ELENA MARIA FERNÁNDEZ

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EDUCATION

In-Progress   **Doctor of Philosophy**, *University at Albany, SUNY. Albany, NY*
Major: Atmospheric Science (*Geosciences and Physics*)
Dissertation: "Evaluating Improvements to S2S Forecasting through ML Applications of Troposphere-Stratosphere Coupling and Teleconnections"
Candidacy Achieved on 15th of March 2024
Expected Graduation: Spring 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

RESEARCH EXPERIENCE

2020 – Present   **Graduate Research Assistant**
Co-Advised: Andrea Lopez Lang and Zheng Wu
Department of Atmospheric and Environmental Science, University at Albany, Albany, NY.
Research centered on using AI and ML distributed deep learning training frameworks for the geosciences. Aims to advance stratospheric predictability and examine the downward impacts of the stratosphere on a sub-seasonal to seasonal timescale by integrating new stratospheric diagnostics into weather forecasting by means of generative data assimilation. Additionally working to evaluate the physical representation of stratosphere-troposphere coupled dynamics and climate teleconnections in hybrid data-driven and physics-based AI weather forecasting and climate modeling simulations.

2019 – 2020   **Undergraduate Research**
Department of Earth and Atmospheric Science, Cornell University, Ithaca, NY.
Research focused on hydrology and climatology of waterways in New York State and surrounding regions. Handled large amounts of climate and hydrological data for statistical analyses. 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
Research focused on hydrological response to tropical cyclones and predecessor precipitation events. Gained foundational experience in working within an applied research position for climate domain science.

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)

MANUSCRIPTS & PUBLICATIONS

- **E. Fernández**, A. L. Lang, H. E. Attard, 2025: "Calculating Stratospheric Polar Vortex Ellipse Moment Diagnostics for Real Time Forecast Applications." *In preparation for Monthly Weather Review*.

- **E. Fernández**, Z. W. Wu, A. L. Lang, 2025: "Subseasonal-to-Seasonal Forecasts of Opportunity Identified through Deep Learning Applications of Stratosphere-Troposphere Coupled Dynamics." *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

- Possesses expertise in climate domain sciences.
- Proficient in Python; knowledgeable in TensorFlow, Keras, and PyTorch.
- Adept software engineering skills, quickly absorbs and efficiently adapts to changing software environments.
- Experienced with using and scaling large amounts of climate data.
- Trained in R and associated statistics coding programs.
- Trained in Linux.
- Literate in using GitHub for documenting research progress.
- Experienced in using various statistical methodologies (e.g., k-means clustering, t-tests, linear and multilinear regressions), distributed deep learning or machine learning methods (i.e., neural networks), and explainable AI (e.g., SHAP, LRP) for research in a climate science domain.
- Comfortable composing thorough and well-written research proposals and conducting self-sufficient or collaborative research projects.
- Excellent communication skills.

CONFERENCE PRESENTATIONS

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

American Meteorological Society:

2025 – Present	Student Member, Committee on Artificial Intelligence Applications to Environmental Science
2019 – Present	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
- *Michael W. Mitchell Memorial Fund Recipient,* 2020
  Cornell University, Ithaca, NY
- *Girl Scout Gold Award,* 2016
  Girl Scouts of Nassau County, Garden City, 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
Professional Reference:
Dr. Elise Schultz | elise.v.schultz@gmail.com
Undergraduate Advisor:
Dr. Arthur T. DeGaetano | atd2@cornell.edu
Department of Earth and Atmospheric Science, Cornell University, Ithaca, NY