Dr. Ze JIANG
University of New South Wales (UNSW), Sydney, Australia
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QUALIFICATIONS

2021 Ph.D., Water Resources Engineering, University of New South Wales, Australia
2015 M.Sc., Hydro-Informatics and Water Management, Partnership of five European Universities
2012 B.Eng., Environmental Engineering, Hohai University, Nanjing, China

RESEARCH INTEREST

- Hydro-climate extremes modeling and forecasting (e.g., Wavelet System Prediction)
- Postprocessing techniques for correcting bias in climate and weather prediction models
- Climate change impacts on the water cycle (e.g., floods and droughts)
- Hydrology/Hydraulics and water quality modeling
- Hydro-Informatics and water management

PROFESSIONAL EXPERIENCE

University of New South Wales (UNSW), Sydney, Australia — **Jan. 2025 – Present** — **Lecturer**
Jun. 2021 – Dec. 2024 — **Research Associate**

- The development of Wavelet System Prediction (WASP) for characterizing hydroclimate system
- Hydro-climatological extreme forecasting using CMIP decadal prediction and ACCESS seasonal forecasts
- Interannual rainfall forecasting with CMIP6 decadal projections over Australia
- Bias characterisation and correction in Numerical Weather Prediction (NWP) models

German Research Centre (GFZ-Potsdam), Potsdam, Germany — **May 2023 – Jul. 2023** — **Visiting Research Scientist**

- Climate-informed flood estimation under a changing climate

National University of Singapore (NUS), Singapore — **Nov. 2015 – Feb. 2018** — **Research Engineer**

- DSSAT crop modeling of future rice yield in Vietnam under climate change, Singapore-MIT Alliance project.
- Development of index-based drought insurance for sovereign disaster risk transfer, World Bank project.
- Impact of climate change on inland and coastal flooding in Singapore, Public Utilities Board (PUB) project.
- Effectiveness of ABC Waters design features in residential developments, PUB-TMSI-Monash University project.

GRANTS & FELLOWSHIPS

2024-2026 **Australian Research Council Industry Fellowship (Early Career)** ($308K AUD, Chief Investigator), Australian Research Council. Title: A Decadal Roadmap for Water Security and Resource Management.

2022-2024 **Hydrological Risk Assessment of Rural NSW Dams** ($425K AUD, co-CI, one of three), WaterNSW State Government. Title: Projecting Drought over the Medium to Long Term for the WaterNSW Water Supply System.

2023 **Global Research and Innovation Partnerships (GRIP)** (~$20K AUD, Chief Investigator), UNSW GLOBAL DIVISION. Title: Index-based Insurance for Agriculture Risk Transfer under a Changing Climate.

2023 **Helmholtz Visiting Researcher Grant** (~$20K EUR, Chief Investigator), Helmholtz Association of German Research Centers. Title: A Novel Method to Estimate Flood Extremes Using Spectrally Transformed Climate Information.

PUBLICATIONS

1. **Jiang, Z.**, Johnson, F., & Sharma, A. (2023). Do derived drought indices better characterize future drought change? ***Earth's Future***, 11(7), e2022EF003350.
2. **Jiang, Z.**, & Johnson, F. (2023). A new method for postprocessing numerical weather predictions using quantile mapping in the frequency domain. ***Monthly Weather Review***, 151(8), 1909-1925.
3. Wu, Y., Li, Y., **Jiang, Z.**, Xu, Z., Yang, M., Ding, J., & Zhang, C. (2023). Machine Learning Prediction of Phosphate Adsorption on Six Different Metal-Containing Adsorbents. ***ACS ES&T Engineering***, 3(8), 1135-1146.
4. Kusumastuti, C., **Jiang, Z.**, Mehrotra R., & Sharma, A. (2022). Correcting systematic bias in climate model simulations in the time-frequency domain. ***Geophysical Research Letters***, 49(19), e2022GL100550.
5. **Jiang, Z.**, Sharma, A., & Johnson, F. (2021). Variable transformations in the spectral domain – Implications for hydrologic forecasting. ***Journal of Hydrology***, 603, 126816.

