

Francis Osei Tutu Afrifa

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OBJECTIVE

Atmospheric Research Scientist and Ph.D. Candidate with years of expertise in computational modeling, high-performance computing (HPC) and data-driven analysis using Python and FORTRAN systems. Proven ability to develop and execute large-scale simulations on national supercomputing resources to solve complex problems. Seeking to apply robust analytical skillset to mission-critical challenges in grid resilience, environmental data science, and computational research.

EDUCATION

University of Wyoming | Laramie, WY

Ph.D., Atmospheric Science | Expected 2026

University of Wyoming | Laramie, WY

M.S., Atmospheric Science | Aug 2022 – Dec 2024, GPA: 3.50

Kwame Nkrumah University of Science and Technology (KNUST) | Kumasi, Ghana

B.S., Meteorology and Climate Science | Nov 2017 – Nov 2021, GPA: 3.74

TECHNICAL SKILLS

- **Programming & Software:** Python (NumPy, Pandas, Matplotlib, Scikit-learn), FORTRAN 90, LaTeX, HTML/CSS, Microsoft Office Suite (Word, PowerPoint, Excel).
- **Modeling & Tools:** Weather Research and Forecasting model (WRF) - Large Eddy Simulations (LES), running models on the National Center for Atmospheric Research, NCAR's CISL HPC systems.
- **Data Science:** Data visualization, Objective Data Analysis (Statistics & Machine Learning, ML).

SOFT SKILLS

- **Communication:** Strong ability to present complex research in accessible formats; experienced in academic and conference presentations.
- **Collaboration:** Worked alongside experts in atmospheric science to deliver collaborative research outcomes.
- **Leadership:** Successfully led initiatives aimed at improving inclusivity and diversity within academic settings.

EXPERIENCE

University of Wyoming | Laramie, WY: *Graduate Research Assistant* | 2022 - Present

- Developed and optimized high-resolution Weather Research and Forecasting (WRF) model simulations on NCAR's Derecho supercomputer to analyze extreme weather dynamics and precipitation patterns.
- Applied Python-based data analysis and machine learning pipelines to interpret large-scale model output, transforming complex datasets into actionable insights on system behavior.
- Collaborated with multidisciplinary teams of scientists from NCAR to validate models.

Graduate Teaching Assistant | Jan 2025 – May 2025

- Mentored over 20 students in HPC environment setup (Linux/Python) for Objective Data Analysis, enhancing their practical programming skills and research efficiency.

- Graded and provided comprehensive feedback on student scripts, improving student comprehension of complex atmospheric science concepts.

KNUST | Kumasi, Ghana: *National Service Personnel* | 2021 - 2022

- Supported faculty in teaching and grading undergraduate courses in Meteorology and Climate Science.
- Engineered precipitation indices to quantify flood risks in West Africa; findings published in a Q2 journal.
- Mentored 5 undergraduate interns in launching the KNUST 24-Hour Campus Weather Forecast, a student-led initiative used by campus operations.

Ghana Meteorological Agency | Accra, Ghana: *Meteorology Intern* | May 2019 - Jun 2019

- Assisted in data collection and quality control across Marine/NWP, Agromet, and Forecasting Units, supporting daily weather bulletins.
- Analyzed synoptic patterns and historical data to improve short-term forecast accuracy for coastal regions.

Presbyterian Boys Secondary School | Legon, Ghana: *PENSA Financial Secretary* | 2016 - 2017

- Managed financial records and budgets for a student association.

ACHIEVEMENTS/AWARDS

- **University of Wyoming Atmospheric Science Sutter Award for Graduate Teaching Assistant** | 2025 Spring
- **University of Wyoming School of Computing Graduate Scholar** | 2023 - 2024
- **Presentations:** Poster Presentations at the 21st American Meteorological Society (AMS) Mountain Meteorology Conference (2023), the 2023 Young Scientist Symposium on Atmospheric Research (YSSAR) and at the 11th Ghana Science Association (GSA) Research Seminar and Poster Presentations (2022).
- **Inclusionary and Global Leadership Program (IGLP):** Successfully completed the IGLP in 2023, applying leadership principles to foster inclusive environments and drive collaborative projects.
- **Supervised a team of Meteorology and Climate Science interns** to launch a department initiative to establish a KNUST 24-hour campus weather forecast, enhancing community preparedness and engagement.

PUBLICATIONS

- Afrifa, F. O., Geerts, B., Xue, L., Chen, S., Hohman, C., Grasmick, C., ... & Zaremba, T. (2025). A Case Study of Cold-Season Emergent Orographic Convection and Its Impact on Precipitation. Part I: Mesoscale Analysis. *Monthly Weather Review*, 153(10), 2229-2250. <https://doi.org/10.1175/MWR-D-24-0241.1>
- Afrifa, F. O., & coauthors (2025). A Case Study of Cold-Season Emergent Orographic Convection and Its Impact on Precipitation. Part II: High-resolution LES Analysis. (accepted under MWR)
- Aryee, J. N. A., Afrifa, F. O. T., Agyapong, K. H., Frimpong, N. G., Quagraine, K. T., & Davies, P. (2024). Quantifying climatic heavy-precipitation-induced floods in West Africa using multiple precipitation indices. *Scientific African*, 25, e02309. <https://doi.org/10.1016/j.sciaf.2024.e02309>
- Butler, M., Khan, A., Afrifa, F., Hu, Y., & Taylor, D. (2025). Multilayer networks characterize human-mobility patterns by industry sector for the 2021 Texas winter storm. *arXiv preprint arXiv:2509.03642*.