Nishan Kumar Biswas
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Area of Expertise

- Satellite remote sensing application in water resources and hydro-climatic disaster management
- Open science and cloud computing applications in large-scale hydrology
- Scientific visualization and geospatial big data analysis

Experience

Assistant Research Engineer (December 2021-Present)
Goddard Earth Sciences Technology and Research II, University of Maryland Baltimore County
Hydrological Sciences Laboratory, NASA Goddard Space Flight Center

- NASA WaterView team member, leading hydrologic fluxes and streamflow estimation using hyper-resolution land-surface modeling and data assimilation of satellite information for the North America Domain (NLDAS3) and Global Domain (HydroGlobe) .
- NASA EIS team member, co-leading the quantification of hydrological changes in coastal regions worldwide due to climate change and human activities.
- Land Information System (LIS) team member of NASA Integrated Digital Earth Analysis System (IDEAS), an Earth System Digital Twin Architecture funded by the Advanced Information Systems Technology program of NASA's Earth Science Technology Office.

Associate Scientist (February 2021 – November 2021)
Goddard Earth Sciences Technology and Research II, Universitires Space Research Association
Hydrological Sciences Laboratory, NASA Goddard Space Flight Center

- Lead developer of Google Cloud Platform based Landslide Hazard Assessment model for Situational Awareness (LHASA-Mekong) and LHASA-Mekong forecast for the Lower Mekong Region of South-East Asia. Leading to migrate landslide hazard monitoring system to the advanced computational infrastructure (i.e. Google Earth Engine, Google Cloud Platform).

Graduate Research Assistant (December 2015 - February 2021)
Department of Civil Engineering (SASWE Research Group), University of Washington

- A Global Reservoir Assessment Tool (RAT) was developed to monitor the operating pattern of 1600 reservoirs solely based on satellite observations, which showed an accuracy of more than 75%.
- A Dynamic River Width based Altimeter Height Visualizer was developed to generate near-real-time river stages of 210 virtual stations over South and South-East Asia. News link of JPL, NASA
- A skillful and computationally efficient flash flood forecasting system developed for the northeastern region of Bangladesh which has been used operationally to minimize flood risk and damage.
- World's first operational transboundary reservoir monitoring system was developed for Mekong and Red River Basins to monitor upstream dams using EO data with a promising accuracy. EOS news link
- A web analytics based real-time correction system was implemented for satellite-based precipitation over the South and South-East Asia river basins which showed a significant improvement in prediction.
- A scalable and operational web interface South Asian Surface Water Modelling System was developed which connects complex back-end models with user-friendly front-end. Earth Sciences News of NASA

Student Intern (June 2017- September 2017)
Hydrological Sciences Laboratory, Goddard Space Flight Center, NASA

- An interactive web based dynamic framework LIS-ATLAS was developed to visualize Land Information System (LIS) Model outputs and quantitative evaluations of model predictions.

Junior Engineer (July 2013 – December 2015)
Flood Management Division, Institute of Water Modelling (IWM), Dhaka, Bangladesh

- A vertically integrated and automated system were designed, developed, and implemented for an operational flood prediction and inundation mapping for 160 million people of Bangladesh.

- More than 6 hydrological-hydrodynamic models were developed, calibrated, and validated using state of the art tools and software for river stage and flow prediction and water resources management.

Education

PhD in Civil and Environmental Engineering (June 2017 – February 2021)
University of Washington, Seattle, WA, USA
Thesis: Mainstreaming multi-mission satellite observations in advancing operational water management
MSc in Civil and Environmental Engineering (January 2016 – June 2017)
University of Washington, Seattle, WA, USA
BSc in Water Resources Engineering (January 2008 – February 2013)
Bangladesh University of Engineering and Technology (BUET), Dhaka, Bangladesh

Awards and Honors

- NASA HBG Annual Peer Award for Science/Technical Support (2022), NASA GSFC
- Career journey highlighted in Early Career Scientist Spotlight (2022), NASA GSFC
- NASA Certificate of Appreciation (2021), SWOT Early Adopter Virtual Hackathon
- NASA Certificate of Appreciation (2020), SWOT Early Adopter Virtual Hackathon
- Appreciation Award (2020) for flash flood forecasting, Bangladesh Water Development Board
- Public Messaging and Engagement Award (2019), UW Student Film Contest 2019
- Co-organizer of Engineering Discovery Days (2016-2018), University of Washington
- Ivanhoe Fellowship (2017), University of Washington
- Ivanhoe Fellowship (2016), University of Washington
- Engineers Stipend (2011), Bangladesh University of Engineering and Technology
- Higher Secondary School Examination Scholarship (2007), Government of Bangladesh

