Hyeri Kim

Postdoctoral Fellow

School of Meteorology
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EDUCATION

The University of Oklahoma *May 2023*

Ph.D., Electrical and Computer Engineering

- Advisors: Drs. Boonleng Cheong and Robert Palmer
- Title: Robust Velocity Unfolding for Weather Radar Based on Convolutional Neural Networks

Korea Aerospace University *Feb 2014*

M.S., Electronic Engineering

- Advisor: Dr. Younggil, Kwag
- Title: Surface Clutter Rejection Technique for Weather Radar Using Terrain-Adaptive Clutter-Map Algorithm

Korea Aerospace University *Feb 2011*

B.A., Electronic Engineering and Avionics

WORK EXPERIENCE

School of Meteorology, University of Oklahoma Norman, OK

Postdoctoral Fellow, Advisor: Drs. David Bodine, Boonleng Cheong, and Robert Palmer *Aug 2023-Current*

- **Machine learning algorithms for boundary layer meteorology:** Develop machine learning algorithms for detection and classification of boundary layer structure using radar data
- **Velocity dealiasing of tornadic storms:** Develop machine learning algorithms for automatic velocity dealiasing of tornadic storms to improve severe weather prediction capabilities
- **Machine learning algorithms for phased array:** Collaborate with a team as the lead machine learning expert to optimize scanning strategies for the fully digital phased array radar called Horus
- **Hydrometeor Classification Algorithm development:** Engineered a robust classification algorithm for the EWR Radar System to identify precipitation types

- Sponsored by: EWR radar system

Weather Radar Center, Korea Meteorological Administration Seoul, Korea
Researcher *Jan 2013-Dec 2016*

- **Weather radar signal processing:** Developed algorithms to prepare for the deployment of the EEC dual-polarimetric S-band radar and enhance radar data quality
- **Dual-polarization variable generation:** Collected I/Q data from the testbed radar, analyzed Doppler signals, and converted I/Q data into radar base variables (reflectivity, radial velocity, spectrum width) and dual-polarization variables (correlation coefficient, different reflectivity, differential phase)
- **Velocity dealiasing for dual PRF mode:** Designed and implemented a velocity dealiasing algorithm for dual PRF mode
- **Radar performance evaluation:** Performed sensitivity tests to assess and further enhance radar data quality

TEACHING EXPERIENCE

University of Oklahoma Norman, OK

- *Guest Lecture: Machine learning basics and application* *March 2024*

University of Florida Gainesville, FL

- *Guest Lecture#1: Radar and Satellite Meteorology (Velocity Dealiasing)* *November 2024*
- *Guest Lecture#2: Machine Learning in Meteorology (Machine learning basics and application on boundary layer organizational mode detection)*

RESEARCH ASSISTANT

Advanced Radar Research Center Norman, OK

- Created algorithms for X-band weather radars, including attenuation correction and velocity dealiasing using staggered PRT and machine learning (Convolutional Neural Networks) *Jan 2017-Present*

Korea Aerospace University Gyeonggi, Korea

- Developed algorithms for radiometric and geometric correction of satellite synthetic aperture radar (SAR) for Kompsat-5 *Mar 2011-Dec 2012*

TEACHING ASSISTANT

University of Oklahoma Norman, OK

- Digital Signals and Filtering *Spring 2022*
- Radar Engineering *Fall 2019-2021*
- Random Signals *Fall 2019-2021*

PROFESSIONAL SERVICE

Peer Review

- Served as a peer reviewer for the following journals:
  - *Natural Hazards* (2025)
  - *IEEE Geoscience and Remote Sensing Letters* (2025)
  - *IEEE Transactions on Geoscience and Remote Sensing* (2023, 2025)
  - *IEEE Sensors Journal* (2024)

