ELENA MARIA FERNÁNDEZ

Ph.D. Candidate in Atmospheric Science

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EDUCATION

In- Progress **Doctor of Philosophy**, *University at Albany, SUNY. Albany, NY*
Major: Atmospheric Science
Dissertation: "*Using Machine Learning to Evaluate Downward-Coupled Stratosphere-Troposphere Interactions and Subseasonal Forecasts of Opportunity*"
Candidacy Achieved on 15th of March 2024
Expected Dissertation Defense: 10th of April 2026

2022 **Master of Science**, *University at Albany, SUNY. Albany, NY*
Major: Atmospheric Science
Thesis: "*Examining the Impact of Stratospheric Vortex Variability on US Surface Temperature*"

2020 **Bachelor of Science**, *Cornell University, Ithaca, NY*
Major: Earth and Atmospheric Sciences, Concentration in Atmospheric Science
Minor: Biometry and Statistics
Honors in Research

FELLOWSHIPS

2025 – Present **NOAA Weather Program Office (WPO) Innovation for Next Generation Scientists (WINGS) Dissertation Fellowship**
Awarded through the University Corporation for Atmospheric Research (UCAR) Cooperative Program for the Advancement of Earth System Science (CPAESS)

RESEARCH EXPERIENCE

2020 – Present **Graduate Research Assistant and WINGS Dissertation Fellow**
Co-Advised: Andrea Lopez Lang and Zheng Wu
Department of Atmospheric and Environmental Science, University at Albany, Albany, NY.
Research centered on using Artificial Intelligence (AI) and Machine Learning (ML) frameworks in advancing stratospheric predictability on the subseasonal to seasonal timescale. PhD thesis also evaluates the physical representation of stratosphere-troposphere coupled dynamics and climate teleconnections in data-driven weather forecasting simulations (GraphCast) and existing physics-based subseasonal forecasting models (NOAA Unified Forecast System).
Project supported by UCAR|CPAESS and NOAA WPO.

2019 – 2020 **Undergraduate Research Assistant**
Department of Earth and Atmospheric Science, Cornell University, Ithaca, NY.
Research focused on hydrology and climatology of waterways in New York State.
Project supported by the Northeast Regional Climate Center.

2018 **Northeast Partnership for Atmospheric and Related Sciences Research Experience for Undergraduates, NEPARS REU**
Plymouth State University, Plymouth, NH
Gained foundational experience in working within an applied research position.
Project supported by the National Science Foundation.

MANUSCRIPTS & PUBLICATIONS

- **E. Fernández**, A. L. Lang, H. E. Attard, 2026: "Stratospheric Polar Vortex Ellipse Diagnostics for Realtime and S2S Forecast Analyses." *Under Review with the Journal of Applied Meteorology and Climatology, Submitted May 2025*.
- **E. Fernández**, Z. W. Wu, A. L. Lang, 2026: "Identifying and Explaining Stratospheric Subseasonal Forecasts of Opportunity, Part 1: A Comparison of Machine Learning Methods." *In preparation for Journal of Artificial Intelligence for the Earth Systems.*
- **E. Fernández**, Z. W. Wu, A. L. Lang, 2026: " Identifying and Explaining Stratospheric Subseasonal Forecasts of Opportunity, Part 2: Using Random Forests to Predict Regional Northern Hemisphere Temperature Anomalies." *In preparation for Journal of Artificial Intelligence for the Earth Systems.*

EXTENDED ABSTRACTS

- **E. Fernández**, A. L. Lang, Z. W. Wu, 2024: "Identifying Subseasonal Forecasts of Opportunity for Wintertime Surface Temperature Extremes Through ML Applications of Stratospheric Variability." ESS Open Archive. DOI: 10.22541/essoar.173482233.37385111/v1

TECHNICAL EXPERIENCE

- Proficient in Python.
- Experienced in TensorFlow and Keras; knowledgeable of PyTorch.
- Adept coding and problem-solving skills; quickly and efficiently adapts to changing software environments.
- Practiced in implementing different ML model architectures (e.g., Random Forests, CNNs, RNNs/LSTMs) and explainable AI techniques such as SHAP and LRP.
- Efficient in managing large amounts of data.
- Confident composing thorough and well-written research proposals and conducting self-sufficient or collaborative research.
- Comfortable in conducting research within large-scale distributed and other cloud-based environments.
- Accomplished in writing scientific papers for publication in journals.
- Highly dedicated to community outreach, mentorship, and teaching.