Peer reviewed publications

1. Rashid, M. M., Ahmed, R.U., **Biswas, N.K.**, Sharma, S. (2025). Mapping probabilistic flood hazard and its uncertainty from satellite imagery and digital elevation model. Earth Systems and Environment (submitted)
2. **Biswas, N.K.**, Kumar, S.V., Nie, W. (2025). Quantitative analysis of the impact of drought on reservoir operations at the Global Scale. (ready for submission)
3. **Biswas, N.K.**, Laverde, M., Stanley, T.A., Kirschbaum, D.B., Amatya, P.M., Meechaiya, C. (2025). Dynamic and near-real-time Landslide forecasting for the Lower Mekong Region (in preparation)
4. Rothee, S.R., **Biswas, N.K.,** Sharma, S., Le, M.H. (2025). Analysis of Land Surface Temperature and Vegetation Trends in Lower Mekong Delta Cities. Discover Geosciences (accepted)
5. Besnier, J., Getirana, A., **Biswas, N.K.**, Lakshmi, V. (2025). Using GRACE TWS to inform reservoir height in the Parana River Basin. Journal of Hydrology (in review).
6. Getirana, A., **Biswas, N.K.**, Kumar, S.V., Nie, W., Ahmad, S.K., Maina, F., Sakib, N., Hossain, M.S., Biswas, R. (2024). Deltaic freshwater scarcity driven by unsustainable groundwater-fed irrigation. Nat Sustain (2025). https://doi.org/10.1038/s41893-025-01566-0
7. Huang, T., Chung, N. T., David, C. H., Hasheminassab, S., Kalashnikova, O. V., Perez, S., **Biswas, N.K.**, & Rodriguez-Suquet, R. (2024, July). Open-Source Framework for Earth System Digital Twins. In IGARSS 2024-2024 IEEE International Geoscience and Remote Sensing Symposium (pp. 2323-2327). IEEE. https://doi.org/10.1109/IGARSS53475.2024.10642313
8. Biswas, N. K. (2024). Reservoirs. In World Meteorological Organization (Ed.). State of Global Water Resources report 2023 (WMO-No. 1362). https://library.wmo.int/idurl/4/69033
9. Lahmers, T., Kumar, S.V., Ahmad, S.K. **Biswas, N.K.** et al. (2024). Modeling the impacts of fire induced soil hydrophobicity and vegetation disturbances on hydrologic response in the western US. Water Resources Research (accepted).

