Tyler H. Doane — Geomorphologist

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Work

Indiana University **2020-current**
Postdoctoral Research Fellow *Bloomington, IN*

United States Geological Survey **2022-2023**
Postdoctoral Research Scientist *Moffett Field, CA*

University of Arizona **2018-2020**
Postdoctoral Researcher *Tucson, AZ*

Affiliations

Case Western Reserve University **2023-Present**
Adjunct Assistant Professor *Cleveland, OH*

Education

Vanderbilt University **2014 – 2018**
Ph.D. in Earth and Environmental Sciences *Nashville, TN*

Vanderbilt University **2012 - 2014**
M.Sc. in Earth and Environmental Sciences *Nashville, TN*

Colorado College **2006 – 2010**
B.A. in Geology *Colorado Springs, CO*

Publications

Dissertation

Theory and Application of Nonlocal Hillslope Sediment Transport (2018)
Vanderbilt University, Nashville, TN

Articles

Gray, H., **Doane, T.H.**, Nicovich, S., Primus, M., DuRoss, C., & Gold, R., (In Prep). Evidence for Nonlocal Sediment Transport on Hillslopes, Target Journal: *Nature Geoscience*

Doane, T.H., Gearon, J.H., Martin, H.K., Yanites, B.J., & Edmonds, D.A., (In prep.). Theory, Development, and Description of Process Topography, Target Journal: *Journal of Geophysical Research: Earth Surface*

Doane, T.H., Yanites, B.J., Edmonds, D.A., & Novick, K.A. (2023). Topographic roughness reveals forest sensitivity to extreme winds, *Proceedings of the National Academy of Sciences*, 10.1073/pnas.2212105120, (**Featured in Eos, Feb 2023**)

Doane, T.H., Edmonds, D.A., Yanites, B.J., & Lewis, Q.W. (2021). Topographic roughness on forested hillslopes: a theoretical approach for quantifying hillslope sediment flux from tree throw, *Geophysical Research Letters*, 41, 10.1029/2021GL094987, (**Featured in Eos, Nov. 2021**)

Doane, T.H., Pelletier, J.D., & Nichols, M. (2021). Hack distributions of rill networks and nonlinear slope length-soil loss relationships, *Earth Surface Dynamics*, 9, 317-331, doi.org/10.5194/esurf-9-317-2021

Furbish, D.J., Roering, J.J., **Doane, T.H.**, Roth, D.L., & Williams, S.G. (2021). Rarefied particle motion on hilslopes: 1. Theory, *Earth Surface Dynamics*, 9, 539-576, doi.org/10.5194/esurf-9-539-2021

Furbish, D.J., Williams, S.G., Roth, D.L., **Doane, T.H.**, & Roering, J.J. (2021) Rarefied particle motion on hillslopes: 2. Analysis, *Earth Surface Dynamics*, 9, 577-613, doi.org/10.5194/esurf-9-577-2021

Furbish, D.J., **Doane, T.H.**, & Williams, S.G., (2021). Rarefied particle motions on hillslopes: 3. Entropy, *Earth Surface Dynamics*, 9, 615-628, doi.org/10.5194/esurf-9-615-2021

Furbish, D.J & **Doane, T.H.** (2021). Rarefied particle motions on hillslopes: 4. Philosophy, *Earth Surface Dynamics*, 9, 629-664, doi.org/10.5194/esurf-9-629-2021

Roth, D.L., **Doane, T.H.**, Furbish, D.J., & Roering, J.J. (2020). Particle motion on burned and vegetated hillslopes, *Proceedings of the National Academy of Sciences*, 117(41), doi.org/10.1073/pnas.1922495117

Doane, T. H., Roth, D.L., Roering, J.J., & Furbish, D.J. (2019). Compression and decay of hillslope topographic variance in wavenumber domain, *JGR: Earth Surface*, 124, 60-79, doi.org/10.1029/2018JF004724

Doane, T. H., Furbish, D.J., Roering, J.J., Schumer, R., & Morgan, D.M. (2018). Nonlocal transport on steep lateral moraines, eastern Sierra Nevada, California, USA, *JGR: Earth Surface*, 123, 187-208, doi.org/10.1002/2017JF004325.

