

Alfonso Ladino-Rincon

Professional Summary

PhD candidate in atmospheric sciences with 5+ years of experience in big data processing, data engineering, and machine learning. Specialized in building AI-ready, cloud-native datasets using Python, HPC, and formats such as Zarr and Parquet for large-scale Earth observation and geospatial data. Experienced in developing scalable, open data pipelines that improve accessibility, performance, and reproducibility in analytics and AI workflows.

Education

- 2020–Present **Ph.D. in Atmospheric Sciences**, *University of Illinois at Urbana-Champaign*
Focus: Machine learning, big data, radar remote sensing, cloud native formats. Expected July 2026.
- 2018 **M.Sc. in Meteorology**, *Universidad Nacional de Colombia*
- 2016 Exchange Program – School of Meteorology, *University of Oklahoma*, Spring Term
- 2013 **B.Sc. in Agricultural Engineering**, *Universidad Nacional de Colombia*

Work Experience

- 2026–Present **Research & Development Intern**, *Silurian AI*, Hybrid
- Preprocess and quality-control large weather radar datasets for machine-learning workflows.
 - Support the design, training, and evaluation of ML models for radar data analysis.
 - Validate model outputs against ground-truth meteorological observations.
- 2025 **Data Science Intern**, *Earthmover PBC*, Remote
- Developing ARCO Datasets – Creating analysis-ready, cloud-optimized (ARCO) datasets for widely used meteorological data products, with a focus on improving accessibility and usability, including radar data.
 - Content Creation & Knowledge Sharing – Producing educational content (e.g., blog posts, tutorials, and documentation) to demonstrate best practices for data analytics, visualization, and AI/ML applications using ARCO datasets.
 - Driving Innovation & Open Science – Showcasing Earthmover's technology to generate new customer leads while advancing open science by documenting best practices and making ARCO datasets widely available to the research community.
- 2016–2020 **Radar Meteorologist & Software Developer**, *IDEAM (Colombian National Weather Service)*
- Developed radar and satellite data visualization tools for operational meteorologists and public communication.
 - Designed multi-sensor quantitative precipitation estimation products for societal applications.
 - Integrated weather data pipelines for national early warning systems.
 - Provided radar meteorology training to aviation and weather personnel.

Skills

- Programming Python, Shell, Git, Docker | Packaging: Conda, Mamba, Pip, UV
- Data Science Pandas, Xarray, SQL, VirtualZarr, Kerchunk | ML: PyTorch, TensorFlow, Scikit-learn

Workflow	HPC: Dask, Slurm Data versioning: Icechunk CI/CD: GitHub Actions, pre-commit, Black, Ruff Cloud Platforms: AWS (S3, Coiled) AI-assisted code: Codex, Claude code
Data Formats	Zarr, NetCDF, HDF5, GRIB, Parquet ARCO principles

Software Projects

Lead Developer	raw2zarr – Original author and lead developer
Contributor	xarray and xradar
Organizations	Open Radar, Project Pythia

Selected Publications

- 2025 Ladino-Rincon, A., Nesbitt, S.W., Di Girolamo, L., Rauber, R.M., McFarquhar, G.M., & Lawson, R.P., *Droplet size distribution retrieval from dual-frequency precipitation radar measurement using a deep neural network*, *Journal of Atmospheric and Oceanic Technology*, 42(11), 1549–1566. DOI: 10.1175/JTECH-D-25-0004.1
- 2025 Ladino-Rincon, A., & Nesbitt, S.W., *Radar DataTree: A FAIR and Cloud-Native Framework for Scalable Weather Radar Archives*, *arXiv preprint*, arXiv:2510.24943. 10.48550/arXiv.2510.24943
- 2025 Zhu, Z., Yang, F., Zawadowicz, M., Ladino-Rincon, A., Ritvanen, J., Lankowicz, S., Lundstrom, K.H., & Fitzgerald, T., *Giant Cloud Condensation Nuclei Facilitate Drizzle Formation in Stratocumulus—Insights From a Combined Observation-Modeling Framework*, *Journal of Geophysical Research: Atmospheres*, 130(22), e2025JD044736. DOI: 10.1029/2025JD044736
- 2025 Drucker, J. et al., *Stable atmospheric conditions underlie a steady pace of nocturnal bird migration in the tropics*, *Proceedings of the Royal Society B*. DOI: 10.1098/rspb.2024.2609
- 2021 Rivelli Zea, L., Nesbitt, S.W., Ladino, A., et al., *Raindrop Size Spectrum in Deep Convective Regions of the Americas*, *Atmosphere*, 12(8), 979. 10.3390/atmos12080979

Conferences & Presentations

- 2026 Oral, *Radar DataTree: A Cloud-Native Data Model for Accessible, Time-Aware Weather Radar Collections*, 106th AMS Annual Meeting – Session: FAIR and Open Data and Software within the Atmospheric and Ocean Sciences II, Houston, TX, Jan 2026
- 2025 Oral, *Analysis-Ready, Cloud-Optimized Data Formats for Scalable Weather and Climate Science*, CARLA – Latin America High Performance Computing Conference, Kingston, Jamaica, Sep 2025
- 2025 Oral, *Advancing Open Radar Science: FAIR Principles and Cloud-Native Data Management*, 41th AMS Radar Meteorology Conference, Toronto, Canada, Aug 2025
- 2025 Oral, *Efficient Weather Radar Data Management in Practice: FAIR Principles and Cloud-Native Solutions*, Cloud Geonative Conference, Snowbird, Utah, May 2025
- 2024 Oral, *Improvement of liquid particle size distribution retrieval from dual-precipitation radar measurement using a deep neural network*, European Radar Conference – ERAD 2024, Rome, Italy, Sep 2024

Short Courses & Workshops

- 2025 **II Simposio ATMOSCOL – Piensa en Nubes, Programa en Python (Instructor)**
Lead instructor and contributor for a hands-on workshop focused on exploring rainfall, weather, and climate data using Python and open data sources.
- 2025 **41th AMS Radar Conference – Open Radar Science Short Course (Instructor)**
Lead instructor and contributor for a hands-on tutorial on cloud-native radar workflows using open-source tools such as xradar. DOI: <https://doi.org/10.5281/zenodo.13694510>
- 2024 **ERAD 2024 – Open Radar Science Short Course (Instructor)**
Lead instructor and contributor for a hands-on tutorial on radar science using FAIR principles and cloud-native formats (Zarr). DOI: 10.5281/zenodo.13694510
- 2023 **AtmosCol – Taller de Datos Científicos con Python y R (Instructor)**
Lead instructor and contributor for a hands-on tutorial on teaching and exploring hydrometeorological data analysis with Python in Spanish. DOI: 10.5281/zenodo.8404427

Research Interests

Rain microphysics | Geospatial data and machine learning | Spaceborne and ground-based radars | Big data analysis, streaming, and visualization | ARCO data formats | Open science and open data

Honors & Awards

Fulbright–Colciencias Fellowship (2019) | AI Fellowship, Ministry of ICT, Colombia (2019) | Hack the Risk! – Winning team (2019)