6. Kusumastuti, C., **Jiang, Z.**, Mehrotra R., & Sharma, A. (2021). A signal processing approach to correct systematic bias in trend and variability in climate model simulations. ***Geophysical Research Letters***, 48(13), e2021GL092953.
7. **Jiang, Z.**, Rashid, M. M., Johnson, F., & Sharma, A. (2020). A wavelet-based tool to modulate variance in predictors: An application to predicting drought anomalies. ***Environmental Modelling & Software***, 135, 104907.
8. Hohl, R., **Jiang, Z.**, Vu, T. M., Raghavan, S. V., & Liong, S.-Y. (2020). Using a regional climate model to develop index-based drought insurance for sovereign disaster risk transfer. ***Agricultural Finance Review***, 81(1), 151-168.
9. **Jiang, Z.**, Sharma, A., & Johnson, F. (2020). Refining predictor spectral representation using wavelet theory for improved natural system modeling. ***Water Resources Research***, 56(3), e2019WR026962.
10. **Jiang, Z.**, Sharma, A., & Johnson, F. (2019). Assessing the sensitivity of hydro-climatological change detection methods to model uncertainty and bias. ***Advances in Water Resources***, 134, 103430.
11. **Jiang, Z.**, Raghavan, S. V., Hur, J., Sun, Y., Liong, S.-Y., Nguyen, V. Q., & Van Pham Dang, T. (2019). Future changes in rice yields over the Mekong River Delta due to climate change - Alarming or alerting? ***Theoretical and Applied Climatology***, 137(1), 545-555.
12. **Jiang, Z.**, Molkenthin, F., & Sieker, H. (2016). Urban Surface Characteristics Study Using Time-area Function Model: A Case Study in Saudi Arabia. ***Procedia Engineering***, 154, 911-918.

AWARDS & HONORS

- 2021 Engineering Faculty Postdoctoral Writing Fellowship funded by UNSW
- 2019 OzEWEX Summer Institute Scholarship
- 2018 University International Postgraduate Award (UIPA) funded by UNSW
- 2013 Erasmus Mundus Scholarship Award by the European Union (EU)
- 2012 Outstanding graduate of Hohai University
- 2010 National Undergraduate Mathematical Contest in Modeling (Provincial Award)

TALKS

1. **Jiang, Z.**, Haberlandt, U., and Sharma, A.: Enhanced daily streamflow simulation for future climates using a non-parametric method with variable selection and transformation, ***Asia Oceania Geosciences Society (AOGS) 2024***, South Korea, 23 June-28 June 2024, HS13-A009.
2. **Jiang, Z.**, Kibria, G., and Sharma, A. Navigating Water Resource Management: A Forecasting Framework for Interannual Drought Projections, ***EGU General Assembly 2024***, Vienna, Austria, 14–19 Apr 2024, EGU24-13279, https://doi.org/10.5194/egusphere-egu24-13279, 2024.
3. Haberlandt, U., **Jiang, Z.**, Brunner, M., Chartier-Rescan, C., Brandt, A., and Sharma, A. Climate informed non-stationary simulation of daily streamflow – a comparison of three stochastic models, ***EGU General Assembly 2024***, Vienna, Austria, 14–19 Apr 2024, EGU24-10852, https://doi.org/10.5194/egusphere-egu24-10852, 2024.
4. **Jiang, Z.**, Choudhury, D., and Sharma, A. Unlocking the Future of Rainfall: Enhancing Interannual Forecasts with Spectral Transformations of CMIP Decadal Predictions, ***Asia Oceania Geosciences Society (AOGS) 2023***, Oral presentation, Singapore, 31 July-04 August 2023, HS10-A010.
5. **Jiang, Z.**, Kibria, G., and Sharma, A. Enhancing water supply management through improved rainfall anomaly forecasting over medium to long term, ***International Union of Geodesy and Geophysics (IUGG) 2023***, Oral presentation, Berlin, Germany, 12 July 2023, IUGG23-4782.
6. **Jiang, Z.**, Choudhury, D., and Sharma, A. (2023). Could the 2019-20 Australia bushfires or 2020-22 floods be predicted using CMIP decadal prediction? ***EGU General Assembly 2023***, Oral presentation, Vienna, Austria, 24 April 2023.
7. **Jiang, Z.**, Sharma, A., & Johnson F. (2022). Hydrologic forecasting over long lead times: A wavelet-based variance transformation approach, ***Asia Oceania Geosciences Society (AOGS) 2022***, Oral presentation, Online, Singapore, 5 August 2022.
8. **Jiang, Z.**, & Johnson, F. (2022). Applications of the Wavelet-based Method for Postprocessing Rainfall Forecasts – Implications for Urban Flood Forecasting, ***Asia Oceania Geosciences Society (AOGS) 2022***, Oral presentation, Online, 2 August 2022.
9. **Jiang, Z.**, Sharma, A., & Johnson, F. (2021). Advanced wavelet-based variance transformation algorithms for ENSO forecasting over long lead times, 24th International Congress on Modelling and Simulation (***MODSIM 2021***), Oral presentation, Online, Sydney, Australia, 8 December 2021.
10. **Jiang, Z.**, Sharma, A., & Johnson, F. (2020). Hydro-climatological forecasting: A view from the spectral domain. ***AGU Fall Meeting 2020***, Oral presentation, Online, San Francisco, CA, USA, 15 December 2020.
11. Sharma, A., **Jiang, Z.**, and Johnson, F. (2020). Forecasting drought revisited - the importance of spectral transformations to dominant atmospheric predictor variables, ***EGU General Assembly 2020***, Invited talk, Online, 4-8 May 2020, EGU2020-12334.
12. **Jiang, Z.**, Sharma, A., & Johnson, F. (2019). A wavelet-based method to analyse sustained hydrological anomalies under climate change, 23rd International Congress on Modelling and Simulation (***MODSIM 2019***), Oral presentation, Canberra, Australia, 6 December 2019.
13. **Jiang, Z.**, Sharma, A., & Johnson, F. (2019). Drought prediction for improved water resource management: A wavelet-based system prediction approach, Statistical Hydrology (***STAHY 2019***), Oral presentation, Nanjing, Jiangsu, China, 20

