

- Cultivated and maintained a website that contains the probabilistic nowcasts and forecasts from the random forest algorithm as well as other information about the project
    - Link to operation webpage: http://www.atmos.albany.edu/student/filipiak/op/

*Ground Observation Team Member for WINTRE-MIX Field Campaign, Dr. Justin Minder* *Feb 2022 – Mar 2022*

- NSF sponsored Winter Precip Type Research Multi-Scale Experiment (WINTRE-MIX) in Plattsburgh, New York and Quebec, Canada
- Collaborated with researchers from University of Colorado, University of Illinois at Urbana-Champaign Flexible Array of Radars and Mesonets (UIUC-FARM), McGill University and University of Quebec at Montreal to study precipitation types that occur in near freezing conditions on the synoptic, mesoscale, and microscale, especially in areas of complex terrain
- Completed 7 Intense Observing Periods (IOPs) that included numerous overnight events
- Successfully launched 24 radiosondes to collect information about current vertical thermodynamic profiles
- Identified and collected ground observations of precipitation type every 10 minutes during IOP
- Assisted mobile radar trucks from UIUC-FARM with pre/post operation procedures and operations logs

**Texas A&M University – NSF REU** **College Station, TX**

*Research Assistant, Dr. Christopher Nowotarski* *Jun 2019 – Aug 2019*

- Researched spatial and diurnal variability of tornadogenesis and forecasting in tropical cyclones
- Created database of tornadoes and tornado warnings produced in tropical cyclones
- Generated and analyzed skewT plots to identify soundings pulled from the Rapid Refresh Model
- Examined the spatial and diurnal variability of near cell environments for tornadic and non-tornadic cells
- Utilized and produced data analyses and plots using Matlab and Python
- Participated in tornado storm chases and weather balloon launches

**National Oceanic and Atmospheric Administration** **Seattle, WA**

*Research Assistant, Dr. Paul Chittaro of Northwest Fisheries Science Center* *Jun 2018 – Aug 2018*

- Studied latitudinal variability in somatic body growth of Blue Lanternfish and Pacific Hake
- Learned laboratory methods and techniques for analyzing specimens
- Conducted analyses of specimens for growth rate and hatch date via R and Excel
- Prepared research equipment and collected data for research trips on Puget Sound and Pacific Ocean

## Publications

- **Filipiak, B. C,** and Coauthors, 2025: Winter precipitation measurements in New England: Results from the Global Precipitation Measurement Ground Validation Campaign in Connecticut. *Earth Syst. Sci. Data*, preprint, under review, https://essd.copernicus.org/preprints/essd-2025-162/.
- **Filipiak, B. C.,** M. Astitha, and D. Cerrai, 2025: Assessing dynamic and thermodynamic variability in initial and boundary conditions for snowstorm prediction in the Northeast United States. *J. Geophys. Res. Atmos.*, under review.
- **Filipiak, B. C.,** U. Khaira, M. S. Walters, and M. Astitha, 2025: The efficacy of ten snow–to-liquid ratio algorithms to predict snowfall for impactful winter storms in the Northeast United States. *Wea. Forecasting*, under review.
- Minder, J., B. Stutsrim, C. Speciale, T. Wasula, **B. C. Filipiak,** B. Shrestra, J. Wang, N. Bassill, H. Reeves, D. Tripp, D. Thompson, and N. Stuart, 2025: Evaluating tools for diagnosis and nowcasting precipitation type and freezing rain: Results from the 3–4 February 2022 winter storm in the Hudson Valley. *Wea. Forecasting*, under review.
- Tokay, A., C. Mahone, C. N. Helms, J. Tan, D. B. Wolff, D. Cerrai, J. L. Pippitt, **B. C. Filipiak,** M. J. Boulanger, and A. V. Chibisov, 2025: Rain-to-snow transition: Evaluation of precipitation phase algorithms in southern New England. *J. Hydrometeor.*, under review.
- **Filipiak, B. C.,** N. P. Bassill, K. L. Corbosiero, A. L. Lang, and R. A. Lazear, 2023: Probabilistic forecasting methods of winter mixed precipitation events in New York State utilizing a random forest. *Artif. Intell. Earth Syst.*, https://doi.org/10.1175/AIES-D-22-0080.1.