10. Khadim, F. K., Getirana, A., Bindlish, R., Biswas, N.K., Nie, W., Lahmers, T. M., & Kumar, S. V. (2024). Continental freshwater discharge influences sea surface salinity variability near world's megadeltas. Proceedings of the National Academy of Sciences, 121(49), e2412551121. https://doi.org/10.1073/pnas.2412551121
11. Rahat, S. H., Saki, S., Khaira, U., Biswas, N. K., Dollan, I. J., Wasti, A., ... & Ray, P. (2024). Bracing for impact: how shifting precipitation extremes may influence physical climate risks in an uncertain future. Scientific Reports, 14(1), 17398. https://doi.org/10.1038/s41598-024-65618-9
12. Maina, F. Z., Getirana, A., Kumar, S. V., Saharia, M., **Biswas, N. K.**, McLarty, S., & Appana, R. (2024). Irrigation-driven groundwater depletion in the Ganges-Brahmaputra basin decreases the streamflow in the Bay of Bengal. Communications Earth & Environment, 5(1), 169. https://doi.org/10.1038/s43247-024-01348-0
13. Getirana, A., **Biswas, N. K.**, Qureshi, A. S., Rajib, A., Kumar, S., Rahman, M., & Biswas, R. K. (2022). Avert Bangladesh's looming water crisis through open science and better data. https://doi.org/10.1038/d41586-022-03373-5
14. **Biswas, N.K.**, Stanley, T.A., Kirschbaum, D.B., Amatya, P.M., Meechaiya, C., Poortinga, A. and Towashiraporn, P. (2022). A dynamic landslide hazard monitoring framework for the Lower Mekong Region. Front. Earth Sci. 10:1057796. https://doi.org/10.3389/feart.2022.1057796
15. Das, P., Hossain, F., Khan, S., **Biswas, N.K.**, Lee, H., Piman, T., Meechaiya, C., Ghimire, U., Hosen, K. (2022). Reservoir Assessment Tool 2.0: Stakeholder driven Improvements to Satellite Remote Sensing based Reservoir Monitoring, Environmental Modeling and Software, vol. 157. https://doi.org/10.1016/j.envsoft.2022.105533.
16. Du, T.L.T, Lee, H., Bui, D.D., Graham, P., Pechlivanidis, I.G., Darby, S.D., Leyland, J., **Biswas, N.K.**, Choi, G., Batelaan, O., Bui, T.T.P., Tran, T.V., Nguyen, H.T. (2022). Streamflow prediction in highly regulated, transboundary watersheds using multi-basin modelling and remote sensing imagery, Water Resources Research, 58, e2021WR031191. https://doi.org/10.1029/2021WR031191
17. Hossain, F., Ahmed, T., Hoque, B.A., Khanam, S., **Biswas, N.K.**, Khan, M. S. K., and Katagami, M. (2022) Impact Evaluation of an Operational Satellite-based Integrated Rice Advisory System in Northeastern Bangladesh, Agricultural Water Management. Vol. 9 (1), pp. 001-011.
18. **Biswas, N. K.** and Hossain, F. (2021) A Multi-decadal Analysis of Reservoir Storage Change in Developing Regions, Journal of Hydrometeorology, 23, 1, 71-85. https://doi.org/10.1175/JHM-D-21-0053.1
19. Bose, I., Jayasinghe, S., Meechaiya, C., Ahmad, S. K., **Biswas, N**.K., & Hossain, F. (2021). Developing a Baseline Characterization of River Bathymetry and Time-Varying Height for Chindwin River in Myanmar Using SRTM and Landsat Data. Journal of Hydrologic Engineering, 26(11), 05021030. https://doi.org/10.1061/(ASCE)HE.1943-5584.0002126
20. **Biswas, N. K.,** Hossain, F., Bonnema, M., Lee, H., & Chishtie, F. (2021). Towards a global Reservoir Assessment Tool for predicting hydrologic impacts and operating patterns of existing and planned reservoirs. Environmental Modelling & Software, 140, 105043. https://doi.org/10.1016/j.envsoft.2021.105043
21. Bose, I., Hossain, F., Eldardiry, H., Ahmad, S., **Biswas, N. K.**, Bhatti, A. Z., ... & Kamal Khan, M. S. (2021). Integrating Gravimetry Data with Thermal Infra-Red Data from Satellites to Improve Efficiency of Operational Irrigation Advisory in South Asia. Water Resources Research, 57(4), e2020WR028654. https://doi.org/10.1029/2020WR028654
22. Beveridge, C., Hossain, F., Biswas, R. K., Haque, A. A., Ahmad, S. K., **Biswas, N. K**., ... & Bhuyan, M. A. (2020). Stakeholder-driven development of a cloud-based, satellite remote sensing tool to monitor suspended sediment concentrations in major Bangladesh rivers. Environmental Modelling & Software, 133, 104843. https://doi.org/10.1016/j.envsoft.2020.104843

23. Bhuiyan, M. A. E., Yang, F., **Biswas, N. K**., Rahat, S. H., & Neelam, T. J. (2020). Machine learning-based error modeling to improve GPM IMERG precipitation product over the brahmaputra river basin. Forecasting, 2(3), 248-266. https://doi.org/10.3390/forecast2030014
24. **Biswas, N. K.**, Hossain, F., Bonnema, M., Aminul Haque, A. M., Biswas, R. K., Bhuyan, A., & Hossain, A. (2020). A computationally efficient flash flood early warning system for a mountainous and transboundary river basin in Bangladesh. Journal of Hydroinformatics, 22(6), 1672-1692. https://doi.org/10.2166/hydro.2020.202
25. Hossain, F., Bonnema, M., **Biswas, N.**, Ahmad, S., Duong, B., & Luong, N. D. (2019). When floods cross borders, satellite data can help, Eos, 100. https://doi.org/10.1029/2019EO115775.
26. **Biswas, N. K.,** Hossain, F., Bonnema, M., Okeowo, M. A., & Lee, H. (2019). An altimeter height extraction technique for dynamically changing rivers of South and South-East Asia. Remote Sensing of Environment, 221, 24-37. https://doi.org/10.1016/j.rse.2018.10.033
27. Hossain, F., Sikder, S., **Biswas, N.,** Bonnema, M., Lee, H., Luong, N. D., ... & Long, D. (2017). Predicting water availability of the regulated Mekong river basin using satellite observations and a physical model. Asian Journal of Water, Environment and Pollution, 14(3), 39-48. https://doi.org/10.3233/AJW-170024
28. Hossain, F., **Biswas, N. K.**, Ashraf, M., & Bhatti, A. (2017). Growing More with Less Using Cell Phones and Satellite Data. Eos. https://doi.org/10.1029/2017eo075143
29. **Biswas, N. K.**, & Hossain, F. (2017). A scalable open-source web-analytic framework to improve satellite-based operational water management in developing countries. Journal of Hydroinformatics, 20(1), 49-68. https://doi.org/10.2166/hydro.2017.073