October 2019.

BOOK CHAPTERS

1. Raghavan, S. V., **Jiang, Z.**, Hur, J., Liu, J., Nguyen, N. S., & Liong, S.-Y. (2019). ASEAN Food Security under the 2 C-4 C Global Warming Climate Change Scenarios. In V. Anbumozhi, M. Breiling, & V. Reddy (Eds.), Towards a Resilient ASEAN: Disasters, Climate Change, and Food Security: Supporting ASEAN Resilience (Vol. 1, pp. 37-52). Jakarta, Indonesia: Economic Research Institute for ASEAN and East Asia.
2. Kim, D., Sun, Y., Wendi, D., **Jiang, Z.**, Liong, S.-Y., & Gourbesville, P. (2018). Flood modelling framework for Kuching City, Malaysia: overcoming the lack of data. In Advances in Hydroinformatics (pp. 559-568): Springer, Singapore.

COMPUTER SOFTWARE

1. **Jiang Z**, Rashid MM, Johnson F, Sharma A. WASP: Wavelet System Prediction. The Comprehensive R Archive Network; 2021. https://cran.r-project.org/web/packages/WASP/index.html
2. **Jiang Z**. Synthesis: Generate Synthetic Data from Statistical Models. The Comprehensive R Archive Network; 2020. https://cran.r-project.org/web/packages/synthesis/index.html
3. Sharma A, Mehrotra R, Jha S, Li J, **Jiang Z**. NPRED: Predictor Identifier: Nonparametric Prediction. The Comprehensive R Archive Network; 2021. https://cran.r-project.org/web/packages/NPRED/index.html

SERVICE & LEADERSHIP

- Contribute to the First and Second Order Draft of IPCC AR6 (FOD-WGII and SOD-WGI) as a group reviewer
- AOGS2024 Hydrological Sciences (HS) session main convener: Statistical Methods in Assessing Hydroclimate Extremes Under Changing Climate
- International Conference on Hydroinformatics (HIC2024) main convener: SS10 Climate Change Impacts on Urban Flooding: Challenges and Innovative Solutions
- Topic Coordinator for a Special Issue of Frontiers in Marine Science
- Reviewer Editor: Frontiers in Water (Sections: Water and Climate; Water and Hydrocomplexity)
- Reviewer for Scholarly Journals: Journal of Hydrology; Weather and Climate Extremes; Environmental Modelling & Software; Geomatics, Natural Hazards and Risk, Journal of Applied Meteorology and Climatology; International Journal of River Basin Management; Frontiers in Water; Water; Sustainability; International Journal of Environmental Research and Public Health

MEMBERSHIP

- American Geophysical Union (AGU)
- European Geosciences Union (EGU)
- Asia Oceania Geosciences Society (AOGS)
- International Union of Geodesy and Geophysics (IUGG)
- International Association of Hydrological Sciences (IAHS)
- International Commission of Statistical Hydrology (ICSH-IAHS)
- Modeling and Simulation Society of Australia and New Zealand (MSSANZ)

TEACHING & ADVISING EXPERIENCE

- 2025-Present Primary supervisor for two Master by Philosophy students, jointly supervised by Prof. Ashish Sharma
- 2021-2024 Assistant to my advisors for: three Ph.D. students' research (two visiting PhD students) and three master students' thesis.
- 2023-2024 Teaching Assistant: ***Catchment and Water Resources Modelling*** and ***Advanced Water Engineering*** (Prof. Ashish Sharma, UNSW)
- 2023 Instructor: ***Catchment and Water Resources Modelling*** (Prof. Ashish Sharma, UNSW)
- 2021-2022 Assistant to assignment and workshop: ***Catchment and Water Resources Modelling*** and ***Advanced Water Engineering*** (Prof. Ashish Sharma, UNSW)
- 2018-2019 Demonstrator & Grader: ***Fundamentals of Water Engineering*** (Prof. Ashish Sharma, UNSW)
- 2019 Demonstrator: ***Water Resources Engineering*** (A/Prof. Fiona Johnson, UNSW)