Jayaram Hariharan

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Professional Experience

United States Federal Government — *Sep 2022 – Present*
Department of Defense — D.C. Metro Area
Data Scientist — *Aug 2023 – Present*

United States Geological Survey, Department of the Interior — Reston, VA (Remote)
Physical Scientist (Data Scientist) — *Sep 2022 – Aug 2023*

The World Bank Group — Washington, DC (Remote)
Short-Term Consultant (Part-time) — *Oct 2023 – Present*

The University of Texas at Austin — Austin, TX
University Graduate Continuing Fellow — *Aug 2021 – Aug 2022*

Los Alamos National Laboratory — Los Alamos, NM (Remote)
Student Intern — *Jan 2021 – Jun 2021*

The University of Texas at Austin — Austin, TX
Graduate Research Assistant — *Aug 2017 – Dec 2020*

Gutschick, Little & Weber P.A. — Burtonsville, MD
Civil Engineer — *Jan 2015 – Jul 2017*

Education

The University of Texas at Austin — Austin, TX
Ph.D., Civil Engineering — *May 2019 – Aug 2022*

- **Thesis**: Connecting Delta Morphology, Surface Processes, and Subsurface Structure

M.S., Civil Engineering — *Aug 2017 – May 2019*

- **Thesis**: Quantifying the Influence of Surface Processes on Subsurface Geometry in Deltaic Environments

University of Maryland, College Park — College Park, MD
B.S., Civil and Environmental Engineering — *Aug 2011 – Dec 2014*

Publications

[1] Hodson, T. O., L. A. DeCicco, **J. A. Hariharan**, L. F. Stanish, S. Black, & J. S. Horsburgh (2023), Reproducibility Starts at the Source: R, Python, and Julia Packages for Retrieving USGS Hydrologic Data, *Water*, 15, 4236, https://doi.org/10.3390/w15244236.

[2] **Hariharan, J.**, K. Wright, A. J. Moodie, N. Tull, & P. Passalacqua (2023), Impacts of Human Modifications on Material Transport in Deltas, *Earth Surface Dynamics*, 11, 405-427, https://doi.org/10.5194/esurf-11-405-2023.

[3] Knights, D., A. Piliouras, J. Schwenk, **J. Hariharan**, & C. Russionello (2023), Seasonal and Morphological Controls on Nitrate Retention in Arctic Deltas, *Geophysical Research Letters*, 50, e2022GL102201, https://doi.org/10.1029/2022GL102201.

[4] Xu, Z., M. R. Khan, K. M. Ahmed, A. Zahid, **J. Hariharan**, P. Passalacqua, E. Steel, A. Chadwick, C. Paola, S. L. Goodbred Jr., A. Paldor, & H. A. Michael (2023), Predicting Subsurface Architecture from Surface Channel Networks in The Bengal Delta, *Journal of Geophysical Research: Earth Surface*, 128, e2022JF006775, https://doi.org/10.1029/2022JF006775.

[5] Wright, K., **J. Hariharan**, P. Passalacqua, G. Salter, & M. Lamb (2022), From Grains to Plastics: Modeling Nourishment Patterns and Hydraulic Sorting of Fluvially Transported Materials in Deltas, *Journal of Geophysical Research: Earth Surface*, 127, e2022JF006769, https://doi.org/10.1029/2022JF006769.

[6] **Hariharan, J.**, P. Passalacqua, Z. Xu, H. A. Michael, E. Steel, A. Chadwick, C. Paola, & A. J. Moodie (2022), Modeling the Dynamic Response of River Deltas to Sea-Level Rise Acceleration, *Journal of Geophysical Research: Earth Surface*, 127, e2022JF006762, https://doi.org/10.1029/2022JF006762.

[7] Xu, Z., **J. Hariharan**, P. Passalacqua, E. Steel, A. Chadwick, C. Paola, & H. A. Michael (2022), Effects of Geologic Setting on Contaminant Transport in Deltaic Aquifers, *Water Resources Research*, 58, e2022WR031943, https://doi.org/10.1029/2022WR031943.

[8] **Hariharan, J.**, A. Piliouras, J. Schwenk, & P. Passalacqua (2022), Width-Based Discharge Partitioning in Distributary Networks: How Right We Are, *Geophysical Research Letters*, 49, e2022GL097897, https://doi.org/10.1029/2022GL097897.