Google scholar link: https://scholar.google.com/citations?user=e0y35q0AAAAJ&hl=en
ResearchGate Profile: https://www.researchgate.net/profile/Nishan-Kumar-Biswas

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Conference Proceedings and non-peer reviewed journals

1. Lahmers, T., Kumar, S.V., Ahmad, S.K. **Biswas, N.K.** et al. (2024). An observation-driven framework for modeling post-fire hydrologic response: evaluation for two central California case studies. AGUFM, H12H-06.
2. Tasnia, N., Pritha, Z.K., Das, U., Khatun, F., **Biswas, N.K.**, Rouf, T., Jahan, N., Zobeyer, H. (2024). Spatiotemporal Variability Analysis of Precipitation and Surface Water Extent in Bangladesh using Google Earth Engine: Implications for Flood Risk Management. AGUFM 2024.
3. **Biswas, N. K.**, Stanley, T. A., Kirschbaum, D.B., Laverde, M., and Towashiraporn, P. (2024). Unravelling the role of global and downscaled rainfall forecasts in landslide hazard prediction over the Lower Mekong Region. AGUFM 2024.
4. Khatun, F., Das, U., Pritha, Z.K., Tasnia, N., **Biswas, N.K.**, Rouf, T., Jahan, N., Zobeyer, H. (2024). Spatiotemporal Variability Analysis of Evapotranspiration and Soil Moisture in Relation to Agriculture in Bangladesh. AGUFM 2024.
5. Chung, N.G., David, C.H., Huang, T., **Biswas, N.K.** et al. (2024). Open-Source Framework for Earth System Digital Twins. IN51E-2410. AGUFM 2024.
6. Rothee, S.R., **Biswas, N.K.** (2024) Analysis of Land Surface Temperature and Vegetation Trends in Lower Mekong Delta Cities. AGUFM 2024.
7. **Biswas, N. K.**, Kumar, S. V. (2024). A global quantification of the response of reservoir storage changes to droughts. H53N-1298. AGUFM 2024.
8. Schmitt, R. **Biswas, N.K.** (2024). Using Ocean Salinity and Machine Learning for Improved Seasonal and Sub-Seasonal Forecasts of Soil Moisture and Streamflow. WaterSciCon24 by AGU and CUAHSI. St. Paul, Minn., 24-27 June 2024.
9. Maina, F. Z., Getirana, A., Kumar, S. V., Saharia, M., **Biswas, N. K.**, Richey, A. S., & Appana, R. (2024, February). Bay of Benghal's responses to groundwater withdrawals in the Ganges-Brahmaputra basin. In Chapman Conference on Remote Sensing of the Water Cycle. AGU.