Furbish, D.J, Roering, J.J., Almond, P., & **Doane, T.H.** (2018). Soil particle transport and mixing near a hillslope crest: 1. Particle ages and residence times, *JGR: Earth Surface*, 123, doi.org/10.1029/2017JF004316

Furbish, D.J., Keen-Zebert, A., Almond, P., **Doane, T.H.,** & Schumer, R. (2018), Soil particle transport and mixing near a hillslope crest: 2. Cosmogenic nuclide and optically stimulated luminescence tracers, *JGR: Earth Surface*, 123, doi.org/10.1029/2017JF004315

Conference Abstracts

First Author

Doane, T.H., Edmonds, D.A, Yanites, B.J. & Novick, K.A. (2022) Wind and tree throw statistics informed

by hillslope topographic roughness, Abstract EP26A-04, presented at 2022 Fall Meeting, AGU, Chicago, IL

Doane, T.H., Yanites, B.J. & Edmonds, D.A., Uprooting the critical zone: Topographic roughness as a metric for sediment transport due to tree throw, Abstract EP43B-04, presented at 2021 Fall Meeting, AGU, New Orleans, LA

Doane T.H., L.Li, Nichols, M., & Pelletier, J. (2020) Hillslope Hack and hydraulic distributions: Theory and mutual information, Abstract EP014-04, presented at 2020 Fall Meeting, AGU, San Francisco, CA

Doane, T.H., & Pelletier, J. (2019). A probabilistic and numerical approach to explore how hillslope length controls sediment yield, Abstract EP51F-2179 presented at 2019 Fall Meeting, AGU, San Francisco, CA

Doane, T.H., & Furbish, D.J. (2018) Sediment capacitors as sources of stochastic sediment transport, Abstract EP23G-2409 presented at 2018 Fall Meeting, AGU, Washington, D.C.

Doane, T.H., Roth, D.L., Roering, J.J., & Furbish, D.J. (2017). Compression and decay of hillslope topographic variance in wavenumber domain, Abstract EP31F-04, presented at 2017 Fall Meeting, AGU, New Orleans, LA.

Doane, T.H., Furbish, D.J., Morgan D., & Roering, J.J. (2016). Characteristics and evaluation of nonlocal hillslope sediment transport, Abstract EP32C-02 presented at 2016 Fall Meeting, AGU, San Francisco, CA.

Doane, T.H. & Furbish, D.J. (2015). Disturbance-driven hillslope diffusion scales and values clarified by extant surface roughness, Abstract EP41C-0937 presented at 2015 Fall Meeting, AGU, San Francisco, CA.

Doane, T.H. & Furbish, D.J. (2014). Exploring a two-dimensional nonlocal description of the hillslope sediment flux, Abstract EP33B-3637 presented at 2014 Fall Meeting, AGU, San Francisco, CA.

Doane, T.H. & Furbish, D.J. (2013). Exploring nonlocal transport on soil-mantled hillslopes and its effect on topographic roughness and soil thickness, Abstract EP53B-0811 presented at 2013 Fall Meeting, AGU, San Francisco, CA.

Contributing Author

Williams, S.G., Furbish, D.J., Roth, D.L., **Doane, T.H.**, & Roering, J.J. (2019) Demonstration and analysis of rarefied particle motions on hillsopes, Abstract EP51F-2176, presented at Fall Meeting, AGU, San Francisco, CA

Roth, D.L., **Doane, T.H.**, Roering, J.J., Furbish, D.J., & Zettler-Mann A. (2019) Slope, roughness, and grain size control on particle motion on burned and vegetated hillslopes, Abstract EP51B-09, presented at Fall Meeting, AGU, San Francisco, CA

Roth, Danica L., Roering, J.J., **Doane, T.H.** , & Furbish, D.J. (2017). Topographic roughness and steep hillslopes: effects of vegetation and fire on nonlocal sediment transport and surface morphology, Abstract EP31F-03, to be presented at Fall Meeting, AGU, New Orleans, LA.

Watkins, T., Furbish, D.J., & **Doane, T.H.** (2015). Numerical and physical experiments to clarify the role of vegetation as sediment capacitors in modulating changes in hillslope form Abstract EP53B-1026 presented at Fall Meeting, AGU, San Francisco, CA.

