



# ARSLAAN KHALID, PHD

## *Research Scientist*

Dr. Arslaan Khalid is a seasoned professional in the field of water resources and coastal engineering. He brings a wealth of experience in coastal and riverine flood modeling, statistical evaluation, geospatial analysis, and risk estimation using the latest analysis techniques.

He expanded his skill set as a data scientist to include Big Data Analysis, Process Automation, Computer Vision and Cloud Computing. He applied these skills across several water resources projects, both in research and industry settings, consistently delivering innovative solutions to complex problems.

His expertise includes advanced storm surge and wave modeling, flood risk mapping, flood forecasting frameworks, extreme value analysis, met-ocean data analysis, climate change impact studies, sea level rise assessments, inland hydrology and hydraulics, and compound flooding. He has been instrumental in providing innovative flood risk solutions to various states and federal entities.

He is actively involved in the academic community. He serves as a peer reviewer for various journals, a role that allows him to contribute his expertise and maintain the high standards of scientific research. He also regularly attends conferences staying well-informed of the latest developments in his field and fostering collaborations with other professionals.

Arslaan completed his doctorate degree in civil and infrastructure engineering and his master's in civil and infrastructure engineering from George Mason University in Virginia. He received his bachelor's in civil engineering from the National University of Science and Technology in Pakistan.

### ORGANIZATION ROLE

Research Scientist

### PROJECT ROLE / FOCUS AREAS

Real-time flood forecasting

Integrated FLOOD (iFLOOD)

Subseasonal weather evaluation

Storm surge & wave modeling

Hydrologic & Hydraulic (H&H) modeling

Geospatial analysis

### EDUCATION

Ph.D., Civil and Infrastructure Engineering, George Mason University, 2020

MS, Civil and Infrastructure Engineering, George Mason University, 2019

BS, Civil Engineering, National University of Science and Technology, Pakistan, 2015

### PROFESSIONAL EXPERIENCE

2024–Present: Research Scientist, The Water Institute

2020–2024: Computational Modeling and AI/ML Lead; Senior Coastal Engineer, Michael Baker International

2019–2020: Flood Modeling Consultant, First Street Foundation

2019: Technical Professional 1, Water Resources, Wood

2018: Water Resources Intern II, Atkins North America



## SELECTED PROJECTS

### **Computer Vision and Semantic Segmentation.**

*Michael Baker International. (2024).* Computational Modeling Lead. Developed computer vision approach to detect first floor elevation from street level imagery and extracted building footprints and landcover from satellite imagery. Also developed pipelines for image acquisition, preprocessing, semantic segmentation, and post-processing.

### **New York City Department of Environmental Protection.** *Michael Baker International. (2023–2024).*

Computational Modeling Lead. Performed analysis to generate a subset of storms to reproduce 1% and 0.2% flooding conditions in New York City. Simulated water level and wave conditions using NPCC 2024 sea level rise estimates to produce future-base flood elevation (BFE) estimates. Developed GIS bathtub toolkits for analysis SLR impacts on the existing BFE.

**Mississippi Coastal Flood Maps Revision.** *Michael Baker International. (2021–2022).* Coastal Engineer. Performed a comprehensive coastal flood risk study for the coastal Mississippi, including coastal analysis, mapping, DFIRM production, preliminary process support, and community engagement. Programmed various python tool to streamline processes of data cleanup, model simulation, and data analysis.

### **Cambridge Flood Mitigation Project.** *Michael Baker International. (2021-2022).* Coastal Engineer.

Developed a risk-based strategy for a flood mitigation project to protect the city against sea level rise combined with major storms. Supported development of innovative hybrid design combining engineered structures with nature-based systems for flood protection due to sea level rise and climate change.

### **Alabama Risk MAP Program Engineering Model.**

*Michael Baker International. (2019).* Water Resources Engineer. Developed hydrological models for three distinct watersheds within the state of Alabama. Create python tools for DEM cleanup, watershed analysis, and flood frequency analysis.

### **National Water Model Forecast Pipeline.** (2019).

Technical Professional. Programmed python tool kit for National Water Model to provide real-time flood maps

for Maryland Department of Environment. Also developed automated watershed delineation tools. Performed H&H analysis for estimation of flood risk.

**Real-time flood forecasting systems.** *Flood Hazards Research Lab, George Mason University. (2016–2020).* Graduate Research Fellow. Developed an integrated flood forecast system to support daily flood forecasting by National Weather Service (NWS) in Chesapeake Bay. Improved existing state of the art flood forecasting by NWS using ensemble-based flood forecasting. Evaluated subseasonal weather predictions to develop long-term flood prediction systems. Extended iFLOOD to Alaska and Brazil for flood forecasting. Supported development of Flood Factor for First Street Foundation.

## SELECTED PUBLICATIONS

1. Khalid, A., & Ferreira, C. (2020). Advancing real-time flood prediction in large estuaries: IFLOOD a fully coupled surge-wave automated web-based guidance system. *Environmental Modelling and Software*, 131.
2. Khalid, A., Lima, A., Cassalho, F., Miesse, T., & Ferreira, C. (2020). Hydrodynamic and wave responses during storm surges on the southern Brazilian coast: A real-time forecast system. *Water*, 12(12).
3. Khalid, A., Bates, P., Quinn, N., Sampson, C., Smith, A., Wing, O., Sosa, J., Savage, J., Olcese, G., Neal, J., Schumann, G., Giustarini, L., Coxon, G., Porter, J., Amodeo, M., Chu, Z., Lewis-Gruss, S., Freeman, N., Houser, T., Delgado, M., ... Krajewski, W. (2020). Combined modelling of US fluvial, pluvial and coastal flood hazard under current and future climates. *Water Resources Research*, 57(2).
4. Cassalho, F., Miesse, T., Lima, A., Khalid, A., Sutton-Grier, A., & Ferreira, C. (2021). Coastal wetlands exposure to storm surge and waves in the Albemarle-Pamlico estuarine system during extreme events. *Wetlands*, 41(49).
5. Khalid, A., Miesse, T., Erfani, E., Thomas, S., Ferreira, C., Pegion, K., Burls, N., & Manganello, J. (2021). Evaluation of storm surge predictability on subseasonal timescales for flood forecasting applications: A case study for Hurricane Isabel and Katrina. *Weather and Climate Extremes*, 34.