[9] Steel, E., C. Paola, A. Chadwick, **J. Hariharan**, P. Passalacqua, Z. Xu, H. A. Michael, H. Brommecker, & E. Hajek (2022), Reconstructing subsurface sandbody connectivity from temporal evolution of surface networks, *Basin Research*, 00, 1-21, https://doi.org/10.1111/bre.12668.

[10] Tull, N., P. Passalacqua, H. Hassenruck-Gudipati, S. Rahman, K. Wright, **J. Hariharan**, & D. Mohrig (2022), Bidirectional River-Floodplain Connectivity During Combined Pluvial-Fluvial Events, *Water Resources Research*, 58, e2021WR030492, https://doi.org/10.1029/2021WR030492.

[11] Miltenberger, A. M., T. Mukerji, **J. Hariharan**, P. Passalacqua, & E. Nesvold (2021), A Graph-Theoretic Monte Carlo Framework for Comparing Delta Surface Dynamics and Subsurface Structure in Numerical Models and Physical Experiments, *Mathematical Geosciences*, 1-28, https://doi.org/10.1007/s11004-021-09973-7.

[12] Moodie, A. J., **J. Hariharan**, E. Barefoot, & P. Passalacqua (2021), *pyDeltaRCM*: a flexible numerical delta model, *Journal of Open Source Software*, 6(64), 3398, https://doi.org/10.21105/joss.03398.

[13] Xu, Z., **J. Hariharan**, P. Passalacqua, E. Steel, C. Paola, & H. A. Michael (2021), Linking the Surface and Subsurface in River Deltas - Part 2: Relating Subsurface Geometry to Groundwater Flow Behavior, *Water Resources Research*, 57, e2020WR029281, https://doi.org/10.1029/2020WR029281.

[14] **Hariharan, J.**, Z. Xu, H. A. Michael, C. Paola, E. Steel, & P. Passalacqua (2021), Linking the Surface and Subsurface in River Deltas - Part 1: Relating Surface and Subsurface Geometries, *Water Resources Research*, 57, e2020WR029282, https://doi.org/10.1029/2020WR029282.

[15] Schwenk, J. & **J. Hariharan** (2021), RivGraph: Automatic Extraction and Analysis of River and Delta Channel Network Topology, *Journal of Open Source Software*, 6(59), 2952, https://doi.org/10.21105/joss.02952.

[16] **Hariharan, J.**, K. Wright, & P. Passalacqua (2020), dorado: A Python package for simulating passive particle transport in shallow-water flows, *Journal of Open Source Software*, 5(54), 2585, https://doi.org/10.21105/joss.02585.

Teaching Experience

The University of Texas at Austin — Austin, TX

- **Teaching assistant:** Elements of Hydraulic Engineering — Spring 2020
- **Substitute lecturer:** Stochastic Hydrology — Fall 2019
- **Grader:** Elements of Hydraulic Engineering; Hydrology — Fall 2018, 2019, 2020

Academic and Volunteer Activities

Academic Activities

- **Topic Editor:** Journal of Open Source Software — Jun 2021 – Present
- **Peer-reviewer:** Computers & Geosciences; Journal of Open Source Software; Geoscience and Remote Sensing Letters; Journal of Selected Topics in Applied Earth Observations and Remote Sensing; Water Resources Research Journal of Geophysical Research - Earth Surface — 2020 – Present
- **CSDMS:** Interactive Teaching Material Creation — Dec 2020
  - **Creator of EKT Lab**: *Alternative mesh generation for Landlab*
- **UT Austin:** Graduate and Industry Networking (GAIN) committee member — 2018
- **UT Austin:** Environmental and Water Resources Engineering Seminar committee member — 2018

Volunteer Activities

- **St. David's Hospital, Austin, TX:** Weekly Volunteer (3 hrs/wk) — Apr 2019 – Apr 2020

Grants and Awards

Grants

- **NSF Supplement:** INTERN Funding Opportunity — FY 2020

Awards

- USGS Special Thanks And Recognition (STAR) Award Recipient — FY 2023
- AGU Hydrology Section: Remote Sensing Technical Committee Student Award — 2021
- Kolodzey Travel Grant — Fall 2021
- University Graduate Continuing Fellowship — 2021 – 2022
- Trigg and Fannie E. Twichell Centennial Endowed Presidential Scholarship — 2020
- Earnest and Agnes Gloyna Endowed Presidential Scholarship — 2019
- Walter L. and Reta Mae Moore Graduate Fellowship in Water Resources — 2017
- University of Maryland President's Scholarship — 2011 – 2014

