Shahzaib Khan

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Personal Website   Email   Personal Email

Education

Ph.D., **University of Washington** *March 2026*

- Civil and Environmental Engineering | Minor in Data Science Option
- Dissertation title: *From Sources to Sinks: Advancing Surface Water Management Through Satellite Remote Sensing*. Link to Defense PPT Slides. (**Defense Completed**, **Degree Conferral: March 2026**)

M.S., **University of Washington** *December 2022*

- Civil and Environmental Engineering
- Thesis title: *Understanding volume estimation uncertainty of lakes and wetlands using satellites and citizen science*. Related paper.

B.Tech (with Honors), **Indian Institute of Technology Gandhinagar** *July 2021*

- Department of Civil Engineering

Honors and Recognition

Appreciation Award

- From *Bangladesh Water Development Board* for training on utilizing SWOT satellite data for water resource management, *News Link* *2023*
- From *NASA* for training early adopters during the *SWOT Early Adopter Virtual Hackathon* at the *University of Washington* *2022*

Fellowship

- *American Water Resources Association (AWRA) Fellowship* *2023*
- Deans List for exceptional performance in academia, *IIT Gandhinagar* *2023*

Peer-Reviewed Publications

1. **S. Khan,** Z. N. Hossain, S. Suresh, and F. Hossain (2025). The Untapped Hydropower Potential of World's Cities, *Earth's Future* (In Review).
2. **S. Khan,** and F. Hossain (2025). (sDRIPS): A Cloud-Based, Open-Source Python Package for Satellite-Informed Surface Water Irrigation Optimization. *Digital Water* (In Review).
3. **S. Khan,** F. Hossain, M. Ahamed, and K. Islam (2025). Satellite Data Rendered Irrigation using Penman-Monteith and SEBAL – sDRIPS for Surface Water Irrigation Optimization, *Hydrology and Earth System Sciences (HESS)* (In Review, preprint - https://doi.org/10.5194/egusphere-2025-4574).
4. **S. Khan,** F. Hossain, et al. (2024). A Network Design Approach for Citizen Science-Satellite Monitoring of Surface Water Volume Changes in Bangladesh, *Environmental Modelling and Software*. https://doi.org/10.1016/j.envsoft.2023.105919.
5. A. M. Gómez, S. Biancamaria, T. Pavelsky, K. Nielsen, G. Parkins, M. Lane, **S. Khan**, F. Hossain, R. Bhattarai, S. Ghafoor, J.F. Crétaux, C. Yanez, N. Picot (2024). Evaluation using In-Situ Observations from National Governments and Citizen Scientists Suggests Nadir Altimeters can Accurately Measure Water Levels Changes Regardless of Lake Area. *GIScience and Remote Sensing*. https://doi.org/10.1080/15481603.2025.2543521.
6. Darkwah, G, F. Hossain, V. Tchervenski, G. Holtgrieve, C. Seaton, D. Graves, S. Minocha, P. Das, **S. Khan**, S. Suresh (2024) Reconstruction of the Hydro-Thermal History of Regulated River Networks Using Satellite Remote Sensing and Data-driven Techniques, *Earth's Future, vol 12(10)*, https://doi.org/10.1029/2024EF004815.
7. Minocha**,** S., F. Hossain, P. Das, S. Suresh**, S. Khan,** G. Darkwah, K. Andreadis, H. Lee, G. Holt, S. Galelli (2023). Reservoir Assessment Tool: A scalable and easy-to-apply python based software architecture to empower the global water community, *Geoscientific Model Development*, https://doi.org/10.5194/gmd-2023-130.
8. S. Suresh, F. Hossain, S. Minocha, P. Das, **S. Khan**, H. Lee, K. Andreadis and Perry Oddo (2023). Satellite-based Tracking of Reservoir Operations for Flood Management during the 2018 Extreme Weather Event in Kerala, India, *Remote Sensing of Environment, vol. 307*, https://doi.org/10.1016/j.rse.2024.114149.

