

# Shahzaib Khan

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## Education

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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

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### 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

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1. **S. Khan**, Y. O. Wang, G. Darkwah, F. Hossain (2026). When the Cloud Warms the River: A Call for Monitoring Data Center Impacts in the Age of AI, *AGU Advances* (In Review).
2. **S. Khan**, Z. N. Hossain, S. Suresh, F. Hossain (2025). The Untapped Hydropower Potential of World's Cities, *Earth's Future* (In Review).
3. **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).
4. **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>).
5. **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>.
6. 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>.
7. 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>.
8. 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>.

9. 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>.
10. 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>
11. **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>.
12. 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>.
13. **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

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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. Crétau (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. Crétau, 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 (15<sup>th</sup> Symposium on Societal Applications: Policy, Research and Practice) 2020, Boston, MA, Jan. 14-15, 2020. *AMS Conference 2020*

## Magazine Articles

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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

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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

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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

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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

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**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 *3<sup>rd</sup> 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

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### 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

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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

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- sDRIPS-Sense work featured in *University of Washington News*, [News Link](#) 2024
- IRAS system featured in *NASA* article, [News Link](#) 2023

## Skills & Interests

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**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

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Dr. Faisal Hossain ([fhossain@uw.edu](mailto:fhossain@uw.edu)) - University of Washington

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

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

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