Jayaram Hariharan

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Research Interests

My research leverages numerical models and remote sensing data to answer questions at the intersection of civil engineering and geology. In particular I am interested in understanding how fluvial-deltaic environments will evolve under changing external conditions.

Education

- **The University of Texas at Austin** — Austin, TX
  PhD, Civil Engineering — *May 2019 – Aug. 2022 (Expected)*
  - **Thesis**: Top to Bottom: Modeling and Analyzing River Delta Surface Morphology and Subsurface Form

  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

- **Los Alamos National Laboratory** — Los Alamos, NM
  Student Intern — *Jan. 2021 - Jun. 2021*
  - Applied graph theory methods to quantify flux partitioning error in river deltas

- **Gutschick, Little & Weber P.A.** — Burtonsville, MD
  Civil Engineer — *Jan. 2015 - Jul. 2017*
  - Led civil engineering site design for 2 commercial land development projects
  - Provided expert testimony at Planning Board meetings and public hearings

Publications

[9] Steel, E., C. Paola, A. Chadwick, **J. Hariharan**, P. Passalacqua, Z. Xu, H.A. Michael, H. Brommecker, E. Hajek (under review), Reconstructing subsurface sandbody connectivity from temporal evolution of surface networks, Basin Research.

[8] Moodie, A. J., **J. Hariharan**, E. Barefoot, & P. Passalacqua (under review), *pyDeltaRCM*: a flexible numerical delta model, Journal of Open Source Software.

[7] Tull, N., P. Passalacqua, H. Hassenruck-Gudipati, S. Rahman, K. Wright, **J. Hariharan**, & D. Mohrig (in revision), Bidirectional River-Floodplain Connectivity During Combined Pluvial-Fluvial Events, Water Resources Research.

[6] **Hariharan, J.**, A. Moodie, & P. Passalacqua (under review), Spectral Band Synthesis: Using Previously Trained Models on New Data, Earth and Space Science.

[5] Miltenberger, A.M, T. Mukerji, **J. Hariharan**, P. Passalacqua, & E. Nesvold (accepted pending minor revisions), A Graph-Theoretic Monte Carlo Framework for Comparing Delta Morphology, Morphodynamics, and Stratigraphy in Numerical Models and Physical Experiments, Mathematical Geosciences.

[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, accepted, 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, accepted, 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
  Graduate Teaching Assistant
  - Substitute lecturer for the hydrology and stochastic hydrology courses — Fall 2019
  - Teaching assistant for undergraduate hydraulic engineering course — Spring 2020
  - Grader for undergraduate hydraulics and hydrology courses — Fall 2018, 2019, and 2020

Academic and Volunteer Activities

- **Academic Activities**
  - **UT Austin:** Graduate and Industry Networking (GAIN) committee member — 2018
  - **UT Austin:** Environmental and Water Resources Engineering Seminar committee member — 2018
  - **CSDMS:** Interactive Teaching Material Creation — Dec. 2020
    - **Creator of EKT Lab**: *Alternative mesh generation for Landlab* [link]
  - **Peer-reviewer:** Computers & Geosciences; Journal of Open Source Software — 2020-
  - **Topic Editor:** Journal of Open Source Software — 2021-
- **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**
  - 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:** Python, LaTeX, MATLAB, Julia, Kotlin, Git, Unix, Bash, Unit Testing
  - **Engineering/Mapping:** AutoCAD Civil 3D, HEC-RAS, ArcGIS/QGIS, Generic Mapping Tools
  - **Other:** MS Office, GIMP, Illustrator/Inkscape, IHS Kingdom, Audacity
- **Licenses**
  - **State of Maryland Engineer in Training (EIT)** Licence #46507

Non-refereed Publications

[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, University of Texas, Austin.

Conference Abstracts and Presentations

[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.