

Faisal Baig, PhD (He/Him)

Water Resources | AI in Climate Predictions | Earth Sciences | Agricultural Water Management

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Nationality: Pakistan

Marital Status: Married

Currently based in: UAE (Golden Visa Holder)

Professional Profile

I am a water resources researcher with a PhD in Water Resources Engineering, specialising in hydrology, flood modelling, satellite remote sensing, and machine learning applications in climate and water management. My work focuses on improving precipitation reliability in data-scarce arid regions through satellite product evaluation, bias correction, and GCM-based climate projections, directly supporting flood risk assessment, agricultural water management, and water security decision-making in arid and semi-arid environments. I have published in high-impact journals including Nature Climate Change and Journal of Hydrology, led nationally funded research project, and bring over twelve years of combined research and university teaching experience.

EDUCATION

PhD in Water Resources Engineering – UAE University, UAE (April 2024)

Dissertation: Development of Accurate Gridded Precipitation Data using Machine Learning and Satellite Products for Arid Regions

Supervisor: Prof. Dr. Mohsen Sherif | External Examiner: Prof. Dr. Soroosh Sorooshian, UC Irvine

MSc in Water Resources Engineering – UET Lahore, Pakistan (2012)

Thesis: Numerical Simulation of River and Reservoir Sediments and Environmental Impact

BSc in Agricultural Engineering – University of Agriculture Faisalabad, Pakistan (2008)

RESEARCH EXPERIENCE

Postdoctoral Researcher – National Water and Energy Center, UAE University (2024–Present)

- Lead investigator on a national project for **climate impact assessment using GCM-driven gridded precipitation data**.
- Integrated satellite rainfall (IMERG, CMORPH, GSMaP) with atmospheric parameters (wind fields, humidity, irradiance) to improve spatial precipitation accuracy across the UAE.
- Developed **AI-based bias-correction models for rainfall estimation**, relevant to both hydrology and meteorological forecasting.

- Proposed a collaborative project for the UAE Rain Enhancement Program to the National Center of Meteorology to advance cloud seeding operations, **precipitation monitoring and forecast reliability**.
- Provided consultation on several urban flood risk modelling projects with international companies like ELARD using HEC-HMS, HEC-RAS, SWMM, NAM etc.

PhD Researcher – UAE University (2019–2024)

- Developed a machine-learning based framework to correct bias in satellite precipitation products for accurate hydrological modeling.
- Assisted multi-stakeholder funded projects for various private and public entities on water resources and climate resilience, including watershed modeling of Fujairah Emirate through hydrologic/hydraulic models.

Visiting Researcher – Colorado State University, USA (Feb–Mar 2022)

- Applied **deep-learning techniques for water resources and atmospheric analysis** and bias-correction of satellite precipitation.
- Gained experience with hydro-meteorological datasets (ERA5, GPM, CMIP6, reanalysis fields) for accurate hydrological applications through remote sensing.

Visiting Scholar – Istanbul Technical University, Turkey (July 2021)

- Conducted hands-on training on hydrological modeling applications under changing climate scenarios.

TEACHING EXPERIENCE

Lecturer – Bahaiddin Zakariya University, Pakistan (2008–2020)

- Taught core engineering courses, supervised MSc theses, and developed OBE-aligned curricula.
- Courses included: Fluid Mechanics, Hydrological Modeling; Irrigation Engineering; Open Channel Hydraulics; Numerical Methods; MATLAB for Engineers; Applied Hydrology, AutoCAD, Engineering Drawing

Teaching Diploma – One Year Teaching Academy Program, UAE University (2020)

Trained in modern pedagogical methods, curriculum design, and outcome-based education (OBE)

Teaching Assistant – UAE University

- Served as teaching assistant in various civil engineering subjects from 2020-2024 at UAEU, including Fluid Mechanics, Surveying, Ethics in Engineering, and Water Resources Engineering.

