We are seeking either a Postdoc or a Programmer for the following project.

**Project description: ML-driven semi-interactive composition climate drivers**

Simulations including interactive composition, simulating emission sources, chemistry, microphysics, climate interactions and removal, are one of the most computationally expensive parts in the GISS Earth System Model, due to the need to transport a large amount of gaseous and aerosol tracers. Interactive composition simulations are limiting what is feasible in terms of higher resolution transient climate simulations at current computational resources. A cheaper way to consider composition effects on climate are NINT (Non-INTeractive tracers) simulations, that use precalculated aerosol and ozone fields, that are read in from previously carried out simulations that used interactive composition.

We propose to develop a ‘smart NINT’ concept, by using ML to project interactive emission information effects on climate forcing. Smart NINT includes interactively calculated emission information for wind and surface driven sources, like sea spray, fires, dust as online simulated source information that react to climate.

**Postdoctoral Research Scientist**

The Postdoctoral Research Scientist will use Machine learning techniques to train a Chemistry Climate Model to take into account interactive emission information to simulate simplified composition climate responses. Finding the right ML technique, training the model and implementing the ML resulting application into the climate model will be part of the project. Finally, climate applications will be tested and evaluated using ML techniques to replace offline aerosol as climate drivers.

The Postdoctoral Research Scientist will be expected to perform original research, present the results of the research at scientific meetings, and prepare publications in peer-reviewed journals.

**Qualifications**

- A PhD in atmospheric sciences, physics, or other relevant fields is required.
- Strong mathematical and programming skills.
- Experience with machine learning libraries in Python or Julia desired
- Experience with Fortran/High Performance Computing desired
- Expertise with climate or aerosol simulations is not required but desired.

**Scientific Programmer**

The Scientific programmer will assist using Machine learning techniques to train a Chemistry Climate Model to take into account interactive emission information to simulate simplified composition climate responses. The projects include testing different ML technique, training the model and implementing the ML resulting application into the climate model.
The Scientific Programmer will work closely with a team of modelling experts.

Qualifications

- Strong mathematical and programming skills.
- Experience with machine learning libraries in Python or Julia desired
- Experience with Fortran/High Performance Computing desired

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