Jayaram Hariharan

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Summary

Researcher with experience at the intersection of civil engineering and geology. Expertise in the development and application of numerical models and remote sensing tools to understand river delta geomorphology. Skilled at quantitative data analysis and geoscientific programming.

Education

- **The University of Texas at Austin** — Austin, TX
  PhD, Civil Engineering — *May 2019 – Aug. 2022*
  - **Thesis**: Connecting Delta Morphology, Surface Processes, and Subsurface Structure

  MS, 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
  BS, Civil and Environmental Engineering — *Aug. 2011 – Dec. 2014*

Professional Experience

- **United States Geological Survey** — Washington, D.C.
  Physical Scientist (Data Scientist) — *Sep. 2022 – Present*

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

- **Los Alamos National Laboratory** — Los Alamos, NM
  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*

Publications (in prep., in revision, under review, and submitted)[†]

[†]Copies may be made available upon request.

[15] Knights, D., A. Piliouras, J. Schwenk, **J. Hariharan**, & C. Russionello (submitted), Seasonal and Morphological Controls on Nitrate Retention in Arctic Deltas.

[14] **Hariharan, J.**, K. Wright, A. J. Moodie, N. Tull, & P. Passalacqua (submitted), Impacts of Human Modifications on Material Transport in Deltas, *Earth Surface Dynamics*.

[13] 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 (under review), Predicting Subsurface Architecture from Surface Channel Networks in The Bengal Delta, *Journal of Geophysical Research: Earth Surface*.

Publications

[12] 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.

[11] **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.

[10] 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.

[9] **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.

[8] 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.

[7] 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.

[6] 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.

[5] 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.

[4] 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.

[3] **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.

[2] 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.

[1] **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 — 2020 – Present
  - **CSDMS:** Interactive Teaching Material Creation — Dec. 2020
    - **Creator of EKT Lab**: *Alternative mesh generation for Landlab* [link]
  - **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 ($44,999) — FY 2020
- **Awards**
  - 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

Invited Presentations

- **Instructional Clinics**
  - **Hypothesis testing with the open-source delta model *pyDeltaRCM*** [CSDMS, link] — 2022
  - **Exploring river and delta channel networks with RivGraph** [CSDMS, link] — 2021

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

Non-refereed Publications

[4] **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

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

[1] **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

[15] 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.

[14] **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.

[13] 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.

[12] 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.

[11] 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.

[10] **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

[8] 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

[7] 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

[6] 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

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

[4] 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

[3] 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.

[2] 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.

[1] **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.