Internship Mentor – Supervised several undergraduate final year internship students from UAE University, and the primary outcomes from the internship programs were journal publications written by UG students.

RESEARCH SKILLS AND TECHNICAL EXPERTISE

- Water Resources
 - Hydrological modelling
 - Flood risk analysis through hydraulic modeling
 - Machine-learning applications in water resources
 - Climate model downscaling and projection of hydroclimatic extremes
 - Data assimilation for numerical weather and climate forecasting
 - Remote Sensing and GIS | Satellite Precipitation Evaluation
 - Machine Learning | Python | MATLAB | R
 - Data Visualization | Uncertainty Analysis | High-Impact Writing
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SELECTED PUBLICATIONS

1. Qamar, M.U., **Faisal Baig***. "Humanitarian blind spots in Western climate change policy and discourse". *Nature Climate Change* (2026). (Top 1% Journal IF=27)
<https://doi.org/10.1038/s41558-026-02613-0>
2. Elkollaly, Mohamed, **Faisal Baig***, Nadeem Iqbal Kajla, Muhammad Abrar Faiz, Haonan Chen, and Mohsen Sherif. "Enhancing satellite-based rainfall estimation in arid regions through AI-driven data fusion." *Journal of Big Data* (2026).
3. Abdelrazaq, Abdulrahman Saeed, Humaid Abdulla Alnuaimi, **Faisal Baig***, Mohamed Elkollaly, and Mohsen Sherif. "Benchmarking MSWEP Precipitation Accuracy in Arid Zones Against Traditional and Satellite Measurements." *Remote Sensing* 18, no. 1 (2025): 95.
4. Elkollaly, Mohamed, Ahmed Sefelnasr, **Faisal Baig**, Bahaa Elboshy, Ahmed El-shafie, Abdel Azim Ebraheem, and Mohsen Sherif. "Harnessing satellite precision: flash flood vulnerability mapping in arid wadis." *Natural Hazards* 121, no. 11 (2025): 12767-12793.
5. Khoso, Waheed Ali, Muhammad Waseem, Muhammad Ashraf Tanoli, and **Faisal Baig***. "Flood risk susceptibility analysis in Larkana district Pakistan using multi criteria decision analysis and geospatial techniques." *Scientific Reports* 15, no. 1 (2025): 13633.
6. **Faisal Baig**, A. Kassem, Md. Zishan, S. Kabeer, M.A. Faiz, M.F. Baig, M. Sherif (2025). Synergies and struggles: Water security and climate action in South Asia's quest for SDG 6 and SDG 13. *Gondwana Research (Top 1% Scopus Journal)*, 21, August 2025.
<https://doi.org/10.1016/j.gr.2025.07.022>

7. **Faisal Baig**, Ali, L., Faiz, M.A., Chen, H., Sherif, M. (2025). From Bias to Accuracy: Transforming Satellite Precipitation Data in Arid Regions with Machine Learning and Topographical Insights. *Journal of Hydrology*, (2025): 132801.
<https://doi.org/10.1016/j.jhydrol.2025.132801>.
8. **Faisal Baig**, Demirel, M. C., Taseer, M. Y. R., Kassem, A., & Sherif, M. (2025). Effect of different likelihood measures on parameter conditioning and model uncertainty. *Stochastic Environmental Research and Risk Assessment*, 1-18.
9. **Faisal Baig**, Mohamed Elkollaly, Nadeem Iqbal, Abrar Faiz, Mohsen Sherif. Harnessing Big Data and AI for Remote Sensing-Based Precipitation Estimation. Under Review in *Journal of Big Data*
10. **Faisal Baig**, Luqman Ali, Abrar Faiz, Haonan Chen, Mohsen Sherif. (2024) "How Accurate are the Machine Learning Models in Improving Monthly Rainfall Prediction in Hyper Arid Environment?". *Journal of Hydrology* Vol. 633, 131040. 10.1016/j.jhydrol.2024.131040.
11. **Faisal Baig**, Muhammad Abrar Faiz, Haonan Chen, and Mohsen Sherif. (2023) "Evaluation of Precipitation Estimates from Remote Sensing and Artificial Neural Network Based Products (PERSIANN) Family in an Arid Region". *Remote Sensing*, March. 15(4), 1078.
12. **Faisal Baig**, Muhammad Abrar Faiz, Haonan Chen, and Mohsen Sherif. (2022) "Rainfall Consistency, Variability, and Concentration over the UAE: Satellite Precipitation Products vs. Rain Gauge Observations". *Remote Sensing*, November. 14(22), 5827
13. Mohsen Sherif, Muhammad Abrar, **Faisal Baig**, Saifudeen Kabeer, "Gulf Cooperation Council countries' water and climate research to strengthen UN's SDGs 6 and 13". *Heliyon*, March, 2023. Volume 9, Issue 3.
14. **Faisal Baig**, Mohsen Sherif, and Muhammad Abrar Faiz. "Quantification of Precipitation and Evapotranspiration Uncertainty in Rainfall-Runoff Modelling". *Hydrology*, (2022). 51, 9(3).

