Umar Farooq

Terrestrial Ecosystem Modeler

Analytical professional with expertise in modeling and analyzing the terrestrial ecosystem fluxes and applying advanced statistical models for data interpretation. Experienced in crop modeling, land-atmosphere interactions, and data analysis methodologies for large datasets on high-performance computers. Aptitude for learning and implementing modeling frameworks to formulate nature-based solutions to achieve carbon emissions neutrality.

A. Education & Professional Development

Ph.D. Civil Engineering **(2017 - 2022)**
Washington State University, WA, USA

MS Agricultural Engineering **(2013 - 2016)**
University of Agriculture, Faisalabad, Pakistan

BS Agricultural Engineering **(2009 - 2013)**
University of Agriculture, Faisalabad, Pakistan

Trainee Engineer (Internship) **(2013 - 2013)**
Environmental Protection Agency, Faisalabad, Pakistan

B. Professional Experience

Euro-Mediterranean Center on Climate Change (CMCC), Bologna, Italy **(March 2024 – Present)**
Postdoctoral Research Assistant
Implementing bioenergy crops in Land Surface Model to:

- Quantify the climate and Earth system responses to pathways achieving climate neutrality through Carbon Dioxide Removal (CDR) deployment, with and without temperature overshoot.
- Assess the potential role of CDR in reducing net greenhouse gas (GHG) emissions, as well as its potential environmental risks and co-benefits.

University of Agriculture, Faisalabad, Pakistan **(Jan 2023 – Feb 2024)**
Assistant Professor

- Taught nineteen-hour lectures every week coupled with overseeing projects, assignments, and exams.
- Mentored graduate and undergraduate students.
- Collaborated in research projects to update agroecological zones of Pakistan and real-time estimation of crop water requirements and forecast crop yield.

Washington State University, WA USA **(Jan 2017 – Dec 2022)**
Graduate Research Assistant

- Modified land component of the Community Earth System Model (CESM) to simulate surface energy fluxes from global lakes and adjacent land-surfaces at the sub-grid scale.
- Simulated long-term surface energy fluxes from global lakes to analyze the lake evaporation response to climate variability, investigate its environmental controls, and its implications for hydrological cycles.
- Implemented statistical methods to identify the regions where lake surface energy fluxes have large sensitives to climate change and the underlying mechanisms for such sensitivities.

University of Agriculture, Faisalabad, Pakistan **(Oct 2014 – Dec 2016)**
Lecturer

- Directed freshmen & sophomore-level agricultural engineering students as a surface water hydrology lab trainer and taught twenty-hour lectures every week coupled with overseeing projects, assignments, and exams.
- Oversaw various project by mentoring of undergraduate pupils, tutoring various courses.

University of Agriculture, Faisalabad, Pakistan **(Feb 2014 – Sep 2014)**
Research Assistant

- Quantified the changes in hydrological response of Jhelum River Basin using the Soil and Water Assessment Tool (SWAT) under changing climate.

C. Publications

Peer-reviewed Articles

1. Muzammil, M., Zahid, A., **Farooq, U.**, Breuer, L. 2023. Climate change adaption strategies for sustainable water management in the Indus Basin of Pakistan. *Science of The Total Environment, 878 163143*
2. Tayyab, M., Aslam, A. R., **Farooq, U.,** Ali, S., Khan, N, S., Iqbal M., Khan, I., and Saddique, N. 2023. Comparative study of geospatial techniques for interpolating groundwater quality data in agricultural areas of Punjab, Pakistan. *Water MDPI. 16 139*
3. **Farooq, U.,** Liu, H., Zhang, Q., Ma, Y., Wang, J., and Shen, L. 2022. Spatial variability of global lake evaporation regulated by vertical vapor pressure difference. *Environmental Research Letters,* 17 054006

D. Oral & Poster Presentations

- ***Farooq, U.*** *Sustainable Water Management Strategies under Climate Change and Growing Food Demand in Pakistan. In 2023 Pak-China Sino Workshop, Faisalabad (presentation)*
- ***Farooq, U.*** *Water Reuse to Enhance Climate Resilience and Water Productivity in 2023 Bridging the Gap between Agriculture and Sustainable Development, Faisalabe (presentation)*
- **Farooq, U.,** Liu H., and Noor, M. Accelerated global lake evaporation driven by vapor pressure deficit. *In 2022 Graduate School Research Exhibition Washington State University, Pullman WA (poster)*
- **Farooq, U.** and Liu H. Geographic and temporal variations in global lake evaporation. *In 2019 Graduate School Research Exhibition Washington State University, Pullman WA (poster)*
- **Farooq, U.** and Liu H. Geographic and temporal variations in global lake evaporation. *In 2019* AGU Annual Meeting *(poster)*

E. Awards & Honors

- Graduate and Professional Students Research Expo 2021 Award, awarded by Washington State University – **Award**
- David E. Harsch Memorial Endowment Award 2022, awarded by Washington State University– **Award**
- Travel Award to present research findings at the HydroML symposium – 2022 State College, PA, awarded by Pennsylvania State University –**Award**
- High School, BS, & MS Agricultural Engineering – **Merit Scholarship**

F. Teaching & Mentoring Experience

Courses Taught

Environmental Engineering (3 credits) – Fall 2014, 2015, & 2023 | Mechanics of Materials (3 credits) – Spring 2015, 2016 & 2023 | Wastewater Engineering (3 credits) – Fall 2016 | Renewable Energy & Environment (3 credits) – Fall 2016