Computational Hydrology and Remote Sensing at Rice University

The *Computational Hydrology and Remote Sensing* research group at Rice University focuses on the intersection between water resources, food, and climate. Our research aims to aid actionable decision-making by improving hydrological information for monitoring and forecasting hydrological extremes and their impacts at the local scales. To this end, we develop scalable computational approaches for hyper-resolution hydrological prediction targeting regional to global scale applications by leveraging advances in satellite remote sensing, land surface modeling, artificial intelligence, big geospatial data, data fusion, and high-performance computing. More information at www.waterai.earth.

Our research group works on multidisciplinary projects in the following areas (and at their intersections) :

1. Advancing terrestrial hydrology through physics-based AI
2. Satellite remote sensing and AI data assimilation
3. Integrated Earth system modeling and climate change impacts
4. Prediction of extreme hydroclimate events (floods, droughts, wildfires)
5. Quantitative assessments of climate change and human interventions on water scarcity

Background:

Successful candidates will have a background in geosciences, environmental science and engineering, climate sciences, applied math, physics, scientific deep learning, or related fields. This is an excellent opportunity to develop expertise in land surface modeling, hydrologic prediction, satellite remote sensing, and data science while contributing to cutting-edge research in Earth science.

Essential Qualifications:

- Strong analytical skills, ability to think critically and solve problems effectively.
- A solid understanding of calculus and numerical methods.
- Strong programming skills (UNIX/Linux, Python, shell scripting) for processing and visualization of simulation and remote sensing data.
- Experience with geospatial datasets (e.g., GeoTIFF, NetCDF, HDF5, Zar, dask) and data processing using Python geospatial libraries (e.g., xarray, cartopy, rasterio).
- Familiarity with machine learning and/or deep learning concepts using Python (e.g., PyTorch, TensorFlow)
- Eagerness to acquire new skills and adapt them to cutting-edge research in hydrology and Earth sciences.
- Excellent written and verbal communication.

Preferred Qualifications:

- Demonstrate a research track record of involvement in topics relevant to computational hydrology, remote sensing, or related fields.
- Experience with an advanced programming language (e.g., C, C++, Fortran, etc.)
- Hands-on experience with machine learning or deep learning frameworks (e.g., TensorFlow, PyTorch).

- Experience with High-performance computing (HPC) systems and/or cloud computing (e.g., AWS, Google Cloud, etc.).
- Familiarity with version control systems for collaborative code development (e.g., Github, Gitlab)

All researchers will benefit from our group's involvement with national and international collaborative projects, and Rice's thriving and expanding programs, such as the Rice Data Science Initiative, Data to Knowledge Lab, Ken Kennedy Institute, and the Rice Space Institute.

We believe that a diverse team enriches our workplace and enhances our impact. We strongly encourage applications from women, individuals from underrepresented minority groups, and all who can contribute to the further diversification of ideas and perspectives.

Application for PhD students:

PhD students should submit an application to Earth, Environmental, and Planetary Sciences (deadline of **January 9th, 2026)**. International students should also meet the language proficiency requirements. Prospective graduate students can email Dr. Vergopolan (vergopolan@rice.edu) with the subject "Prospective PhD student" before applying. In the email, please include your unofficial transcripts and curriculum vitae, as well as the names and contact information of three references, all in PDF format (not zipped). In the body of your email, include *a brief personal statement explaining why you fit and why you would like to join the group*. We greatly appreciate all the applications, but due to the high volume of submissions, please note that only shortlisted candidates will be notified. Compensation: $37K/year stipend with benefits plus full tuition ($63K/year).