9. Minocha, S., Pei-Hsin Pei, **S. Khan**, and F. Hossain (2023). Factors influencing Lake Surface Temperature for Reservoirs of the Columbia River Basin, *Northwest Science, vol. 97(4)*. https://doi.org/10.3955/046.097.0403

10. **S. Khan,** F. Hossain, et al. (2022) Understanding Volume Estimation Uncertainty of Lakes and Wetlands Using Satellites and Citizen Science, *IEEE JSTARS*. https://doi.org/10.1109/JSTARS.2023.3250354.

11. Das, P., F. Hossain, **S. Khan**, N. K. Biswas, H. Lee, T. Piman, C. Meechaiya, U. Ghimire, K. Hosen (2022) Reservoir Assessment Tool 2.0: Stakeholder driven Improvements to Satellite Remote Sensing based Reservoir Monitoring, *Environmental Modeling and Software*. https://doi.org/10.1016/j.envsoft.2022.105533.

12. **S. Khan,** N. Kamboj, U. Bhatia (2020) Lifeline Infrastructures and Hydro-climate Extremes: A Future Outlook, *Climate Change and Extreme Events*. https://doi.org/10.1016/B978-0-12-822700-8.00004-4.

Conference Presentations

1. **S. Khan;** F. Hossain; B. Davis, E. Roth, Mamadou Ba, M. Ahamed and K. Islam (2025). sDRIPS: A Cloud-Based, Open-Source Python Package for Satellite- Informed Surface Water Irrigation Optimization. *AGU Conference 2025*

2. **S. Khan;** F. Hossain; M. Ahamed (2024). sDRIPS: Satellite Data Rendered Irrigation Using Penman and SEBAL - A Framework For Surface Water Irrigation Optimization. *AGU Conference 2024*

3. **S. Khan;** et al, (2024). sDRIPS-Sense: A Hybrid Framework of Satellite and Sensor-Based Data Rendered Irrigation Using Penman and SEBAL Model. *AGU Conference 2024*.

4. T. Pavelsky, F. Hossain, S. K. Ghafoor, G. Parkins, A. M. Gomez, **S. Khan,** R. Bhattarai and M. Hendrickson (2024). Building a Global Lake Observation System through the Lake Observations by Citizen Scientists and Satellites (LOCSS) Project. *AGU Conference 2024*

5. **S. Khan**; F. Hossain, et al, (2023). An Optimal Network Design Framework for Citizen Science-Satellite Monitoring of Surface Water Volume Changes in Bangladesh. *AGU Conference 2023*

6. A. M. Gomez, T. Pavelsky, G. Parkins, M. Lane, **S. Khan**, F. Hossain, R. Bhattarai, S. K. Ghafoor, J.F. Crétaux (2023). Regional lake monitoring network design aided by Citizen Scientists and Satellites *AGU Conference 2023*.

7. S. Minocha, F. Hossain, P. Das, S. Suresh, **S. Khan**, G. Darkwah (2023). Collaborative Water Management for Advancing Open Science in Regulated River Basins with the Open-Source Reservoir Assessment Tool (RAT) 3.0: A Python Package Integrating Cloud Computing, Satellite Data, and Modeling *AGU Conference 2023*.

8. S. Suresh, F. Hossain, S. Minocha, P. Das, **S. Khan**, H. Lee, K. Andreadis, P. Oddo (2023). Satellite Earth Observations Based Tracking of Reservoir Operations for Flood Preparedness in Mountainous and High Precipitation Regions: A Case of the 2018 Kerala Floods. *AGU Conference 2023*

9. A. M. Gomez, D.R. Arias, T. Pavelsky, G. Parkins, M. Lane, L.D. Donado, **S. Khan**, F. Hossain, W.J.G Ríos, R. Bhattarai, S.K. Ghafoor (2023). Enhancing levels of engagement in citizen science projects involving lake water level monitoring. *AGU Conference 2023*

