

# ChangJae Lee

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## Education

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### Yonsei University

Korea

- **B.S. Atmospheric Science**

Fall 2014

Coursework: Atmospheric Dynamics, Atmospheric Physics, Atmospheric Analysis, Statistical Analysis in Meteorology, Calculus

### University of Texas at Austin

USA

- **M.S. Data Science**

Expected Fall 2025

Coursework: Machine Learning, Deep Learning, Reinforcement Learning, Natural Language Processing, Deep Generative Models, Optimization, Data Structures & Algorithms

## Research Experience

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### Center for Analysis and Prediction of Storms (CAPS)

University of Oklahoma

- **Visiting Scientist**

Aug 2022 – Feb 2024

- Co-authored a peer-reviewed paper on **Spatial Aligned Mean (SAM)**, an ensemble consensus technique for quantitative precipitation forecasting (*Weather and Forecasting*).
- Delivered **two oral presentations** at the AMS 28th Conference on Numerical Weather Prediction and the 104th AMS Annual Meeting.
- Participated in the **2023 NOAA Hazardous Weather Testbed** (Week 1, 1–5 May, 2023).
- Contributed ensemble post-processing results (**Spatial Aligned Mean**) for operational evaluation to the **2023 NOAA Flash Flood and Intense Rainfall Experiment**.
- **Highlighted by 2024 FFaIR participants and facilitators** for improved ensemble focus and realism, **with a recommendation that Spatial Aligned Mean methods be transitioned into NWS operational use.**  
[\[2024 FFaIR Final Report\]](#)

### Korea Meteorological Administration (KMA)

Korea

- **Data Scientist**

Mar 2024 – Present

- Co-authored two preprints:
  1. **Deep-Learning-based Quantitative Precipitation Forecasting** (U-Net, GANs).
  2. **Multimodal Reasoning for Skew-T Log-P Diagrams using Vision-Language Models.**
- Released fully documented code and reproducible inference pipelines on GitHub.

## Publications & Preprints

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**Peer-Reviewed:** Lee, C., K. A. Brewster, N. Snook, P. Spencer, and J. Park, 2024: Spatial Aligned Mean: A Method to Improve Consensus Forecasts of Precipitation from Convection-Allowing Model Ensembles. *Wea. Forecasting*, 39, 1545–1558. [doi:10.1175/WAF-D-23-0229.1](https://doi.org/10.1175/WAF-D-23-0229.1)

**Preprint:** Lee, C., H. Yang, and B. Kim, 2025: Improving Post-Processing for Quantitative Precipitation Forecasting Using Deep Learning. *arXiv*. [doi:10.48550/arXiv.2506.03842](https://doi.org/10.48550/arXiv.2506.03842)

**Preprint:** Lee, C., H. Yang, and J. Choi, 2025: Exploring Multimodal AI Reasoning for Meteorological Forecasting from Skew-T Diagrams. *arXiv*.

## Conference Presentations

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**AMS 2023:** Spatial alignment of CAM ensemble members to improve ensemble consensus precipitation. Oral presentation at the 28th Conference on Numerical Weather Prediction, Madison, WI.

**AMS 2024:** Spatial Aligned Mean Ensemble Consensus Method Applied to CAM Precipitation Forecasts in the 2023 FFaIR Experiment. Oral presentation at the 104th AMS Annual Meeting, Baltimore, MD.

## Professional Experience

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### Korea Meteorological Administration (KMA)

- **Data Scientist / Software Engineer** 2016 – Present (concurrent with Weather Forecaster role)

- Developed post-processing and visualization tools for forecast systems.
- Led AI/ML integration into operational workflows.
- Conducted verification and statistical evaluation of NWP models.
- Performed in-depth statistical analysis using observational datasets and NWP outputs.

### Korea Meteorological Administration (KMA)

- **Weather Forecaster** 2016 – Present

- Analyzed and interpreted NWP output, radar, and satellite imagery to support high-impact weather forecasting and risk communication.
- Delivered weather briefings to the public and media, including live broadcasts and interviews for upcoming weather events.

### Republic of Korea Air Force

- **Weather Observer** 2011 – 2013

- Collected, coded, and quality-controlled METAR and synoptic surface observations.

## Technical Skills

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**Languages:** Python, C, JavaScript, R, PHP, Bash

**Tools:** Git, Docker, Linux, VSCode, Google Colab

**Frameworks:** PyTorch, Scikit-learn, D3.js, Leaflet (GIS), LaTeX

## Selected Projects

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**Deep-Learning QPF:** Developed a U-Net and GAN-based post-processing model trained on high-resolution precipitation observations to improve NWP Quantitative Precipitation Forecasting (QPF) performance.

(<https://github.com/hunter3789/Deep-Learning-QPF>)

**Vision–Language Skew-T:** Fine-tuned a lightweight Vision–Language Model (VLM) for atmospheric sounding diagnosis and precipitation classification using synthetic prompting and curriculum learning.

(<https://github.com/hunter3789/VLM-Skew-T>)

**SLR Observational Study:** Conducted a statistical analysis of the relationship between surface observations and Snow-to-Liquid Ratio (SLR).

(<https://github.com/hunter3789/SLR-study>)

**Lightning Forecasting and Climatological Analysis:** Developed a post-processing model for lightning prediction based on NWP and observed lightning data. Performed statistical analysis on lightning event characteristics and forecasting potential.