Jinjun Liu

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Education

Texas A&M University Expected 2025
Ph.D. in Atmospheric Sciences (GPA: 3.8/4.0) *College Station, TX*

- Research topics: tropical cyclones and climate change, high-resolution model simulations.

Georgia Institute of Technology 2022
M.S. in Computer Science with a specialization in Machine Learning (GPA: 3.8/4.0) *Atlanta, GA*

- Courseworks: Machine Learning, Data and Visual Analytics, Database Systems Concepts and Design, Machine Learning for Trading, Software Development Process, Computer Networks, AI for Robotics, Computer Vision, Deep Learning, Graduate Algorithms.

University of Science and Technology of China 2017
M.S. in Atmospheric Physics and Atmospheric Environment *Heifei, China*

University of Science and Technology of China 2014
B.S. in Atmospheric Sciences *Heifei, China*

Skills

Programming Languages: Python, FORTRAN, MATLAB, NCL, C, etc
Technologies: Git, Linux, Docker, Python libraries (e.g., PyTorch, xarray, scikit-learn, etc), Cloud Computing platforms
Domain knowledges: Data Processing and Visualization, Statistical Method, Numerical Simulation, Machine Learning

Experience

Texas A&M University, *Graduate Research Assistant* *2017-Now | Collge Station, TX*

Texas A&M University, *Graduate Teaching Assistant* *2020-Now | Collge Station, TX*

- Instructor for ATMO 202: Weather & Climate Laboratory (about 25 students per section).
- Grader for ATMO 363: Introduction to Atmospheric Chemistry and Air Pollution.
- Grader and Lab Q&A Facilitator for ATMO 336: Atmospheric Dynamics.

Publication

- Jinjun Liu, Robert Korty, et al. *Impacts of Model Horizontal Resolution on the Potential Intensity of Tropical Cyclones and Upper Ocean Heat Content in Community Earth System Model.* (To be submitted)
- Rui Li, Yipu Wang, Jiheng Hu, Yu Wang, Qilong Min, Yves Bergeron, Osvaldo Valeria, Zongting Gao, Jinjun Liu, and Yuyun Fu. *Spatiotemporal variations of satellite microwave emissivity difference vegetation index in China under clear and cloudy skies*. Earth and Space Science 7, no. 5 (2020): e2020EA001145.
- Jinjun Liu, Yunfei Fu, Rui Li, Yu Wang, Yuyun Fu, and Jiheng Hu. *The Influence of Atmosphere to Passive Microwave Retrieval of Snow Depth over Qinghai-Tibetan Plateau*. Plateau Meteorology 37, no. 2 (2018): 305-316.

Presentation

- **The effects of high horizontal resolution on tropical cyclones' potential intensity and upper ocean heat content in the Community Earth System Model**, *AMS 36th Conference on Hurricanes and Tropical Meteorology*, 2024, Long Beach, CA
- **Gap-Filling AOD Data Using Deep Learning Techniques in Satellite Imagery**, *104th American Meteorological Society Annual Meeting*, 2024, Baltimore, MD
- **Does the Frequency of Rapid Intensification Vary with Climate?**, *2023 American Geophysical Union Fall Meeting*, 2023, San Francisco, CA
- **Relationship between African Outgoing Longwave Radiation and Tropical Cyclone Genesis in the Last Millennium Simulations**, *American Meteorological Society's 35th Conference on Hurricanes and Tropical Meteorology*, 2022, New Orleans, LA
- **Atlantic Multidecadal Variability and Tropical Cyclones in Last Millennium Climate**, *American Meteorological Society's 34th Conference on Hurricanes and Tropical Meteorology*, 2021, Virtual

- **Comparison of the TAMU Vector Radiative Transfer Model (TAMU-VRTM) and Community Radiative Transfer Model (CRTM) in the Gas Absorption Calculation**, *100th American Meteorological Society Annual Meeting*, 2020, Boston, MA
- **Sensitivity study of the radiance to optical and microphysical properties of nonspherical dust aerosols**, *17th Electromagnetic and Light Scattering Conference*, 2018, Collge Station, TX

Research Project

2023 | **Deep Learning for Filling Aerosol Data Gaps** | *Remote Sensing*, *Deep Learning*, *PyTorch*, *AWS*, *MLOps*
- Implemented a Convolutional Long Short-Term Memory (ConvLSTM) algorithm to predict Aerosol Optical Depth (AOD) images and effectively fill gaps derived from cloud cover in GOES 18 ABI images. The algorithm is two orders of magnitude faster than the traditional method and achieves lower mean square error.