10. Huang, T., Bull, M., David, C.H., **Biswas, N.K.** et al. (2023). An Open-Source Framework for Federation of Earth System Digital Twins. AGUFM 2023.
11. Besnier, J., Getirana, A., **Biswas, N.K.**, Lakshmi, V. (2023). Using GRACE TWS to inform reservoir height in the Parana River Basin. AGUFM 2023.
12. Getirana, A., **Biswas, N.K.**, Kumar, S.V. (2023).Climate and human impacts on hydrological processes and flood risk in the Bay of Bengal. AGUFM 2023.
13. Patel, K., Rajib, A., **Biswas, N.K.** (2023). Developing an efficient globally applicable flood mapping framework using SWAT and HAND. AGUFM 2023.
14. **Biswas, N.K.**, Getirana, A., Sakib, N., Kumar, S.V., Nie, W., Rahman, K.S., Biswas, R.K. (2023). Satellite remote sensing observation based groundwater monitoring over Bangladesh. AGUFM 2023.
15. Felikson, D., Shiklomanov, A., **Biswas, N.K. et al. (2023).** Creating an open-source science ecosystem and culture for NASA's Earth Information System. AGUFM.
16. **Biswas, N.K.**, Laverde, M., Stanley, T., Amatya, P.M., Kirschbaum, D. (2023). Dynamic landslide hazard forecasting over the Lower Mekong Region using global forecasting precipitation products. AGUFM.
17. Lahmers, T., Kumar, S.V., Ahmad, S.K. **Biswas, N.K.** et al. (2023). Modeling the impacts of fire induced soil hydrophobicity and vegetation disturbances on hydrologic response in the western US. AGUFM.
18. Besnier, J., Getirana, A., Biswas, N.K., Lakshmi, V. (2023). Satellite gravimetry helps monitor the operation of large reservoirs. EGU23, the 25th EGU General Assembly, Vienna, Austria.
19. **Biswas, N.K.**, Laverde, M., Stanley, T.A., Kirschbaum, D.B., Amatya, P.M., Meechaiya, C. (2023). A near-real-time and dynamic landslide hazard forecasting framework for the Lower Mekong Region. 6th World Landslide Forum, November 2023 in Florence, Italy.
20. **Biswas, N. K**., Getirana, A., Kumar, S. (2022). Understanding the stress on water resources due to climate change and human activities in Bangladesh using satellite observations. AGUFM, H52L-0621
21. **Biswas, N. K.**, Stanley, T. A., Amatya, P. M., Kirschbaum, D.B., Meechaiya, C., Laverde, M., and Towashiraporn, P. (2022). A dynamic Landslide hazard forecasting Framework for the Lower Mekong Region. AGUFM, GC15G-0523.
22. Kirschbaum, D., Stanley, T., Khan, S., **Biswas, N.K.**, Emberson, R., Orland, E. (2022). Investigating the potential of forecast products to inform extreme event analysis and multi-scale landslide hazard assessment. AGUFM, A52F-04.
23. Stanley, T., Kirschbaum, D., Amatya, P.M., **Biswas, N.K.**, Emberson, R., Orland, E., Soobitsky, R. (2022) Advancing landslide hazard assessment around the world, AGUFM, NH15B-08
24. Dandridge, C., Stanley, T., **Biswas**, **N.K.**, Lakshmi, V., Kirschbaum, D. (2022). Evaluation of Satellite-Based Soil Moisture Products using the Landslide Hazard Assessment for Situational Awareness (LHASA) Model for Landslide Prediction and Hazard Analysis in the Lower Mekong River Basin. AGUFM, H42G-1378
25. Huang, T., David, C.H., Kang, J., Marlis, K.M., Milosevich, M., Perez, S., Phyo, W., Oaida, C.M., Roberts, J., Wronkiewicz, M., Kumar, S.V., **Biswas, N.K.**, Stackhouse, P.W., Borges, D., Broddle, M., Macpherson, B., Baillarin, S., Blanchet, G., Bretar, F., Kettig, P., Rodriguez, R., Ricci, S.M., Piacentini, A., Nguyen, T.H., Valladeau, G., Poisson, J.C., Froidevaux, A., Raynal, R., Huynh, T. (2022). A Multi-Agency Collaboration Digital Twin for Flood Prediction and Analysis. AGUFM, IN35D-0423
26. **Biswas** et al. (2021). Development of a dynamic landslide hazard awareness system for the Lower Mekong Region. AGUFM, 2021
27. **Biswas, N. K.**, & Hossain, F. (2020). A Global Reservoir Assessment Tool for Predicting Hydrologic Impact and Operating Pattern of Existing and Planned Reservoirs. In AGU Fall Meeting 2020. AGU.
28. **Biswas, N. K.**, & Hossain, F. (2018). A Satellite Observations and Numerical Modelling Based Integrated Flash Flood Forecasting System for North-East Region of Bangladesh. AGUFM, H41I-2162.
29. **Biswas, N. K.**, & Hossain, F. (2016). Design and Performance Analysis of a Real-time Correction Application to the IMERG Estimated Precipitation in Ganges-Brahmaputra Basin, AMSFM 2016

30. **Biswas, N. K.**, Paul, M., & Haider, M.R. (2015). Calibration and Sensitivity Analysis of a Hydrological Model for Jamunesswari River Basin of Bangladesh, Journal of Civil Engineering and Environmental Technology, ISSN: 2349-879X; 2 (2), 200-205.
31. **Biswas, N.K.** & Ahammed, M. (2014). Application of CCHE2D Mathematical Model in the Gorai Offtake for Two-Dimensional simulation, International Journal of Surface and Groundwater Management (IJSGWM), 1(1), 52-58. Rahman, M.M.,
32. Rahman, M.M., **Biswas, N.K.**, & Jubair, S. (2014). Sustainability of an artificial dredged channel along the braided Jamuna River of Bangladesh, Journal of River Research Institute, 12(2), 59-67
33. Hossain, S., Pramanik, S., Kafi, A. H., **Biswas, N.K.** (2014). Application of mathematical models to improve flood control, drainage, and irrigation facilities Shariatpur district, Bangladesh. 5th International Conference on Water & Flood Management, 6-8 March 2015, IWFM, BUET, Dhaka, Bangladesh

