Exponent®
Engineering & Scientific Consulting

Ehsan Omranian, Ph.D.

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Professional Profile

Dr. Omranian's expertise focuses on advanced big data analytics, numerical modeling, statistical analysis, machine learning, software development, and data visualization. His research experience spans the areas of water resources engineering, hurricane detection, climate change, and traffic safety.

In his previous role as a lead engineer, Dr. Omranian combined numerical models with advanced machine learning techniques to prepare floodplain maps and provide master flood mitigation plans under FEMA regulations. He designs innovative solutions to complex engineering problems using data-driven approaches.

At Exponent, Dr. Omranian works on a variety of projects involving software development, data analytics and validation, building advanced machine learning prediction models, data engineering and pipelines, and developing forecasting algorithms. His work touches multiple fields such as health sciences, utilities, and electronics and increases work efficiencies by automating analytics and calculations.

Dr. Omranian received, the Dwight David Eisenhower Transportation Fellowship from U.S. Department of Transportation, Federal Highway Administration in 2017 for his novel research on predicting large-scale effects of adverse weather conditions on transportation safety using a big data approach. He developed a cloud-based prediction software to connect satellite real-time precipitation products to crashes for the entire state of Texas. He utilized parallel programming and distributed system concepts/tools to analyze and develop the prediction model.

Academic Credentials & Professional Honors

Ph.D., Environmental Science and Engineering, University of Texas, San Antonio, 2018

M.Sc., Civil and Environmental Engineering, Iran University of Science and Technology, 2012

B.S., Civil and Environmental Engineering, Shiraz University, 2010

Prior Experience

Scientist/Engineer III, Moffatt & Nichol, 2019-2021

Civil Associate II, Michael Baker International, 2018-2019

Research Assistant, Hydrology/Remote Sensing Lab, UTSA, 2015-2018

Professional Affiliations

American Society of Civil Engineers (ASCE)

Languages

Persian

Publications

Omranian, Ehsan, Hatim O. Sharif, and Ahmad A. Tavakoly. "How well can global precipitation measurement (GPM) capture hurricanes? Case study: Hurricane Harvey." Remote Sensing 10.7 (2018): 1150.

Omranian, Ehsan, et al. "Exploring rainfall impacts on the crash risk on Texas roadways: A crash-based matched-pairs analysis approach." Accident Analysis & Prevention 117 (2018): 10-20.

Omranian, Ehsan, and Hatim O. Sharif. "Evaluation of the global precipitation measurement (GPM) satellite rainfall products over the lower Colorado River basin, Texas." JAWRA Journal of the American Water Resources Association 54.4 (2018): 882-898.

Omranian, Ehsan, Hatim Sharif, and Samer Dessouky. Large-scale weather-related crash risk analysis over Texas–Application of Big Data. Transportation Research Board 97th Annual Meeting, No. 18-05348. 2018.

Afshari, S., Tavakoly, A. A., Rajib, M. A., Zheng, X., Follum, M. L., Omranian, E., & Fekete, B. M. “Comparison of new generation low-complexity flood inundation mapping tools with a hydrodynamic model”. Journal of Hydrology 556 (2018): 539-556.

Javaheri, A., Nabatian, M., Omranian, E., Babbar-Sebens, M., & Noh, S. J. “Merging real-time channel sensor networks with continental-scale hydrologic models: A data assimilation approach for improving accuracy in flood depth predictions.” Hydrology 5.1 (2018): 9.

Afshari, Shahab, Ehsan Omranian, and Dongmei Feng. "Relative Sensitivity of Flood Inundation Extent by Different Physical and Semi-Empirical Models.", National Water Center Innovators Program Summer Institute Report (2016)

Presentations

Omranian, Ehsan. Evaluating Flood Resilience Strategies using HEC-RAS Coupled 1D-2D Hydrodynamic Modeling. 101st Annual American Meteorological Society Meeting, New Orleans, LA (Virtual), 2020.

Omranian, Ehsan, Hatim Osman Sharif, and Ahmad A. Tavakoly. "Evaluation of GPM IMERG Precipitation Product for Extreme Rainfall: Hurricane Harvey Case Study." American Geophysical Union Fall Meeting, 2018.

Omranian, Ehsan, and Hatim O. Sharif “A BIG DATA Approach to Investigate the Effect of Adverse Weather Conditions on Crash Risk in Texas”. University of Texas at San Antonio Annual College of Science Conference, 2017.

Omranian, Ehsan, Hatim Osman Sharif, and Samer Desouky. "Large-scale Effect of Inclement Weather Conditions on Crash Risk over Texas." American Geophysical Union Fall Meeting 2017.

Omranian, Ehsan, and Hatim Osman Sharif. "Evaluation of GPM-based Multi-satellite IMERG Precipitation Products Over the Lower Colorado River Basin, Texas." American Geophysical Union Fall Meeting, 2016.

Peer Reviews

Journal of Hydrology

Remote Sensing (Multidisciplinary Digital Publishing Institute)

Water (Multidisciplinary Digital Publishing Institute)

Hydrology (Multidisciplinary Digital Publishing Institute)

Sustainability (Multidisciplinary Digital Publishing Institute)