2022 | **Rapid Intensification of Tropical Cyclones in Paleo-Climates** | *Climate Change*, *Tropical Cyclones*, *Data Analysis*
- Analyzed the frequencies of rapid intensification in paleo-climates such as the Miocene and Eocene epochs, as well as during the Last Glacial Maximum, using downscaled and observational tropical cyclone tracks data. Discovered changes in the frequency of rapid intensification in different climates and identified the underlying drivers through time series analysis.

2021 | **Tropical Cyclones in High-resolution Climate Model** | *Climate Model*, *Tropical Cyclones*, *Big Data Processing*
- Analyzed the precursors and large-scale environmental conditions that support tropical cyclones in climate models using very large-volume high-resolution climate model simulation data. Investigated the differences in tropical cyclone variables between high- and low-resolution models and identified the physical processes that contribute to simulation differences.

2018 | **Fast Numerical Radiation Transfer Model Development** | *Atmospheric Radiation Transfer*, *Numerical Simulation*
- Developed a FORTRAN-based regression model that enables the radiation transfer model to account for gas absorption in MODIS radiation bands. This achievement resulted in computation speeds two orders of magnitude faster than the standard Line-by-line model, while maintaining similar accuracy to the Community Radiative Transfer Model (CRTM).

Computer Science Project

2022 | **Udacity Java Programming Nano Degree** | *Java*, *Object-Oriented Programming*, *Unit Test*, *Maven*, *etc*
- **Hotel Reservation Application**: developed a Java-based application that enables users to book rooms, view their reservations, and manage customers, rooms, and reservations as an admin. The app ensures rooms are not double-booked, provides recommended rooms, and handles exceptions gracefully.
- **Web Scrawler**: used concurrent programming to improve a legacy web crawler, making it multi-core compatible. The crawler reads a JSON file, downloads and parses multiple HTML documents in parallel, and records popular web terms in an output file.
- **UdaSecurity**: developed a GUI application (UdaSecurity) to manage home security systems. Restructured it into a multi-module Maven project and incorporated unit tests using JUnit 5 and Mockito libraries.

2021 | **Deep Learning Methods to Detect Hateful Memes** | *Deep Learning*, *Python*, *PyTorch*, *GCP*
- Trained and deployed an ensemble learning model based on VisualBERT to detect hateful memes in the Hateful Memes Challenge proposed by Facebook. Utilized data augmentation techniques to increase the volume of data. The algorithm achieves 0.7675 AUROC with an accuracy of 0.7111.

2019 | **A Website for Selling Used Cars** | *HTML*, *PHP*, *JavaScript*, *MySQL*
- Developed a full-stack website for customers and employees of a car shop, enabling them to carry out various tasks based on their roles, including inventory clerks, salespeople, managers, and owners.

2019 | **ML Methods to Predict House Prices in Los Angeles** | *scikit-learn*, *SVM*, *Random Forest*, *Data Visualization*
- Developed an accurate model for predicting house prices in the Los Angeles area by integrating multiple community and environmental data, along with local economic indicators. The model utilized various machine learning methods such as support vector and random forest to make predictions. The results were then visualized on a map to assist users in making informed decisions when purchasing a house.

Awards

- 2016 | Grade 1, Graduate Student Academic Scholarship
- 2015 | Grade 1, Graduate Student Academic Scholarship
- 2012 | Second Prize, Research-Oriented Physics Experiment Project
- 2012 | Grade 3, USTC Outstanding Student Scholarship