Technical, Modelling, & Visualization Competency

Cloud computing and programming: Google Cloud & Earth Engine, Python, C#, MATLAB, Bash
Hydro Modelling: LIS, VIC, MIKE by DHI, HEC-RAS, HEC-HMS, CCHE 2D
Data & ML: NCO, Xarray, Pandas, GeoPandas, Rasterio, Scipy, Seaborn, Tigramite, XGBoost
GIS & Database: ArcGIS, ArcPy, QGIS, GDAL, ENVI, Microsoft SQL Server Express, SQLite
Web and Visualization: HTML, CSS, JavaScript, WordPress, D3.js, Leaflet.js, Highcharts.js

Workshops, Forums

- Participated and presented a talk as a keynote speaker on flooding in Bangladesh: A satellite perspective in the special webinar: Bangladesh Recent Floods, Causes, Consequences, and Countermeasures organized by Bangladesh Environment Network on August 31st, 2024.
- Participated and presented a talk on global quantification of the response of reservoir storage changes to droughts at the NASA Early Career Scientist Forum 2024, NASA Goddard Space Flight Center.
- Attended as a subject matter expert in an invited workshop on Agricultural Water Productivity Assessment in Coastal Bangladesh organized by Radcliffe Institute of Harvard University. This workshop is focused on applying satellite remote sensing data to gather weather information to assess irrigation water requirements which will be essential to support solutions to reduce agriculture productivity gaps and build resilience for the food-water nexus across the country.
- Participated and presented a talk on satellite remote sensing based groundwater monitoring in Bangladesh at the NASA Early Career Scientist Forum 2023, NASA Goddard Space Flight Center.
- Presented a talk on understanding the stresses on freshwater resources in Ganges Delta due to climate change and human impact using satellite observations in 11th conference on International Perspective on Water Resources and the Environment jointly organized by Environmental & Water Resources Institute, American Society of Civil Engineers and Institute of Water and Flood Management, Bangladesh University of Engineering and Technology, Dhaka, Bangladesh on January 4-6, 2023.
- Participated and presented a talk on understanding the stresses on freshwater resources in Ganges Delta due to climate change and human impact using satellite observations in Early Career Scientist Forum 2022 (Hybrid), NASA Goddard Space Flight Center.
- Participated in a courtesy visit and discussion between the Department of Mineral Resources (DMR), Thailand, the Asian Disaster Preparedness Center (ADPC), Thailand, and the National Aeronautics and Space Administration (NASA). Led a deep dive discussion on final handover of LHASA to SERVIR-Mekong and end users, future of forecasting of landslide hazard in the Lower Mekong Region and potential future collaboration between NASA and regional agencies on 26-28th September, 2022.
- Participated in the NASA SERVIR Applied Sciences Team Science Exchange, held in Huntsville, AL, from May 10-12, 2022. The event was geared toward exploring innovations in the use of Earth observation information to address global development challenges. UMBC news link
- Hacker and helper of SWOT Virtual Early Adopter Hackathon (2021), organized by NASA and the University of Washington to build deeper engagement with SWOT Early Adopters.

- Invited speaker on Data Science and Cloud Computing application in Remote Sensing (2020), Sensing River 2020 Workshop organized at University of Washington.
- Presenter, helper, and hacker of SWOT Virtual Early Adopter Hackathon (2020), organized by NASA and the University of Washington to build deeper engagement with SWOT Early Adopters.
- Summer school participant (2019) on using Satellite Observations to Advance Climate Models, organized by Center for Climate Sciences, Jet Propulsion Lab, NASA.
- Posters presented in American Geophysics Union Fall Meetings (2018, 2020, 2021)
- Poster presented in Fifth AMS Symposium on the Joint Center for Satellite Data Assimilation, American Meteorological Society Meeting, 2017.
- Undergrad internship in Flood Management Division, Institute of Water Modelling (IWM), Dhaka, Bangladesh

Trainings

Training as the lead:

