

Huma Tariq Malik*

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EDUCATION

Ph. D. Soil and Crop Sciences (2019 – Expected Fall 2025)

Colorado State University, USA

Research: Evaluated the impacts of oil and gas produced water irrigation water on soil and crop health.

Master of Environmental Engineering (2016 – 2018)

U.S.-Pakistan Center for Advanced Studies in Water, Pakistan

Research: Characterized the microbiome within biofilms formed in drinking water distribution systems.

Research Training and Exchange Semester (Fall 2017)

University of Utah, USA

Bachelor of Environmental Engineering (2011 – 2015)

National University of Sciences and Technology, Pakistan

Research: Developed Titania embedded cotton cloth for disinfection of drinking water.

PROFESSIONAL EXPERIENCE

Graduate Research Assistant (2022 – Present)

Department of Soil and Crop Sciences, Colorado State University, USA

Skills Acquired: Experimental design, interdisciplinary research, data analysis, scientific writing.

- Designed and led interdisciplinary field and greenhouse studies at the intersection of oil and gas produced water reuse, soil microbiology, soil chemistry, and plant metabolomics.
- Conceptualized and led an interdisciplinary review paper on sustainable agricultural water management with global co-authors.
- Designed and led a precision agriculture field trial assessing the spatial and temporal effects of variable-rate nitrogen application.

Community Coordinator (2022 – 2025)

University Housing, Colorado State University, USA

Skills Acquired: Community engagement and leadership, event planning, cross-cultural communication, conflict resolution, program development.

- Oversaw and provided support for assigned residential community.
- Developed and implemented community programs and events tailored to the needs of diverse international and local residents, including families and individuals across age groups.
- Mediated and resolved conflicts among residents, promoting a respectful and inclusive living environment.

*Previously used the name Huma Tariq in academic and official records (e.g., transcripts, publications)

Graduate Research Assistant (2018)

U.S.-Pakistan Center for Advanced Studies in Water, Pakistan

Skills Acquired: Field sampling, water quality analysis, microbiome analysis, technical writing.

- Conducted field sampling and microbiome analysis related to drinking water quality in water distribution systems.
- Assisted in drafting technical reports and documentation for academic and institutional use.

Junior Professional (2015)

Pakistan Poverty Alleviation Fund, Pakistan

Skills Acquired: Stakeholder communication, program coordination, data reporting, report writing.

- Supported implementation and monitoring of livelihood enhancement projects.
- Assisted in gathering field-level data and preparing project reports, presentations, and documentation for internal and donor communication.

Technical & Analytical Skills

- R (statistics, wrangling, visualization, machine learning)
- GIS and remote sensing (ArcGIS Pro, ENVI)
- Python and SQL
- MZmine and SIRIUS (metabolomics data analysis)
- HYDRUS-1D

AWARDS, HONORS, SCHOLARSHIPS

• Interviewed on CBS News (2025)

Invited to discuss water sustainability challenges and solutions in the United States.

Available at: https://youtu.be/-GT1eu_Snfo

• Fulbright Scholarship (2019-2024)

Received a fully funded, merit-based Ph.D. scholarship from the U.S. Department of State for academic excellence and leadership potential.

• SoGES Sustainability Leadership Fellow (2023-2024)

Selected for and completed a competitive professional development program in science communication and sustainability leadership.

• Water Fellow (2023-2024)

Selected for and completed a competitive program supporting interdisciplinary collaboration and leadership in water-related research and policy.

- **Women in Agribusiness Summit, Nashville, USA (2023)**
Received a competitive scholarship to attend this professional summit focused on advancing women's leadership in agribusiness.
- **Observer, United Nations Water Conference, New York, USA (2023)**
Attended as an observer to follow global discussions on sustainable water management and policy.
- **Climate Reality Leadership Corps, Las Vegas, USA (2022)**
Participated in a leadership training program focused on climate change communication, solutions, and advocacy, led by former U.S. Vice President Al Gore.
- **Best Graduate Award – U.S.-Pakistan Center for Advanced Studies in Water (2019)**
Recognized for outstanding academic performance and overall excellence upon completing the master's degree in Environmental Engineering.
- **USAID Scholarship (2016–2019)**
Received a fully funded, merit-based scholarship to pursue a master's degree in Environmental Engineering.

PUBLICATIONS

- **Malik, H. T., et al.** *Advancing Sustainable Water Use Across the Agricultural Lifecycle in the USA*. *Nat Water* 3, 655–667 (2025). <https://doi.org/10.1038/s44221-025-00450-7>
- **Malik, H. T., et al.** *Biological and Soil Indicators of Environmental Stress in Cropping Systems Irrigated with Produced Water*. *ES&T Water* (2025). <https://pubs.acs.org/doi/10.1021/acsestwater.5c00351>
- Contributed to an evaluation report as required by House Bill 23-1242 titled *Analytical and Toxicological Methods and Evaluation Tools for Produced Water Treatment and Potential Use Outside of the Oilfield*. Colorado Produced Water Consortium (2025).
- Wiltse, M. E., Ballenger, B., Stewart, C.B., Blewett, T.A., Wadler, C., Roth, H.K., Coupannec, M., **Malik, H.T., et al.** *Oil and Gas Produced Water for Cattle, Crops, and Surface Water Discharge: Evaluation of Chemistry, Toxicity and Economics*, *Journal of Hazardous Materials* (2025), 494, 138581. <https://doi.org/10.1016/j.jhazmat.2025.138581>
- Yang, Yushun., Tian, L., Borch, T., **Malik, H.T., et al.** *Safety and Technical Feasibility of Sustainable Reuse of Shale Gas Flowback and Produced Water after Advanced Treatment Aimed at Wheat Irrigation*, *ACS Sustainable Chemistry & Engineering* 10.38 (2022): 12540-12551. <https://doi.org/10.1021/acssuschemeng.2c02170>

- Kori, J. A., Mahar, R. B., Vistro, M. R., **Malik, H.T., et al.** *Metagenomic analysis of drinking water samples collected from treatment plants of Hyderabad City and Mehran University Employees Cooperative Housing Society.* Environmental Science and Pollution Research 26 (2019): 29052-29064. <https://doi.org/10.1007/s11356-019-05859-8>
- Kori, J. A., **Malik, H.T et al.**, *MOLECULAR EVALUATION OF BIOFILMS FORMED ON PIPES OF DIFFERENT MATERIALS DEPICTS CLOSTRIDIUM AND AEROMONAS SPP. DOMINATION.* (2021): 423-439.