## Selected Graduate Coursework and Projects

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| Atmospheric Dynamics – FA 2020 | Numerical Weather Prediction- SP 2022 |
| Introduction to Atmospheric Physics I– FA 2020 | Environmental Transport Phenomena- SP 2023 |
| Advanced Geophysical Data Analysis– FA 2020 | Environmental Engineering Chemistry- SP 2023 |
| Synoptic-Dynamic Meteorology – SP 2021 | Hydrometeorology- FA 2023 |
| Renewable Energy Issues – SP 2021 | Quantitative Methods for Engineers- FA 2023 |
| Introduction to Atmospheric Physics II – SP 2021 | Regional Climate Modeling- FA 2024 |
| Mesoscale Processes – FA 2021 | |

### Related Projects

- Solar and Wind Resource Assessment and Resource Droughts in New York, SP 2021: Renewable energy resources were assessed in terms of their availability and analyzed for periods of underperformance, or drought, compared to a threshold. This project is ongoing and being expanded for publication.

## Invited Talks and Conference Presentations

### Invited Talks

- **Filipiak, B.,** and Coauthors, 2024: "Winter Precipitation Measurements in New England: Results from the Global Precipitation Measurement Ground Validation Campaign in Connecticut." NASA Global Precipitation Measurement Particle Size Working Group, 15 February, Storrs, CT.
- **Filipiak, B.,** K. Corbosiero, A. L. Lang, R. A. Lazear, and N. P. Bassill, 2023: "Data Fusion: A Machine Learning Tool for Forecasting Winter Mixed Precipitation Events - Updates and Performance." WINTRE-MIX Precipitation Type Workshop, 22 May, Albany, NY.
- **Filipiak, B.,** D. Cerrai, and M. Astitha, 2023: "Success and Challenges Associated with Weather Based Machine Learning Algorithms." University of Connecticut Civil and Environmental Engineering Seminar Series, 24 March, Storrs, CT.
- **Filipiak, B.,** K. Corbosiero, A. L. Lang, R. A. Lazear, and N. P. Bassill, 2022: "Data Fusion: A Machine Learning Tool for Forecasting Winter Mixed Precipitation Events." Albany Weather Forecasting Office Fall Meeting, 8 November, Albany, NY.
- **Filipiak, B.,** K. Corbosiero, A. L. Lang, R. A. Lazear, and N. P. Bassill, 2022: "Data Fusion: A Machine Learning Tool for Mixed Precipitation." New York State Mesonet Forum, 15 April, Albany, NY.
- **Filipiak, B.,** K. Corbosiero, A. L. Lang, R. A. Lazear, and N. P. Bassill, 2021: "Data Fusion: A Machine Learning Tool for Forecasting Winter Mixed Precipitation Events." 2021-2022 NOAA Weather Prediction Center Winter Weather Experiment Seminar Series, 7 December, Albany, NY.
- **Filipiak, B**., K. Corbosiero, A. L. Lang, R. A. Lazear, and N. P. Bassill, 2021: "Data Fusion: A Machine Learning Tool for Forecasting Winter Mixed Precipitation Events." Albany Weather Forecasting Office Fall Meeting, 19 November, Albany, NY.
- **Filipiak, B.,** K. Corbosiero, A. L. Lang, R. A. Lazear, and N. P. Bassill, 2021: "Data Fusion: A Machine Learning Tool for Mixed Precipitation." New York State Mesonet Forum, 7 May, Albany, NY.

### Oral Presentations

- **Filipiak, B.,** M. Astitha, and D. Cerrai, 2025: "Assessing the Impact of Initial and Boundary Conditions on WRF Microphysics in Northeast US Winter Cyclones with the Support of Extensive NASA Field Campaign Instrumentation" 105th AMS Annual Meeting/ 33rd Conference on Weather Analysis and Forecasting (WAF)/29th Conference on Numerical Weather Prediction (NWP) and Fourth Symposium on Mesoscale Processes, 13 January, New Orleans, LA.
- **Filipiak, B.,** M. Astitha, and D. Cerrai, 2024: "Assessing the Impact of Initial and Boundary Conditions on WRF Microphysics in Northeast US Winter Cyclones with the Support of Extensive NASA Field Campaign Instrumentation" AGU Annual Meeting, 13 December, Washington, D.C.
- Minder, J., Stutsrim, B., Speciale, C., Wasula, T., **Filipiak, B.,** Shrestra, B., Wang, J., Bassill, N., Reeves, H., Tripp, D. Thompson, D., and Stuart, N. "Evaluating Tools for Diagnosis and Nowcasting Precipitation Type and Freezing Rain: Results from the 3–4 February 2022 Winter Storm in the Hudson Valley" 105th AMS Annual Meeting/ 33rd

Conference on Weather Analysis and Forecasting (WAF)/29th Conference on Numerical Weather Prediction (NWP), 16 January, New Orleans, LA.