- Led a weeklong capacity building training entitled "Capacity Building Training of Meteorologists for Development of Dynamic Landslide Early Warning System" at the Bangladesh Meteorological Department from July 28-31, 2025, Dhaka, Bangladesh supported by Regional Integrated Multi-Hazard Early Warning System (RIMES), Save the Children, and Caritas, Bangladesh.
- Led a workshop entitled "Supporting Water Management and flood modelling through the use of rsatellite remote sensing for Bangladesh Water Development Board" from August 20-25, 2023, Dhaka, Bangladesh supported by University of Washington, funded by Ivanhoe Foundation and University of Washington.
- Provided training on LHASA-Mekong (July 26, 2022), a landslide hazard model for the Lower Mekong Region, to staff from the NASA SERVIR Coordination office and relevant participants.
- Provided an online Regional LHASA 2.0 Training for Landslide Monitoring and Forecasting on 24-26 August 2022 for 60 participants from different regional agencies in Thailand, Nepal, Vietnam. This training was focused on understanding different datasets for landslide forecasting and access them within GEE and hazard map generation using a pre-trained model and geospatial datasets.
- Led an online LHASA version 1.1 Hackathon on Satellite Observations and Tools for Landslide Monitoring and Forecasting on July 24-25, 2022 with hands-on experience in setting up and operating a system for landslide monitoring and forecasting. The training is primarily intended for the Department of Mineral Resources, Ministry of Natural Resources and Environment, Thailand.
- Provided 2-days training on LHASA-Mekong (May 2022), a landslide hazard model for the Lower Mekong Region, to staff from Asian Disaster Preparedness Center and SERVIR using Google Collab.
- Led an online training on Satellite Observations and Tools for Landslide Monitoring and Forecasting (March 8-11, 2022) where the application of Google Earth Engine (GEE), precipitation data in GEE, and exposure model in GEE and GEE-based Landslide Hazard Assessment for Situation Awareness (LHASA) was familiarized with the training participants.
- Provided hands-on training on Landslide Hazard Modelling during SERVIR-Mekong and NASA Goddard Space Flight Center organized online training on Satellite Observations and Tools for Landslide Risk Management in the Lower Mekong Region.
- Spent 14 days at Hanoi, Vietnam for the technical training workshop (July 1st 2018 to July 14th 2018) to mainstream decision support system for Vietnam on USAID Evidence to Action project for "Application of Satellite Gravimetry, Satellite Altimetry, and VIC Hydrological Model for Water Resource Management in Vietnam"
- Led a workshop entitled "Supporting Water Management in the Lower Mekong with Satellites" from 5-7th October, 2016, Hanoi, Vietnam supported by SERVIR-Mekong, funded by USAID in partnership

with NASA, joined forces with USAID's Partnerships for Enhanced Engagement in Research (PEER) with participants from various agencies in Vietnam, Cambodia, Lao PDR, Myanmar, and Thailand

- Online IT training on how to build and maintain web-portals such as South Asian Surface Water Modelling System (http://depts.washington.edu/saswe) using non-proprietary (free) software to Pakistan Council for Research in Water Resources, Pakistan and Department of Hydrology and Meteorology, Nepal by University of Washington
- Training at University of Washington, Seattle on development of Variable Infiltration Capacity (VIC) Model and Satellite Altimeter to person/group from:
  - National University of Civil Engineering (NUCE), Vietnam (March - April 2016)
  - Department of Hydrology and Meteorology (DHM), Nepal (April - May 2016)
  - Pakistan Council of Research in Water Resources (PCRWR), Pakistan (May 2017)
  - National Center for Water Resources Planning and Investigation (NAWAPI), Vietnam (Oct 2016)
  - Asian Disaster Preparedness Center (ADPC)
  - Bangladesh Water Development Board, Bangladesh
- Online IT training on how to build and maintain web-portals such as South Asian Surface Water Modelling System (http://depts.washington.edu/saswe) using non-proprietary (free) software to Pakistan Council for Research in Water Resources, Pakistan and Department of Hydrology and Meteorology, Nepal by University of Washington

Trainings as a participant:

- Training on User Interface Development using C# and SQL Server Database Management by Institute of Water Modelling, Dhaka, Bangladesh
- Training on Environmental Impact Assessment & Environment Management Plan by the Department of Civil Engineering, BUET, Dhaka, Bangladesh
- Training on MIKE 11: Flood Mapping and Data Assimilation from the Academy by DHI, Delft Hydraulic Institute, Denmark, Dhaka, Bangladesh
- Training on MIKE 11(HD & NAM) by Institute of Water Modelling, Dhaka, Bangladesh
- Training on Basic Arc-GIS by Institute of Water Modelling, Dhaka, Bangladesh
- Orientation Training of Junior Engineers by Institute of Water Modelling, Dhaka, Bangladesh

Students Mentoring

Student	Degree	Institution	Role
Patel, Krutikkumar Thakorbhai	PhD	University of Texas, Arlington, USA	Committee
Ayantike Bose	PhD	University of Texas, El Paso, USA	Co-supervisor
Samrin Sumaiya Sauda	PhD	Pennsylvania State University	Committee
Smita Sharma	BSc	University of Dhaka	Co-supervisor
Nafisa Tasnia	BSc.	Bangladesh University of Engineering and Technology	Co-supervisor
Zubaira Khan Pritha	BSc.	Bangladesh University of Engineering and Technology	Co-supervisor
Upajna Das	BSc.	Bangladesh University of Engineering and Technology	Co-supervisor
Faria Khatun	BSc.	Bangladesh University of Engineering and Technology	Co-supervisor

Proposals, Fundings

1) Nishan Kumar Biswas (PI), Satellite remote sensing based reservoir monitoring at the global scale for hydrologic applications, NASA ROSES, 2024-2026, $250,000 (Rejected)

