ANDREW JUAN

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EDUCATION

Rice University Houston, TX
PhD in Environmental Engineering (*August 2016*)
Dissertation: Evaluating the Hydrodynamic Performance of Green and Gray Infrastructure in Urban Watersheds for the Greater Houston Region (*Advisor: Philip Bedient*)

Rice University Houston, TX
MS in Environmental Engineering (*May 2011*)
Thesis: Developing a Radar-based Flood Alert System for Sugar Land, Texas (*Advisor: Philip Bedient*)

Pensacola Christian College Pensacola, FL
BS in Mechanical Engineering (*summa cum laude*) (*May 2007*)

RESEARCH EXPERIENCE

Institute for a Disaster Resilient Texas (IDRT)
Texas A&M University – *Research Scientist* Houston, TX
November 2025 – present
Community-focused flood resilience, state-wide flood information repository, compound and coastal flood impact analysis, nature-based solutions

Institute for a Disaster Resilient Texas (IDRT)
Texas A&M University – *Associate Research Scientist* Houston, TX
December 2022 – October 2025
Community-focused flood resilience, machine learning (ML) based surrogate flood modeling, regional infiltration, regional flood hazard analysis

Severe Storm Prediction, Education, and Evacuation from Disasters (SSPEED) Center
Rice University – *Research Scientist* Houston, TX
September 2018 – November 2022
Urban flood mitigation, wastewater epidemiology, coupled real-time flood warning and road network accessibility, estuarine and coastal wetland hydrodynamics

Severe Storm Prediction, Education, and Evacuation from Disasters (SSPEED) Center
Rice University – *Postdoctoral Research Associate* Houston, TX
October 2016 – August 2018
Urban hydrology, green infrastructure, coastal environmental risk, water resources studies, flood alert systems

Rice University – *Graduate Research Assistant* Houston, TX
May 2009 – August 2016
Low Impact Development (LID), hydrologic and hydraulic modeling, watershed / floodplain analysis, flood warning, coastal flood studies

RESEARCH ARTICLES

- Lee, C.C., Huang, L., Antolini, F., Garcia, M., Juan, A., Brody, S.D. and Mostafavi, A., 2024. Predicting peak inundation depths with a physics informed machine learning model. Scientific Reports, 14(1), p.14826. https://doi.org/10.1038/s41598-024-65570-8
- Stephens, K. K., Varela Castro, S., Xu, Y., Juan, A., Diaz, N., Blessing, R., & Brody, S. D., 2024. Rectifying a flood data desert one step at a time: a co-created, engaged scholarship approach. Journal of Applied Communication Research, 1–14. https://doi.org/10.1080/00909882.2024.2357131
- Garcia, M., Juan, A., Doss-Gollin, J., Bedient, P., 2023. Leveraging mesh modularization to lower the computational cost of localized updates to regional 2D hydrodynamic model outputs. Engineering Applications of Computational Fluid Mechanics 17, 2225584. https://doi.org/10.1080/19942060.2023.2225584
- Garcia, M. and Juan, A., 2022. Mesh modularization enables surrogate modelling for 2D hydrodynamic solvers. Brisbane: Engineers Australia. https://search.informit.org/doi/10.3316/informit.906003926429373.
- McCall, C., Fang, Z.N., Li, D., Czubai, A.J., Juan, A., LaTurner, Z.W., Ensor, K., Hopkins, L., Bedient, P.B., Stadler, L.B., 2022. Modeling SARS-CoV-2 RNA degradation in small and large sewersheds. Environ. Sci.: Water Res. Technol. 10.1039.D1EW00717C. https://doi.org/10.1039/D1EW00717C.
- Atoba, K., Newman, G., Brody, S., Highfield, W., Kim, Y. and Juan, A., 2021. Buy them out before they are built: evaluating the proactive acquisition of vacant land in flood-prone areas. *Environmental Conservation, 48(2), pp.118-126*.
- Garcia, M, Juan, A., Bedient, P., 2020. Integrating Reservoir Operations and Flood Modeling with HEC-RAS 2D. *Water*: 12(8):2259.
- Juan, A., Gori, A., and Sebastian, A., 2020. Comparing Floodplain Evolution in Channelized and Un-Channelized Urban Watersheds in Houston, Texas. *Journal of Flood Risk Management 2020; e12604. https://doi.org/10.1111/jfr3.12604.*
- Gori, A., Gidaris, I., Elliott, J.R., Padgett, J.E., Loughran, K., Bedient, P.B., Panakkal, P., and Juan, A., 2020. Accessibility and recovery assessment of Houston's roadway network due to fluvial flooding during Hurricane Harvey. *Natural Hazards Review*, doi:10.1061/(ASCE)NH.1527-6996.0000355.
- Panakkal, P., Juan, A., Garcia, M., Padgett, J.E., and Bedient, P.B., 2019. Towards enhanced response: Integration of a flood alert system with road infrastructure performance models. *SEI Structures Congress 2019,* doi:10.1061/9780784482223.029
- Gori, A., Blessing, R., Juan, A., Brody, S., & Bedient, P. B., 2018. Characterizing Urbanization Impacts on the 100-yr Floodplain through Integrated Land Use, Hydrologic, and Hydraulic Modeling. Journal of Hydrology, doi: 10.1016/j.jhydrol.2018.10.053.
- Bass, B., Juan, A., Gori, A., Fang, Z., and Bedient, P., 2016. 2015 Memorial Day Storm Flood Impacts for Changing Watershed Conditions in Houston, TX. *Natural Hazards Review,* doi: 10.1061/(ASCE)NH.1527-6996.0000241.
- Juan, A., Hughes, C., Fang, Z., and Bedient, P., 2016. Hydrologic Performance of Watershed-scale Low Impact Development (LID) in a High Intensity Rainfall Region. *Journal of Irrigation and Drainage Engineering,* doi: 10.1061/(ASCE) IR.1943-4774.0001141.
- Juan, A., Fang, Z., and Bedient, P., 2015. Developing a Radar-Based Flood Alert System for Sugar Land, Texas. *Journal of Hydrologic Engineering*, doi: 10.1061/(ASCE)HE.1943-5584.0001194.