- De Azevedo, G.B.H., Avery, A., Doyle, B., **Filipiak, B.**, Qadiri, R., Wolff, D., Helms, C., Tokay, A., Loftus, A., Jacob, J., and Schvartzman, D., "WxUAS results for the NASA GPM Multi Atmospheric Instrument Intercomparison Study." 105th AMS Annual Meeting/ 25th Conference on Aviation, Range, and Aerospace Meteorology, 15 January, New Orleans, LA.
- **Filipiak, B.,** M. Astitha, and D. Cerrai, 2024: "Improving Winter Power Outage Forecasts with a Snow Index." 104th AMS Annual Meeting/15th Conference on Weather, Water, Climate and the New Energy Economy, 29 January, Baltimore, MD.
- **Filipiak, B.,** and Coauthors, 2024: "Winter Precipitation Measurements in New England: Results from the Global Precipitation Measurement Ground Validation Campaign in Connecticut." 104th AMS Annual Meeting/24th Symposium on Meteorological Observation and Instrumentation, 29 January, Baltimore, MD.
- **Filipiak, B.,** and D. Cerrai, 2023: "Predicting Weather Related Power Outages in the Northeast United States." 24th Annual Northeast Regional Operational Workshop, 14–15 November, Albany, NY.
- **Filipiak, B.,** K. Corbosiero, A. L. Lang, R. A. Lazear, and N. P. Bassill, 2023: "Data Fusion: A Machine Learning Tool for Forecasting Winter Mixed Precipitation Events - Updates and Performance." 103rd AMS Annual Meeting/22nd Conference on Artificial Intelligence for Environmental Science, 12 January, Denver, CO.
- **Filipiak, B.,** K. Corbosiero, A. L. Lang, R. A. Lazear, and N. P. Bassill, 2022: "Data Fusion: A Machine Learning Tool for Forecasting Winter Mixed Precipitation Events." 23rd Annual Northeast Regional Operational Workshop, 2–3 November, Albany, NY.
- **Filipiak, B.,** K. Corbosiero, A. L. Lang, R. A. Lazear, and N. P. Bassill, 2022: "Data Fusion: A Machine Learning Tool for Forecasting Winter Mixed Precipitation Events." Second Annual New York State Mesonet Symposium, 13 September, Albany, NY.
- **Filipiak, B.,** K. Corbosiero, A. L. Lang, R. A. Lazear, and N. P. Bassill, 2022: "Data Fusion: A Machine Learning Tool for Forecasting Winter Mixed Precipitation Events." 102nd AMS Annual Meeting/31st Conference on Weather Analysis and Forecasting (WAF)/27th Conference on Numerical Weather Prediction (NWP), 26 January, Houston, TX.
- **Filipiak, B.,** K. Corbosiero, A. L. Lang, R. A. Lazear, and N. P. Bassill, 2021: "Data Fusion: A Machine Learning Tool for Forecasting Winter Mixed Precipitation Events." 22nd Annual Northeast Regional Operational Workshop, 9–10 November, Albany, NY.

**Poster Presentations**

- **Filipiak, B.,** K. Corbosiero, A. L. Lang, R. A. Lazear, and N. P. Bassill, 2021: "Data Fusion: A Machine Learning Tool for Forecasting Winter Mixed Precipitation Events." First Annual New York State Mesonet Symposium, 29 September, Albany, NY.
- **Filipiak, B.,** C. J. Nowotarski, and J. R. Spotts, 2020: "Diurnal and Spatial Variability of Tornadogenesis and Forecasting in Tropical Cyclones." AMS 19th Annual Student Conference, 12 January, Boston, MA.
- **Filipiak, B.,** C. J. Nowotarski, and J. R. Spotts, 2019: "Diurnal and Spatial Variability of Tornadogenesis and Forecasting in Tropical Cyclones." Undergraduate Summer Research Symposium, 31 July, College Station, TX.
- **Filipiak, B.,** and P. Chittaro, 2018: "Latitudinal and Annual Patterns of Somatic Growth for Pacific Hake Along the U.S. Pacific Coast." JISAO Student Summer Research, 16 August, Seattle, WA.