Funding

NSF - Geomorphology and Land-use Dynamics **2022**
2 years of postdoctoral funding *$400,000*

Skills

Computer Languages: Python, Matlab, R

Geospatial Software: QGIS, ArcGIS, GDAL, Google Earth Engine, ESA STEP (SAR)

Invited Talks

Washington University in St. Louis
Department of Earth and Planetary Sciences Seminar *10/2023*

Kent State University
Department of Earth Science Seminar *09/2023*

U.S. Geological Survey
GMEG Seminar *10/2022*

Stanford University
Geological Sciences Seminar *02/2022*

U. British Columbia
Surface Process Research Group *03/2021*

Colorado College
Geology Department Colloquium *03/2021*

Indiana University
Earth and Atmospheric Sciences *10/2020*

University of Arizona
Civil Engineering Seminar *10/2018*

Teaching Experience

Case Western Reserve University **2023**
Adjunct Assistant Professor, Geomorphology and Remote Sensing *Cleveland, OH*

University of California, Berkeley **2021**
Lecturer, Geomorphology *Berkeley, CA*

Vanderbilt University **2012 – 2018**
Teaching Assistant *Nashville, TN*

- Eight semesters
- Courses taught: Structural Geology, Dynamic Earth, Geomorphology, Sedimentology

Colorado College **Colorado Springs, CO**
Paraprofessional *2010–2011*

- Six courses
- Courses taught: Sedimentology, Rocky Mountains as a Physical System, Rocky Mountains as a Chemical System, Metamorphic Petrology, Advanced Structural Geology, Physical Geology

Research Experience

Indiana University-Bloomington **2020-2023**
Post-doctoral Research Fellow *Bloomington, IN*

- Supervisor: Dr. Douglas Edmonds, Dr. Brian Yanites
- Develop theory that explains the topographic roughness of forested hillslopes
- Develop object detection programs for automatic mapping of tree uprooting events in high resolution lidar data (Python, PyTorch, Yolo)
- Demonstrate the consequences of trees on landscape evolution in forested settings

U.S. Geological Survey **2022 - 2023**
Postdoctoral Research Scientist *Moffett Field, CA*

- Identify thresholds for surface runoff in post-wildfire landscapes
- Develop theory and numerical simulations for surface flow (Python)
- Measure soil-hydraulic data in post-wildfire landscapes
- Identify potential use for synthetic aperture radar for identifying runoff-prone areas

University of Arizona **2018 - 2020**
Postdoctoral Research Associate *Tucson, AZ*

- Supervisor: Professor Jon Pelletier, Ph.D. (University of Arizona); Mary Nichols, Ph.D. (USDA-ARS)
- Developing theory that explains how topographic roughness, ecology, and climate influence hillslope length

Vanderbilt University **2012 – 2018**
Research Assistant *Nashville, TN*

- Supervisor: Professor David Jon Furbish, Ph.D.
- Application and Clarification of Nonlocal Hillslope Sediment Transport
- Key Findings: Demonstrated nonlocal transport at the hillslope scale, identified values of parameters that reflect the magnitude of natural transport processes, mathemtically identified underlying similarities between various formulations, identified diagnostic behaviors of transport style that are contained in land-surface form, identified the theoretical distribution of particle rest times on hillslopes.

McGill University **2011 – 2012**
Research Assistant *Montréal, QC, Canada*

- Supervisor: Assistant Professor, Sarah Hall, Ph.D
- Studied glacial chronology and uplift history of Cordillera Blanca, Peru

Service

Committee Member: Earth and Planetary Surface Process-Connects, 2022

Committee Member: University of Arizona Postdoctoral Association, 2018-2020

Reviewer: Reviewer for Journal of Geophysical Research – Earth Surface, Earth Surface Dynamics, Earth Science Reviews, Water Resources Research, Trees, Science Advances

Session Convener: American Geophysical Union Fall Meeting, 2018, 2020, 2021, 2023

Professional Development

2021: Unlearning Racism in Geosciences (URGE) *National initiative bringing members of the braoder geoscience community together to consider solutions and policies to increase diversity and equity in the field.*

2017: Evidence Based Teaching Workshop *Short course on challenge-based learning, course design, assessment, classroom management, classroom technology, and scholarly resources*

2016: Earth Educator's Rendezvous *Conference aimed at undergraduate Earth science education*

2016: Preparing for an Academic Career *Short course detailing approaches to academic jobs, teaching techniques, and academic requirements*

2016: Summer Institute for Earth Surface Dynamics *Coupled hydro-eco-geomorphologic processes in human dominated landscapes: cascade of changes and the use of modeling for management and decision making*

Professional Memberships

American Geophysical Union: *2012 – present*

National Association of Geoscience Teachers: *2016 – present*