PRESENTATIONS

- **E. Fernández**, Z. Wu, A. Lang, 2026*: A Comparison of Using Different Machine Learning Methods for Identifying Subseasonal Forecasts of Opportunity.* 106th American Meteorological Society Annual Meeting 2026, Houston, TX. (Oral)

- **E. Fernández**, , Z. Wu, A. Lang, 2026*: Implementing Stratospheric Polar Vortex Geometries in Identifying Subseasonal Forecasts of Opportunity for Northern Hemisphere Temperature Extremes.* 106th American Meteorological Society Annual Meeting 2026, Houston, TX. (Poster)

- **E. Fernández**, A. Lang, 2025: *Steps toward using metrics of stratospheric variability for tropospheric temperature forecasts.* NOAA Climate Prediction Office AI in Earth Science Seminar Series, April 2025 and Commodity Weather Group Webinar Series, October 2025.

- **E. Fernández**, A. Lang, 2024*: Examining the S2S Predictability of Northern Hemisphere Winter Surface Temperature Extremes through ML Applications of Stratospheric Variability.* American Geophysical Union Annual Meeting 2024, Washington, D.C. (Oral)

- **E. Fernández**, A. Lang, 2024*: Connecting Stratospheric Polar Vortex Geometries to Subseasonal Forecasts of Wintertime Tropospheric Temperature Anomaly.* 22nd American Meteorological Society Conference on the Middle Atmosphere, Burlington, VT. (Poster)

- **E. Fernández**, A. Lang, 2024*: Applying Stratospheric Polar Vortex Geometry to Subseasonal Forecasts.* 104th American Meteorological Society Annual Meeting, Baltimore, MD. (Poster)

- **E. Fernández**, A. Lang, 2023*: The Potential of Stratospheric Vortex Geometry in Forecasting.* 32nd AMS Conference on Weather Analysis and Forecasting, American Meteorological Society Collective Madison Meeting, Madison, WI. (Poster)

- **E. Fernández**, A. Lang, 2022*: Examining the Impact of Stratospheric Vortex Variability on US Surface Temperatures.* 17th AMS Conference on Polar Meteorology and Oceanography, American Meteorological Society Collective Madison Meeting, Madison, WI. (Oral)

- **E. Fernández**, A. Lang, 2022*: Examining the Impact of Stratospheric Vortex Variability on US Surface Temperatures.* 21st AMS Conference on the Middle Atmosphere, 102nd American Meteorological Society Annual Meeting, Remote. (Oral)

- **E. Fernández**, A. DeGaetano, 2020*: Examining the Hydroclimatological Extremes of New York State Waterways Over the Past 60 Years.* 100th American Meteorological Society Annual Meeting, 19th Annual Student Conference, Boston, MA. (Poster)

- **E. Fernández**, L. Aviles, 2019: *Streamflow Associated with Northeast Tropical Cyclones in the Connecticut River Watershed: Wet Antecedent Conditions and Hurricane Irene Case Study.* 99th American Meteorological Society Annual Meeting, 18th Annual Student Conference, Phoenix, AZ. (Poster)

SERVICE AND LEADERSHIP EXPERIENCE

University at Albany, Department of Atmospheric and Environmental Science:

2024 – Present	Graduate Program Committee
2024 – 2025	DAES Mentorship Program
2024 – 2025	Co-Chair, DAES Graduate Student Recruitment
2021 – 2025	Co-Chair, Outreach Committee
2021 – 2023	Undergraduate Tutoring

American Meteorological Society:

2025 – Present	Student Member, Committee on Artificial Intelligence Applications to Environmental Science
2019 – 2025	Student Conference Planning Committee for the American Meteorological Society Annual Meeting
2020 – 2025	Conference Session Chair
2023 – 2025	Co-Chair and Member, Board on Student Affairs; Specialty Meeting Events Committee
2022 – 2024	Student Member, Commission on the Weather, Water, and Climate Enterprise (CWWCE)

SCHOLARSHIPS AND AWARDS

- *Department of Atmospheric and Environmental Science Distinguished Service Award, 2025-2026*
  University at Albany, Albany, NY
- *Michael W. Mitchell Memorial Fund Recipient,* 2020
  Cornell University, Ithaca, NY

PROFESSIONAL SOCIETIES

2019 – Present	American Meteorological Society (AMS)
2024 – Present	American Geophysical Union (AGU)

REFERENCES

Graduate Advisors:

Dr. Andrea Lang | andrea.lopez.lang@wisc.edu
Dept. of Atmospheric and Oceanic Sciences, University of Wisconsin-Madison, Madison, WI
Dr. Zheng Wu | zwu26@albany.edu
Department of Atmospheric and Environmental Science, Albany, NY