[Full publication list available via google scholar link]

INTERNATIONAL PRESENTATIONS

Attended and presented my research work at

- American Geophysical Union (AGU) 2024, Washington D.C. USA
 - AGU 2023, San Francisco, USA
 - International Precipitation Conference (IPC) 2023, Oklahoma University, USA
 - AGU 2022, Chicago, USA
 - European Geophysical Union (EGU) 2022, Vienna, Austria
 - ADIA Lab Symposium 2025, October 2025 in Abu Dhabi (AI for Climate Sciences Theme).
 - American Meteorological Society (AMS) 106th Annual Meeting. January 2026
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PROFESSIONAL SERVICE AND HONORS

- Reviewer for: npj Climate and Atmospheric Science, Meteorology and Atmospheric Physics, Journal of Hydrology: Regional Studies, Water Resources Management, Remote Sensing, Environmental Development, Journal of Big Data, Scientific Reports,
- President of the Graduate Students' Club at UAEU during 2020-2021.
- Recipient of full travel grant to attend IPC 2023, at Oklahoma University from NSF funds.
- Travel Grant Recipient – EGU 2018

COMMUNITY SERVICES

- Member of Patient and Family Advisory Council at Amana Health Care Abu Dhabi to provide suggestions/feedback to provide best facilities for the physically challenged people in the facility.

RESEARCH GRANTS

- Won the research grant (for my postdoc) titled "Gridded rainfall dataset development for climate change impact assessment using advanced computational techniques for UAE" worth equivalent to 400,000 AED.
- Member of a wider team including UAE University, University of California, Irvine, and Texas A&M University for submission of the preproposal for the "UAE Research Program for Rain Enhancement Science 6th Cycle".
- Submitted a project titled, "Machine Learning-Enhanced Detection and Forecasting of Atmospheric Rivers (ARs) and Extreme Events over Arabian Peninsula using WRF model" for internal funding at UAE University.

LANGUAGES

- Urdu: Native | English: Proficient | Turkish: Intermediate | Arabic: Basic

REFERENCES

- Prof. Dr. Mohsen Sherif, Deputy Vice Chancellor, UAE University Al Ain. msherif@uaeu.ac.ae
- Prof. Dr. Soroosh Sorooshian, Distinguished Professor and Director of the Center for Hydrometeorology and Remote Sensing (CHRS) at the University of California, Irvine (UCI). soroosh@uci.edu
- Prof. Dr. Mehmet Cuneyt Demirel, Department of Civil and Environmental Engineering, Istanbul Technical University, Istanbul, Turkey. demirelmc@itu.edu.tr

- Dr. Haonan Chen, Associate Professor and Director of Artificial Intelligence and Remote Sensing Hub, Colorado State University, FC, CO, USA.

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