## Professional Development

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| American Meteorological Society Short Course: Open Radar | *24 August 2025* |
| American Association of State Climatologists: Climate Data Bootcamp | *10 June 2025* |
| European Centre for Medium Range Forecasting MOOC on AI and Weather Forecasting | Jan-May 2023 |
| American Meteorological Society Board of Private Sector Meteorologists Mentoring Program | 2022-2023 |
| Trustworthy Artificial Intelligence for Environmental Sciences Summer School | *26-29 July 2021* |
| American Meteorological Society Short Course: AI and Weather Radar | *17 May 2021* |

## Teaching Experience

**University of Connecticut** **Storrs, CT**

*Air Pollution Control* *Jan– May 2023, 2024, 2025*

- Held office hours to assist students with course material
- Graded assignments, papers, and exams to assess student understanding of coursework

- Lecture topics presented: Air Pollution Control technologies for Volatile Organic Compounds

**State University of New York at Albany** **Albany, NY**
*Atmospheric Structure, Thermodynamics, and Circulation* *Aug– Dec 2020, 2022*
*The Atmosphere* *Jan 2022– May 2022*
*Atmospheric Dynamics* *Aug 2021– Dec 2021*
*Weather, Climate Change and Societal Impacts* *Feb 2021– May 2021*
- Held office hours and homework review sessions to assist students with course material
- Graded assignments, papers, and exams to assess student understanding of coursework

**University of Rochester** **Rochester, NY**
*Calculus 2 - Workshop Teaching Assistant* *Aug 2019 – May 2020*
*Chemical Concepts, Systems, and Practices 2 - Workshop Teaching Assistant* *Jan 2018 – May 2018*
*Introduction to Geological Sciences - Workshop Leader* *Aug 2017 – Dec 2017*
- Led workshops and held office hours to assist students with course material
- Graded homework and exams; proctored exams

## Leadership Experience

**Department of Atmospheric and Environmental Sciences Graduate Student Organization** **Albany, NY**
*President* *May 2021– May 2022*
- Provided an open line of communication between graduate students and faculty/staff
- Motivated other graduate students to be engaged both inside and outside of the department to encourage retention
- Collaborated with other executive board members in program development and oversight
- Revamped and expanded the graduate student recruitment webpage and expand FAQ section to increase enrollment
- Promoted and led outreach events/opportunities throughout greater Albany area

**University of Rochester and City of Rochester** **Rochester, NY**
*Project Leader- Community Engaged Scholarship* *Jan 2017– May 2020*
- Developed a proposal for a community outreach center with collaboration from community members
- Facilitated discussions with community and university leaders throughout the proposal process

**University of Rochester Rising Leader Class** **Rochester, NY**
*Mentor* *Aug 2017– Jan 2020*
- Provided guidance and mentoring to first-year students enrolled in the leadership advancement class

## Professional Affiliations, Trainings and Awards

- 103rd AMS Annual Meeting/22nd Conference on Artificial Intelligence for Environmental Science Oral Presentation Award: Honorable Mention
- American Meteorological Society Energy Committee Student Member: 2024-Present
- American Meteorological Society Board of Enterprise Economic Development Student Member: 2023-2026
- American Geophysical Union Hydrology Precipitation Technical Committee Member: 2023-2025
- American Meteorological Society Board of Private Sector Meteorologists Student Member: 2023
- FEMA Independent Study Certificates: Professional Development Series (Completed July 2020)
- American Geophysical Union Member: 2024-Present
- American Meteorological Society Member: 2019-Present
- Phi Beta Kappa Member: 2020-Present

## Technical Skills

- Fluent with Microsoft Office, Google Suite, Linux computing environments, and Python
- Proficiency with handling numerical weather model output including compile and running components of Weather Research and Forecasting (WRF) model
- Working understanding of ArcGIS, MATLAB, R, NCAR Computing Language (NCL), basics of website design and development, and various machine learning techniques