10. **S. Khan**; F. Hossain; T. Pavelsky, et.al, Investigating Volumetric Uncertainty of Lakes and Wetlands Using Satellites and Citizen Science, American Water Resources Association Annual Conference 2022, Seattle, WA, Nov. 7-9, 2022 *AWRA Conference 2022*

11. A. M. Gomez, S. Biancamaria, T. Pavelsky, G. Parkins, M. Lane, **S. Khan**, F. Hossain, R. Bhattarai, S.K. Ghafoor, J.F. Crétaux, N. Picot (2023). Nadir altimeter validation in small lakes using multisource ground observations. *AGU Conference 2022*

12. **S. Khan**, D. Upadhyay, U. Bhatia, Extreme Precipitation Volatilities and Its Implication for Critical Infrastructures in India, American Meteorological Society (AMS) Conference (15th Symposium on Societal Applications: Policy, Research and Practice) 2020, Boston, MA, Jan. 14-15, 2020. *AMS Conference 2020*

Magazine Articles

1. Das, P., S. Minocha, **S. Khan**, and F. Hossain. How satellites helped debunk 2024 flood myths. In *International Water Power and Dam Construction*, 2025. *Link*

2. F. Hossain, P. Das, G. Brencher, H. Conroy, G. Darkwah, A. McCall, S. Minocha, G. Schelepp, S. Yao, **S. Khan**, A satellite remote sensing perspective on water resources. In *International Water Power and Dam Construction*, 2023. *Link*

3. P. Das, F. Hossain, H. B. Helgason, and **S. Khan**. Satellites over the amazon capture the choking of the 'house of god' by the belo monte dam – they can help find solutions, too. In *The Conversation*, 2022. *Link*

Textbooks

1. Contributed tutorials and exercises to the textbook - Hossain, F. (2025). Satellite Remote Sensing for Water Management, *Cambridge: Cambridge University Press*. https://doi.org/10.1017/9781009453509

Journal Peer Review Activity

Geophysical Research Letters (2)	Environmental Modelling and Software (1)	Earth and Space Science (1)
Scientific Reports (1)	Earth Science Informatics (1)	Discover Geoscience (1)

Research Experience

Graduate Research Assistant at the **University of Washington**, Seattle, WA

September 2021 – Present

- **Irrigation advisories** – Conducted applied research on satellite-informed irrigation decision support, developing weekly irrigation advisories for farmers and canal operators. Integrated in situ sensors and local weather station data (when available) to bias-correct global weather model and satellite observations, improving evapotranspiration estimates. Tool for public use (with link) - sDRIPS, sDRIPS-Sense
- **Canal water allocation framework** – Developed a satellite-based canal water allocation methodology to help canal operators allocate water more efficiently based on crop water demand and actual field conditions, supporting climate-change adaptation in agricultural water management. Tool for public use (with link) - sDRIPS-TBP
- **Scalable gauge network framework** – Designed an open-source framework integrating citizen science with current and future satellite observations to optimize gauge placement in lakes and wetlands, enhancing monitoring of regional surface water storage in ungauged water bodies. Framework on GitHub
- **Uncertainty in volumetric estimates** – Investigated uncertainties in lake volume change estimates, focusing on variability introduced by radar- and optical-based water surface detection methods, while leveraging citizen science elevation data.

Summer Intern at **Jet Propulsion Laboratory**, **NASA**, Pasadena CA

July 2025 – September 2025

- Investigated PODAAC's SWOT On-Demand Raster Generation tool for generating customized spatial-resolution rasters and developed a Python-based framework to streamline data requests and processing. Framework on GitHub - SWODLR-Python

Teaching Experience

Teaching Assistant   *2024, 2025*

- Taught Google Earth Engine (GEE) in *Satellite Remote Sensing for Water Resources* class at the *University of Washington,* with a focus on the Python API for quantifying satellite-based precipitation and evapotranspiration.