2) Nishan Kumar Biswas (PI). Tracking freshwater availability and its changes in the lakes and reservoirs of West Tennessee. NASA ROSES, Thomas Stanley (UMBC, Co-I), Md Nowfel Mahmud Bhuyian (WTRBA, Co-I), Sujay Kumar (NASA, Collaborator), $765, 800, 2024-2027 (Rejected)
3) Nishan Kumar Biswas (Collaborator), SWOT contribution to the understanding of global terrestrial water storage and fluxes through a multi-satellite data assimilation framework, NASA ROSES, Sujay Kumar (NASA, PI), Augusto Getirana (SAIC, Science PI), Yeosang Yoon (SAIC, Co-I), Wanshu Nie (JHU, Collaborator), Konstantinos Andreadis (UMass, Collaborator), July 2024-June 2025 (Funded)
4) Nishan Kumar Biswas (Co-I), Process-based characterization and projections of flood risk and salt-water intrusion over U.S. coasts and deltas accounting for climate, geodesy, hydrology, and anthropogenic factors, NASA ROSES, Sujay Kumar (NASA, PI), Augusto Getirana (SAIC, Co-I), Yeosang Yoon (SAIC, Co-I), Wanshu Nie (JHU, Collaborator), July 2025-June 2027 (Rejected)
5) Nishan Kumar Biswas (Science PI), Flexible framework for landslide forecasting and capacity building tools for SERVIR-HKH, NASA ROSES, Dalia Kirschbaum (NASA, PI), Pukar Amatya (UMBC, Co-I), Thomas Stanley (UMBC, Co-I), Sana Khan (UMBC, Co-I), July 2025-June 2027 (Rejected)
6) Nishan Kumar Biswas (Co-I), Conflict and Catastrophe: Navigating Landslide and Flashflood Risks in Cox's Bazar, Bangladesh, NASA ROSES (Rejected)
7) Nishan Kumar Biswas (Co-I), Earth Observations, Machine Learning, and Smartphone-based Dissemination for Nationwide High-Resolution Cholera Surveillance and Forecasting in Bangladesh (High-Burden Countries), NASA ROSES, Ali S. Akanda (University of Rhode Island, PI) (pending)

Outreach activities and professional memberships

- Contributed to the research on Urban Heat in the Lower Mekong Delta was highlighted in the NASA Landsat Scienc homepage. Link to the NASA News: https://landsat.gsfc.nasa.gov/article/urban-heat-in-the-lower-mekong-delta/
- Contributed to the Reservoirs Chapter of the State of Global Water Resources 2024 Report of the World Meteorological Organization (WMO) as a NASA resource person. The report provided A quantitative assessment of global water resources for the year 2024.
- Contributed to the Reservoirs Chapter of the State of Global Water Resources 2023 Report of the World Meteorological Organization (WMO) as a NASA resource person. The report provided A quantitative assessment of global water resources for the year 2023, including reservoir operation and inflow. Interactive ArcGIS StoryMap Link of the report
- Presented a lecture on the Application of Satellite Remote Sensing in Water Resources and Disaster Management in the Department of Water Resources Engineering, Bangladesh University of Engineering and Technology (BUET) on December 2, 2023, with the participation of 156 students, researchers, staff, and faculties.
- Presented a talk in a public lecture on the topic “Mainstreaming satellite remote sensing in water resources and hydroclimatic disaster management” organized by the Institute of Remote Sensing and GIS, Jahangirnagar University, Bangladesh on August 23, 2023. The Vice-Chancellor, Pro-Vice Chancellor, Chairman of the University Grants Commission (UGC) and more than 200+ faculties and students were in there during the lecture session.
- UMBC news featuring Dr. Biswas’s work on Bangla delta: https://gestar2.umbc.edu/post/130465/
- Op-Ed on tracking Bangladesh's climate change and human intervention on water resources using satellite information is published leading daily newspaper of Bangladesh (the Daily Star): https://www.thedailystar.net/opinion/views/news/what-nasa-satellites-say-about-bangladeshs-climate-3234491
- Developed course material on situational landslide hazard monitoring and forecasting using machine learning and cloud computing which is disseminated through https://courses.adpc.net/
- Reviewer of MDPI Remote Sensing, MDPI Sustainability, and IEEE Transactions on Geoscience and Remote Sensing
- Guest Editor of special issue “Artificial Intelligence and Statistical Techniques to Advance Weather Forecasting and Impact Modeling”

- Associate Member, American Society of Civil Engineers (ASCE)
- Member, American Geophysical Union (AGU)
- Member, American Meteorological Society (AMS)