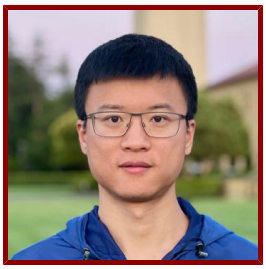
Stanford



# Dapeng Feng

Postdoctoral Scholar, Earth System Science

## Bio

### BIO

Dapeng Feng is a postdoctoral fellow in the Department of Earth System Science and Stanford Institute for Human-Centered Artificial Intelligence. During his PhD he developed the differentiable hydrologic modeling framework to unify machine learning and physical models for large-scale water cycle simulations and streamflow forecasting. His current research interests focus on systematically integrating AI, physical models, and big earth observations for large-scale geoscientific modeling and knowledge discovery, particularly in characterizing the terrestrial water cycle and its interactions with plant and climate systems.

### INSTITUTE AFFILIATIONS

- Postdoctoral Fellow, Institute for Human-Centered Artificial Intelligence (HAI)

### HONORS AND AWARDS

- HAI Postdoctoral Fellowship, Stanford Institute for Human-Centered Artificial Intelligence (2023)
- Top Downloaded Article (Feng et al., 2022), Water Resources Research (2024)
- Editors' Choice Award (Ma, Feng et al., 2021), Water Resources Research (2023)
- Top Cited Article 2020-2021 (Feng et al., 2020), Water Resources Research (2022)
- James E. Marley Graduate Fellowship in Engineering, Penn State University (2020)
- C. Norwood Wherry Memorial Graduate Fellowship in Engineering, Penn State University (2021)
- University Graduate Fellowship, Penn State University (2018)

### PROFESSIONAL EDUCATION

- Doctor of Philosophy, Pennsylvania State University (2023)
- Ph.D., Penn State University , Hydrology (2023)
- M.E., Peking University , Hydrology and Water Resources (2018)
- B.E., Wuhan University , Hydraulic Engineering (2015)

### STANFORD ADVISORS

- Alexandra Konings, Postdoctoral Faculty Sponsor

### LINKS

- Google Scholar: https://scholar.google.com/citations?user=BeSNxLMAAAAJ

# Publications

## PUBLICATIONS

- **Differentiable modelling to unify machine learning and physical models for geosciences** *NATURE REVIEWS EARTH & ENVIRONMENT*
  Shen, C., Appling, A. P., Gentine, P., Bandai, T., Gupta, H., Tartakovsky, A., Baity-Jesi, M., Fenicia, F., Kifer, D., Li, L., Liu, X., Ren, W., Zheng, et al
  2023

- **The suitability of differentiable, physics-informed machine learninghydrologic models for ungauged regions and climate change impact assessment** *HYDROLOGY AND EARTH SYSTEM SCIENCES*
  Feng, D., Beck, H., Lawson, K., Shen, C.
  2023; 27 (12): 2357-2373

- **Differentiable, Learnable, Regionalized Process-Based Models With Multiphysical Outputs can Approach State-Of-The-Art Hydrologic Prediction Accuracy** *WATER RESOURCES RESEARCH*
  Feng, D., Liu, J., Lawson, K., Shen, C.
  2022; 58 (10)

- **From calibration to parameter learning: Harnessing the scaling effects of big data in geoscientific modeling.** *Nature communications*
  Tsai, W. P., Feng, D., Pan, M., Beck, H., Lawson, K., Yang, Y., Liu, J., Shen, C.
  2021; 12 (1): 5988

- **Mitigating Prediction Error of Deep Learning Streamflow Models in Large Data-Sparse Regions With Ensemble Modeling and Soft Data** *GEOPHYSICAL RESEARCH LETTERS*
  Feng, D., Lawson, K., Shen, C.
  2021; 48 (14)

- **Enhancing Streamflow Forecast and Extracting Insights Using Long-Short Term Memory Networks With Data Integration at Continental Scales** *WATER RESOURCES RESEARCH*
  Feng, D., Fang, K., Shen, C.
  2020; 56 (9)

- **Deep dive into hydrologic simulations at global scale: harnessing the power of deep learning and physics-informed differentiable models (#HBV-globe1.0-hydroDL)** *GEOSCIENTIFIC MODEL DEVELOPMENT*
  Feng, D., Beck, H., de Bruijn, J., Sahu, R., Satoh, Y., Wada, Y., Liu, J., Pan, M., Lawson, K., Shen, C.
  2024; 17 (18): 7181-7198

- **When ancient numerical demons meet physics-informed machine learning: adjoint-based gradients for implicit differentiable modeling** *HYDROLOGY AND EARTH SYSTEM SCIENCES*
  Song, Y., Knoben, W. M., Clark, M. P., Feng, D., Lawson, K., Sawadekar, K., Shen, C.
  2024; 28 (13): 3051-3077

- **Improving River Routing Using a Differentiable Muskingum-Cunge Model and Physics-Informed Machine Learning** *WATER RESOURCES RESEARCH*
  Bindas, T., Tsai, W., Liu, J., Rahmani, F., Feng, D., Bian, Y., Lawson, K., Shen, C.
  2024; 60 (1)

- **Identifying Structural Priors in a Hybrid Differentiable Model for Stream Water Temperature Modeling** *WATER RESOURCES RESEARCH*
  Rahmani, F., Appling, A., Feng, D., Lawson, K., Shen, C.
  2023; 59 (12)

- **The Data Synergy Effects of Time-Series Deep Learning Models in Hydrology** *WATER RESOURCES RESEARCH*
  Fang, K., Kifer, D., Lawson, K., Feng, D., Shen, C.
  2022; 58 (4)

- **Continental-scale streamflow modeling of basins with reservoirs: Towards a coherent deep-learning-based strategy** *JOURNAL OF HYDROLOGY*
  Ouyang, W., Lawson, K., Feng, D., Ye, L., Zhang, C., Shen, C.
  2021; 599

- **Transferring Hydrologic Data Across Continents - Leveraging Data-Rich Regions to Improve Hydrologic Prediction in Data-Sparse Regions** *WATER RESOURCES RESEARCH*

Ma, K., Feng, D., Lawson, K., Tsai, W., Liang, C., Huang, X., Sharma, A., Shen, C.
2021; 57 (5)

- **From Hydrometeorology to River Water Quality: Can a Deep Learning Model Predict Dissolved Oxygen at the Continental Scale?** *Environmental science & technology*
  Zhi, W., Feng, D., Tsai, W. P., Sterle, G., Harpold, A., Shen, C., Li, L.
  2021; 55 (4): 2357-2368

- **An integrated hydrological modeling approach for detection and attribution of climatic and human impacts on coastal water resources** *JOURNAL OF HYDROLOGY*
  Feng, D., Zheng, Y., Mao, Y., Zhang, A., Wu, B., Li, J., Tian, Y., Wu, X.
  2018; 557: 305-320