PUBLICATIONS

Journal Article

- **Kim, H.,** and D. Bodine, 2025: Automated Boundary Layer Organizational Mode Classification with S-band Radar Reflectivity using Convolutional Neural Networks. *AMS Artificial Intelligence for the Earth Systems*, accepted pending minor revision.
- Choi, J., **H. Kim**, K.-H. Kim, and J. Lee, 2025: AT Loss: Advanced Torrential Loss Function for Precipitation Forecasting. *Phys. Rev. Lett.* https://doi.org/10.1103/c36m-stxl
- **Kim, H.,** and B. Cheong, 2023: Robust Velocity Dealiasing for Weather Radar based on Convolutional Neural Networks. *Remote Sensing*, 15(3), 802, https://doi.org/10.3390/rs15030802.
- **Kim, H.,** M.-K. Suk, K.-Y. Nam, and J.-S. Ko, 2016: Development of Unfolding Radial Velocity Algorithm for Dual PRF Mode of Yong-In Testbed (YIT) Radar. *J. Korean Inst. Electromagn. Eng. Sci.,* 27, 521–530.
- **Kim, H.,** J.-S. Jung, Y.-K. Kwag, J.-W. Kim, J.-H. Kim, and J.-S. Ko, 2014: Performance Analysis on Terrain-Adaptive Clutter Map Algorithm for Ground Clutter Rejection of Weather Radar. *J. Korean Inst. Electromagn. Eng. Sci.,* 25, 1292–1299.

Conference Papers

- Cohen, B. K., D. Bodine, M. Yeary, J. C. Snyder, D. Schvartzman, **H. Kim**, C. Kuster, A. Alford, T. Schuur, J. Boettcher, and T.-Y. Yu, 2026: A Machine Learning Adaptive Scanning Algorithm for Scanning Supercells with Phased Array Radars. *106th Amer. Meteor. Soc. Annu. Meeting*, Houston, TX, Amer. Meteor. Soc.,
- **Kim, H**., and D. Bodine, 2025: Automated Detection of Radar-based Boundary Layer Organizational Mode using Convolutional Neural Networks. *41st Conf. on Radar*

Meteorology, Toronto, Ontario, Amer. Meteor. Soc.

- Cohen, B. K., D. J. Bodine, M. Yeary, J. C. Snyder, D. Schvartzman, C. M. Kuster, A. A. Alford, T. J. Schuur, J. B. Boettcher, T.-Y. Yu, and **H. Kim**, 2025: Developing a Machine Learning Adaptive Scanning Algorithm for Scanning Supercell Characteristics with Phased Array Radars. *41st Conf. on Radar Meteorology*, Toronto, Ontario, Amer. Meteor. Soc.
- **Kim, H**., and D. Bodine, 2024: Utilizing Radar Observations to Automate Classification of Boundary Layer Organizational Mode using Convolutional Neural Networks. *12th European Conf. on Radar in Meteorology and Hydrology*, Rome, Italy, ERAD.
- **Kim, H.,** B. Cheong, and T.-Y. Yu, 2022: Weather Radar Velocity Unfolding using Convolutional Neural Networks*. 11th European Conf. on Radar in Meteorology and Hydrology,* Locarno, Switzerland, ERAD.
- **Kim, H.,** B. Cheong, and T.-Y. Yu, 2019: Velocity Unfolding using Convolutional Neural Network for X-band Doppler Weather Radar. *39th Conf. on Radar Meteorology*, Nara, Japan, Amer. Meteor. Soc.
- **Kim, H.,** M.-K. Suk, S.-A. Jung, J.-S. Park, and J.-S. Ko, 2016: Sensitivity Analysis of Sampling Number on Quality of Polarimetric Measurements from S-band Dual-Polarization Radar. *AGU Fall Meeting,* San Francisco, CA, Amer. Geophys. Union.
- **Kim, H.,** M.-K. Suk, K.-Y. Nam, J.-H. Kim, and J.-S. Ko, 2015: Performance Analysis on Terrain-Adaptive Clutter Map Algorithm for Ground Clutter Mitigation in Korea. *37th Conf. on Radar Meteorology,* Norman, OK, Amer. Meteor. Soc.

PATENTS

- **Hyeri Kim** et al., "Method for Applying an Unfolding Radial Velocity Algorithm", Korea Patent #1016861510000, Dec. 2016.
- **Hyeri Kim** et al., "Method for Offset Decision for Differential Phase", Korea Patent # 1016861560000, Dec. 2016.

AWARDS

- Korean Meteorological Administration (KMA) administrator award, March 2016
  - Was nominated as a recipient to celebrate World Meteorological Day

- Best paper awards, Korea Water Resources Association (KWRA), May 2014
  - Hyeri, Kim et al., Analysis of Signal Characteristics Using Time-Series Data from Sobaeksan Rain Radar
- 3rd place in Capstone Design, Korea Aerospace University, Dec 2010
  - Title: 3D Surround System using Multi-Panning

SKILLS

Programming	Python, MATLAB, C, Linux, Py-ART, Tensorflow, Keras
Technical Writing	LaTeX