Short Courses

Participant

- **Geoscientific data analysis using UNIX and GMT** [UTIG] — 2021
- **Earth Surface Processes Modeling Summer Institute** [CSDMS] — 2020
- **Summer Institute for Earth-Surface Dynamics** [NCED] — 2018

Peer-Mentor

- **Earth Surface Processes Modeling Summer Institute** [CSDMS] — 2021

Skills and Licenses

Skills

- **Programming/Scripting Languages:** Python, Bash, MATLAB, Julia, R, Kotlin, Slurm
- **Programming Tools:** Git, Unix, Continuous Integration, Unit Testing, HPCs
- **Engineering/Mapping:** AutoCAD Civil 3D, HEC-RAS, ArcGIS/QGIS, Generic Mapping Tools
- **Office/Media:** LaTeX, MS Office, GIMP, Illustrator/Inkscape, IHS Kingdom, Audacity

Licenses

- **State of Maryland Engineer in Training (EIT)** License #46507

Invited Presentations

Presentations

- "Developing Software to Power Research: 3 Examples" [ESPIn at CU Boulder] 15 May 2023
- "Developing Software to Power Research: 3 Examples" [University of Delaware] 11 May 2023

Instructional Clinics

- "Hypothesis testing with the open-source delta model *pyDeltaRCM*" [CSDMS] May 2022
- "Exploring river and delta channel networks with RivGraph" [CSDMS] May 2021

United States Geological Survey Software Releases

[1] Hamshaw, S.D., **Hariharan, J.**, Hinman, E.D., Sleckman, M.J., Stanish, L.F., 2024, hyswap: A USGS software package for hydrologic data analysis: U.S. Geological Survey software release, https://doi.org/10.5066/P13SKXA2.

[2] **Hariharan, J.A.**, 2023, DataRetrieval.jl-Julia package for obtaining USGS water data directly from web services: U.S. Geological Survey software release, Julia package, Reston, Va., https://doi.org/10.5066/P95XLHUH.

[3] Hodson, T.O., **Hariharan, J.A.**, Black, S., and Horsburgh, J.S., 2023, dataretrieval (Python): a Python package for discovering and retrieving water data available from U.S. federal hydrologic web services: U.S. Geological Survey software release, https://doi.org/10.5066/P94I5TX3.

[4] **Hariharan, J.A.**, 2023, gwatlas2—Shiny Application Displaying Nation-Wide Groundwater Data: U.S. Geological Survey software release, R package, Reston, Va., https://doi.org/10.5066/P9WALGA0.

[5] **Hariharan, J.A.**, 2023, precompute—Pre-computation functions for the nation-scale groundwater Shiny app.: U.S. Geological Survey software release, R package, Reston, Va., https://doi.org/10.5066/P9LFGHC5.

Non-refereed Publications

[1] **Hariharan, J.** (2022), Connecting delta morphology, surface processes, and subsurface structure, Ph.D. Dissertation, The University of Texas at Austin, http://http://dx.doi.org/10.26153/tsw/49288

[2] **Hariharan, J.** (2022), Exploring *pyDeltaRCM*: A Collection of Numerical Experiments v0.1, Zenodo, https://doi.org/10.5281/zenodo.7315645

[3] **Hariharan, J.**, A. J. Moodie, P. Passalacqua (2022), SynthSWIR v0.1, Zenodo, https://doi.org/10.5281/zenodo.5851583

[4] **Hariharan, J.** (2020), py_gee_tools v0.1, Zenodo, http://doi.org/10.5281/zenodo.4331356

[5] **Hariharan, J.** (2019), Quantifying the Influence of Surface Processes on Subsurface Geometry in Deltaic Environments, M.S. Thesis, The University of Texas at Austin, http://dx.doi.org/10.26153/tsw/3300

Conference Abstracts and Presentations

[1] **Hariharan, J.**, L. DeCicco, T. Hodson (2023), Programmatic Retrieval of USGS Water Data: The Data Retrievals, CSDMS 2023: Patterns and Processes Across Scales.

[2] Wright, K.A., **J. Hariharan**, P. Passalacqua (2023), Apples to apples: Comparing the transport patterns of a wide variety of materials within a unified reduced-complexity modeling framework, CSDMS 2023: Patterns and Processes Across Scales.

