

The Rice University Environmental Fluid Dynamics Group (<http://pedram.rice.edu/>) has one postdoc and one PhD position to work on applications of machine learning (ML) to improve the modeling and prediction of atmospheric processes, climate variability, and weather extremes. One topic of particular interest is developing new subgrid-scale parameterizations for atmospheric gravity waves by leveraging high-resolution simulations, observational data, and novel ML techniques. This project is part of two multi-disciplinary collaborative initiatives involving several US and international teams: DataWave (<https://datawaveproject.github.io/>) and CSSI-GW (<https://cssi-gws.github.io/>).

The main interest is in building on some of our recent work in data-driven SGS modeling of idealized turbulent flows and discovering structural model errors and applying these new tools to improve the representation of gravity waves in climate/weather models in close collaborations with gravity waves, climate modeling, and climate dynamics experts in the DataWave and CSSI-GW initiatives. Using physics-informed ML to improve accuracy and stability (especially at the small-data regime), using transfer learning to improve generalization/extrapolation, and gaining interpretability (e.g., using equation discovery techniques or through dissecting the neural networks) are some of the main directions we aim to pursue.

Postdoc applicants: For more information and the application process, please see “Postdoc Positions” at <http://pedram.rice.edu/available-positions/>. The start date is flexible (but should be before September 1, 2022). Applications that are received by Dec. 1, 2021 will receive full consideration. Review of applications will continue until the positions are filled.

PhD applicants: For more information about the application process, please see “PhD Positions” at <http://pedram.rice.edu/available-positions/>.