OTHER PUBLICATIONS

- Sebastian, A. and Juan, A., 2022. Chapter 5: Urban Flood Modeling: Perspectives, challenges, and opportunities. *Coastal Flood Risk Reduction - 1st Edition*.
- Fang, N., Juan, A., and Nikiel, C., 2018. Chapter 13 - Case Studies in Water Resources: Flood and Drought Management in the United States. *Hydrology and Floodplain Analysis, 6th ed.*
- Bedient, P. and Juan, A., 2017. Lack of infrastructure, regulation made Houston vulnerable. *Houston Chronicle*, September 9, 2017.
- Juan, A., Fang, Z., and Bedient, P., 2013. Flood Improvement and LID Modeling Using XP-SWMM. *Published in* http://xpsolutions.com/Resources/Case-Studies/.

SELECT CONFERENCE PRESENTATIONS AND POSTERS

- American Geophysical Union, *December 2018*
  Poster title: "Comparison of 1D and 2D Approaches for Flood Inundation Modeling in an Urban Watershed"
- American Geophysical Union, *December 2017*
  Poster title: "Quantification of Interbasin Transfers into the Addicks Reservoir during Hurricane Harvey"
- World Environmental and Water Resources Congress, *May 2017*
  Presentation title: "Comparing Floodplain Evolution in Channelized and Un-Channelized Urban Watersheds in Houston, TX"
- American Geophysical Union, *December 2016*
  Poster title: "Quantifying the Influence of Urbanization on a Coastal Floodplain"
- World Environmental and Water Resources Congress, *May 2015*
  Presentation title: "Evaluating Watershed-Scale LID Performances in a High-Intensity Rainfall Region with a Distributed Hydrologic Model"
- American Geophysical Union, *December 2013*
  Poster title: "Rice University Flood Improvement and LID Modeling Using XP-SWMM"
- World Environmental and Water Resources Congress, *May 2012*
  Presentation title: "Flood and Storm Surge Impact on a Highly Urbanized Area – The Harris Gully Watershed"
- Texas Floodplain Management Association, *April 2011*
  Presentation title: "Flood Warning Indicator: Establishing a Reliable Radar-based Flood Warning System for the Upper Oyster Creek Watershed in Sugar Land, Texas"
- National Flood Workshop, *October 2010*
  Presentation title: "Developing a Radar-based Flood Warning System for Sugar Land, Texas"

STUDENT MENTORSHIP

- Ph.D. committee:
  Matthew Garcia, Rice University (2023) "Novel Urban Floodplain Modeling Methods for Applications in Coupling Surrogate Machine Learning Methods"
- MS committee:
  Mia Peeples, Rice University (2023) "Modeling Flood Reduction of Nature-Based Channel Modifications in Houston, TX"
  Auke Dijkstra, TU Delft (2025) "A Surrogate Modeling Framework for Compound Flood Risk and Optimization Analysis"

GRANTS AND FUNDED PROJECTS

- Principal Investigator, Create a Comprehensive Flood-Risk Geospatial Layer for Historic Buildings, NPS / LSU (2025-2027), $151,191.
- Principal Investigator, Model Storage and Management System (MS2), TWDB (2024-2027), $1,025,000.
- Principal Investigator, Screening and optimization of the Clear Lake gate and pump station system, GCCDD (2025-2026), $192,805. Co-PI: Federico Antolini.
- Co-Principal Investigator, RAISE: Flood Resilience in Rural Texas Communities, NSF #2440167 (2025-2028), $999,986. PI: Avantika Gori, Co-PI: Keri Stephens, James Doss-Gollin.
- Co-Principal Investigator, Developing Effective Flood Risk Communication Tools for Texas Communities, Texas General Land Office (2023-2026), $3,000,000. PI: Russell Blessing, Co-PI: Samuel Brody, Wesley Highfield, Antonia Sebastian, Keri Stephens.
- Principal Investigator, Flood Information and Response System (FIRST) for the City of Houston, Texas Division of Emergency Management (2023-2024), $15,000. Co-PI: Philip Bedient, Nick Fang.

AWARDS AND FELLOWSHIPS

- Recognition by Rice University's Board of Trustees for the development of a Letter of Map Revision to mitigate campus flooding and reduce flood insurance premiums (2015)
- Rice University Graduate Research Fellowship (2009)

QUALIFICATIONS AND SKILLS

- Certified Engineer In Training (EIT #52327) in Texas
- Hydrologic/ hydraulic models: HEC Suite (HEC-1, HEC-2, HMS, Geo-HMS, RAS, Geo-RAS, Res-Sim), EPA-SWMM, XP-SWMM, Infoworks, Modflow, Vflo®, LSPC
- Other software: ArcGIS, AutoCAD, Matlab, Python