[3] Wright, K. A., **J. Hariharan**, P. Passalacqua, G. Salter, M. P. Lamb, M. Simard (2021), Comparing the Nourishment Areas and Dynamics of Different Fluvially-Transported Materials in River Deltas, 2021 AGU Fall Meeting, Abstract EP52A-03.

[4] **Hariharan, J.**, A. Piliouras, J. Schwenk, P. Passalacqua (2021), Width-Based Discharge Partitioning in Distributary Networks: How Wrong Are We?, 2021 AGU Fall Meeting, Abstract H11D-05.

[5] Passalacqua, P., T. M. Jarriel, **J. Hariharan**, S. L. Goodbred, I. Overeem, L. Giosan, A. Piliouras, J. P. Schwenk (2021), A network approach to delta sustainability, 2021 AGU Fall Meeting, Abstract H12D-01A.

[6] Michael, H., Z. Xu, **J. Hariharan**, P. Passalacqua, M. Khan, K. Ahmed, A. Zahid, C. Paola, E. Steel, A. Chadwick (2021), From Surface to Subsurface: Connecting Depositional Processes and Surface Features to Subsurface Architecture and Contaminant Transport in Deltaic Aquifers, GSA Connects 2021, Abstract AM-367749, https://doi.org/10.1130/abs/2021AM-367749.

[7] Passalacqua, P., **J. Hariharan**, H. Michael, C. Paola, Z. Xu, E. Steel, A. Chadwick, M. Khan (2021), From Surface to Subsurface: Connectivity, Metrics, and Predictability of Subsurface Patterns from Surface Information, GSA Connects 2021, Abstract AM-367301, https://doi.org/10.1130/abs/2021AM-367301.

[8] **Hariharan, J.**, K. Wright, P. Passalacqua (2021), Modeling The Influence Of Polders On River Delta Connectivity, 8th International Conference on Water and Flood Management, Abstract 100261.

[9] Tull, N., S. Rahman, P. Passalacqua, K. Wright, **J. Hariharan**, H. Hassenruck-Gudipati, D. Mohrig (2020), Determining Local Mesh Resolution for Accurate Modeling of River-Floodplain Connectivity, 2020 AGU Fall Meeting, Abstract H137-003

[10] Moodie, A. J., **J. Hariharan**, J. Caers, P. Passalacqua (2020), Constraining autogenic smaller-scale stratigraphic variability via information theoretic relationships with larger-scale observations, 2020 AGU Fall Meeting, Abstract EP025-06

[11] Xu, Z., **J. Hariharan**, P. Passalacqua, C. Paola, E. Steel, H. A. Michael (2019), Contaminant transport in deltaic aquifers: The impact of surface-to-subsurface connectivity, 2019 AGU Fall Meeting, Abstract EP21D-2237

[12] Steel, E., C. Paola, P. Passalacqua, H. A. Michael, **J. Hariharan**, Z. Xu (2019), Linking surface dynamics to the subsurface record: the effectiveness of overhead imagery in quantifying depositional architecture, 2019 AGU Fall Meeting, Abstract EP21D-2236

[13] **Hariharan, J.**, P. Passalacqua (2019), Modeling Deltaic Evolution Amidst Anthropomorphic Development, 2019 AGU Fall Meeting, Abstract EP23E-2261

[14] Miltenberger, A., T. Mukerji, P. Passalacqua, **J. Hariharan** (2019), Comparing a Delta Numerical Model to a Flume Experiment using Monte Carlo Simulations and Graph Theory, 2019 AGU Fall Meeting, Abstract EP31A-06

[15] Michael, H. A., Z. Xu, **J. Hariharan**, P. Passalacqua, C. Paola, E. Steel, M. C. Perignon (2018), Surface to Subsurface Connectivity in River Deltas: From Depositional Processes to Preferential Groundwater Flow, 2018 AGU Fall Meeting, Abstract EP42A-07.

[16] Xu, Z., H. A. Michael, **J. Hariharan**, P. Passalacqua, C. Paola, M. C. Perignon, E. Steel (2018), Relations between static and dynamic connectivity in a deltaic aquifer, 2018 AGU Fall Meeting, Abstract EP43D-2744.

[17] **Hariharan, J.**, M.C. Perignon, P. Passalacqua, Z. Xu, H. A. Michael, C. Paola, E. Steel (2018), Quantifying Connectivity Between the Surface and Subsurface in Numerically Modeled Deltas, 2018 AGU Fall Meeting, Abstract EP43D-2746.