Guest Lecturer

- *Environmental and Water Program Seminar, University of Washington's Civil and Environmental Engineering Department* – Delivered a lecture on utilizing satellite remote sensing to optimize surface water irrigation.   *2024*
- Led tutorial class for *Satellite Remote Sensing for Water Resources* on estimating evapotranspiration through satellite data.   *2023*

Mentor   *2025*

- Supervised and taught the basics of geospatial data analysis and QGIS software to a high school student.

Trainer

- Trained 25 participants on '*Remote sensing based surface water tracking, citizen science, Cloud Computing and the Surface Water and Ocean Topography (SWOT) Mission*' (Dhaka, Bangladesh).   *2023*
- Trained the engineers of *the Department of Agricultural Extension, Bangladesh,* on the use of the *Integrated Rice Advisory System (IRAS)* for irrigation advisory dissemination.   *2023*
- Trainer at *3rd SWOT Early Adopter Virtual Hackathon*, organized by *NASA, CNES, and the University of Washington.*   *2022*
- Trained engineers from *the Department of Hydrology and Meteorology, Nepal,* on *Utilizing Satellite Remote Sensing Data to Monitor Lakes*.   *2022*

Leadership & Engagement

American Water Resources Association (AWRA), University of Washington Chapter   *2023*
- Revived the student chapter post-COVID-19, fostering community and engagement in water resources.

Class Representative, Indian Institute of Technology Gandhinagar   *2019, 2020*
- Represented peers in academic and administrative discussions, serving as the primary liaison between students and faculty

Stakeholders Engagement

Collaborated with government agencies and private sector partners to co-develop science-informed decision-support tools. Engagement activities included code sharing, technical feedback, and capacity-building training sessions to enhance operational adoption of research outputs.

- **Bangladesh Water Development Board** (A government agency that is responsible for water management in Bangladesh).   *January 2022 - Present*
- **Department of Agricultural Extension** (A government agency in Bangladesh that provides extension services to the farmers in accessing and utilizing better know-how to increase profitable crop production).   *January 2023 – Present*
- **Crown Farms** (A private farm in South Africa)   *April 2024 – September 2025*
- **University of Washington Landscape Workers**   *January 2024 - March 2025*
- **Pakistan Council of Research in Water Resources** (A government agency that is responsible for water management in Pakistan).   *January 2022 - April 2022*

Other Tools Developed

1. SWOT Raster Visualizer – A visualization tool for SWOT raster products to monitor water surface elevation. Applied during the 2024 Tripura (India) floods.
2. IRAS – Provides weekly irrigation advisories for rice cultivation in Northeastern and Northwestern Bangladesh. The advisories are disseminated by the Department of Agricultural Extension to hundreds of thousands of farmers, supporting large-scale water management and food security.
3. PyWRIS – A Python API for streamlined data access to India's Water Resources Information System (WRIS).
4. Barind, Haors – Satellite based surface water availability in the Northeastern and Northwestern parts of Bangladesh respectively.
5. A detailed document on ReadtheDocs – Documentation for a satellite-driven irrigation advisory system, improving usability, reproducibility, and stakeholder adoption.

Media Highlights

- sDRIPS-Sense work featured in *University of Washington News*, *News Link*   *2024*
- IRAS system featured in *NASA* article, *News Link*   *2023*

Skills & Interests

Cloud computing and programming: Google Earth Engine, Python, MATLAB, Bash, HTML, Javascript

Software: ArcGIS, QGIS, Git, Figma

Society Affiliations: Student Member at the American Geological Union (AGU) and the American Water Resources Associations (AWRA)

References Available Upon Request

Dr. Faisal Hossain (fhossain@uw.edu) - University of Washington

Dr. Tamlin Pavelsky (pavelsky@email.unc.edu) - University of North Carolina

Edward Armstrong (edward.m.armstrong@jpl.nasa.gov) - Jet Propulsion Laboratory, NASA

Karen Yuen (karen.yuen@jpl.nasa.gov) - Jet Propulsion Laboratory, NASA