Tianhao Le

QUANTITATIVE MODELING / ATMOSPHERIC SCIENCE

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Quantitative modeler working on mortgage forecasting, survival analysis, Monte Carlo pricing, and monotonic neural networks, with a research background in atmospheric simulation.

EXPERIENCE

Morgan Stanley New York, NY
Quantitative Modeler, Vice President Jan 2022 - Present

- Built a mean-reverting regression model for mortgage origination volumes under macroeconomic scenarios; in-sample R^2 = 0.95 and out-of-sample MAPE = 11.3% over a nine-quarter backtest.
- Modeled rate-lock pull-through and fallout with survival analysis; priced rate-lock mortgages with Monte Carlo simulation under projected market-rate paths.
- Built a package for monotonicity-constrained neural networks to support market-driven controls and model interpretation.

Caltech | Graduate Researcher Jul 2016 - Dec 2021

- Used WRF-Chem and satellite observations to distinguish meteorological and emission effects on lockdown air pollution; first-author publication in Science.
- Developed a neural-network radiative transfer model: 100-1000 times faster in tested cases; errors generally below 0.5% of peak spectral radiance. Evaluated AIRS cloud overlap with Wasserstein distance.

EDUCATION

California Institute of Technology Jun 2022
Ph.D., Environmental Science and Engineering; minor, Computational Science and Engineering.
M.S., Environmental Science and Engineering, Jun 2021.

Peking University Jun 2016
B.S., Physics; double degree in Applied Mathematics.

SKILLS

Programming: Python (TensorFlow, PyTorch, Keras, scikit-learn, pandas, NumPy, SciPy); C/C++; CUDA; Fortran; MATLAB; R.

Modeling: Linear and nonlinear regression; survival analysis; Monte Carlo simulation; time series; neural networks; deep learning; natural language processing.

Languages: Chinese (native); English.

SELECTED PUBLICATIONS

Le, T., et al. (2020). Unexpected air pollution with marked emission reductions during the COVID-19 outbreak in China. *Science*, 369, 702-706. doi:10.1126/science.abb7431

Wang, Y., **Le, T.**, et al. (2020). Reduced European aerosol emissions suppress winter extremes over northern Eurasia. *Nature Climate Change*, 10, 225-230. doi:10.1038/s41558-020-0693-4

Le, T., et al. (2020). Application of machine learning to hyperspectral radiative transfer simulations. *JQSRT*, 246, 106928. doi:10.1016/j.jqsrt.2020.106928

Le, T., et al. (2022). Evaluation of Modeled Hyperspectral Infrared Spectra Against All-Sky AIRS Observations Using Different Cloud Overlap Schemes. *Earth and Space Science*, 9, e2022EA002245. doi:10.1029/2022EA002245