

## Roman A. DiBiase

Department of Geosciences  
Pennsylvania State University  
306 Deike Building  
University Park, PA 16802

814-865-7388 (Office)  
rdibiase@psu.edu  
<http://sites.psu.edu/dibiase>

### Education

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- 2011 Ph.D., Geological Sciences, Arizona State University
- 2005 B.A., Geophysics, University of California, Berkeley

### Appointments

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- 2020 – Rudy L. Slingerland Early Career Professor in the College of Earth and Mineral Sciences
- 2014 – Assistant Professor of Geosciences, Pennsylvania State University
- 2011–2014 Postdoctoral Scholar in Geology, California Institute of Technology

### Honors and awards

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- 2019 NSF CAREER Award
- 2013 Editors' citation for excellence in refereeing for JGR-Earth Surface
- 2010–2011 ARCS Fellowship, Arizona State University
- 2006–2008 Arizona State University Graduate Scholar Fellowship

### Grants

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- 2020-2023 “GEMT: Collaborative Research: From grain to rock and back again: Elucidating the coordinated evolution of exhumation pathways, rock strength, and topography in the Taiwanese orogen” NSF EAR-1933203 (PI, w/D. Fisher, \$471,887)
- 2019–2024 “CAREER: Quantifying the controls of wildfire, climate, and tectonics on the transition between soil-mantled and bedrock hillslopes” NSF EAR-1848321 (Sole PI, \$541,960)
- 2019–2020 “Wetland Program Development in Support of Pennsylvania’s Aquatic Resource Protection and Management Action Plan, Program Focus Area 3: Headwater Aquatic Resource Reference System” Pennsylvania Department of Environmental Protection (Co-I, w/S. Brantley, X. Niu, and D. Waldrop, \$256,000)
- 2019–2020 “UAV-assisted geomorphic and structural surveys of river corridors in the Taiwan Central Range” Penn State Office of Global Programs (PI, w/D. Fisher and E.C. Yeh, \$5,000)
- 2018–2019 “Coring of pre-Holocene sediments at Bear Meadows: A coupled record of paleoclimate, paleoecology, and hillslope erosion?” Penn State Institutes of Energy and the Environment (PI, w/S. Ivory, \$10,000)
- 2018 “Quaternary landscape evolution of the southern Afar Depression, Ethiopia” Purdue University PRIME Lab Seed Grant (Co-I, w/E. DiMaggio and R. Arrowsmith, \$11,240)
- 2016–2021 “Fracture density and grain size controls on the relief structure of bedrock landscapes” NSF EAR-1608014 (Sole PI, \$315,052)
- 2014–2020 Using the Susquehanna - Shale Hills CZO to Project from the Geological Past to the Anthropocene Future (Co-I, w/S. Brantley, D. Eissenstat, K. Davis, L. Li, J. Kaye, and J. Duncan, \$6,399,992)

Citation metrics available from Google Scholar: <https://scholar.google.com/citations?user=Wa5gdkwAAAAJ>

\* indicates supervised graduate student author

\*\* indicates supervised undergraduate student author

2020

27. **DiBiase, R.A.**, and Lamb, M.P., 2020. Dry sediment loading of headwater channels fuels post-wildfire debris flows in bedrock landscapes, *Geology* 48, p. 189–193, <http://doi.org/10.1130/G46847.1>

2019

26. Kaye, J.P., Brantley, S.L., Williams, J.Z., and **the SSHCZO team**, 2019. Proposed Best Practices for Collaboration at Cross-disciplinary Observatories, *Biogeosciences* 16, p. 4661–4669, <http://doi.org/10.5194/bg-2019-249>
25. Xiao, D., Shi, Y., Brantley, S., Forsythe, B., **DiBiase, R.A.**, Davis, K., Li, L., in press. Streamflow generation from catchments of contrasting lithologies: the role of soil properties, topography, and catchment size, *Water Resources Research* 55, p. 9234–9257, <http://doi.org/10.1029/2018WR023736>
24. \*Neely, A.B., **DiBiase, R.A.**, Corbett, L.B., Bierman, P.R., and Caffee, M.W., 2019. Bedrock fracture density controls on hillslope erodibility in steep, rocky landscapes with patchy soil cover, southern California, USA, *Earth and Planetary Science Letters* 522, p. 186–197, <http://doi.org/10.1016/j.epsl.2019.06.011>
23. Chen, Y., **DiBiase, R.A.**, \*\*McCarroll, N., and Liu, X., 2019. Quantifying flow resistance in mountain streams using computational fluid dynamics modeling over structure-from-motion photogrammetry derived microtopography, *Earth Surface Processes and Landforms* 44, p. 1973–1987, <http://doi.org/10.1002/esp.4624>

2018

22. **DiBiase, R.A.**, Denn, A.R., Bierman, P.R., Kirby, E., West, N., and Hidy, A.J., 2018. Stratigraphic control of landscape response to base-level fall, Young Womans Creek, Pennsylvania, USA, *Earth and Planetary Science Letters* 504, p. 163–173, <http://doi.org/10.1016/j.epsl.2018.10.005>
21. Brantley, S.L., White, T., West, N., Williams, J.Z., Forsythe, B., Shapich, D., Kaye, J., Lin, H., Shi, Y., Kaye, M., Herndon, E., Davis, K., He, Y., Eissenstat, D., Weitzman, J., **DiBiase, R.A.**, Li, L., Reed, W., Brubaker, K., and Gu, X., 2018. Susquehanna Shale Hills Critical Zone Observatory: Shale Hills in the Context of Shaver’s Creek Watershed, *Vadose Zone Journal* 17, 180092, <http://doi.org/10.2136/vzj2018.04.0092>
20. \*Del Vecchio, J., **DiBiase, R.A.**, Denn, A.R., Bierman, P.R., Caffee, M.W., and Zimmerman, S.R., 2018. A record of coupled hillslope and channel response to Pleistocene erosion and deposition in a sandstone headwater valley, central Pennsylvania, *Geological Society of America Bulletin* 130, p. 1903–1917, <http://doi.org/10.1130/B31912.1>
19. **DiBiase, R.A.**, 2018. Short Communication: Increasing vertical attenuation length of cosmogenic nuclide production on steep slopes negates topographic shielding corrections for catchment erosion rates, *Earth Surface Dynamics* 6, p. 923–931, <http://doi.org/10.5194/esurf-6-923-2018>
18. Li, L., **DiBiase, R.A.**, \*Del Vecchio, J., Marcon, V., Hoagland, B., Xiao, D., Wayman, C., Tang, Q., He, Y., \*Silverhart, P., Forsythe, B., Williams, J.Z., Shapich, D., Mount, G.J., Kaye, J., Guo, L., Lin, H., Eissenstat, D., Dere, A., Brubaker, K., Kaye, M., Davis, K., and Brantley, S., 2018. Investigating the effect of lithology and agriculture at the Susquehanna Shale Hills Critical Zone Observatory (SSHCZO): The Garner Run and Cole Farm subcatchments, *Vadose Zone Journal* 17, 180063, <http://doi.org/10.2136/vzj2018.03.0063>

17. **DiBiase, R.A.**, Rossi, M.W., and \*Neely, A.B., 2018. Fracture density and grain size controls on the relief structure of bedrock landscapes, *Geology* 46, p. 399–402, <http://doi.org/10.1130/G40006.1>

2017

16. Scherler, D., **DiBiase, R.A.**, Fisher, G.B., and Avouac, J.P., 2017. Testing monsoonal controls on bedrock river incision in the Himalaya and Eastern Tibet with a stochastic-threshold stream power model, *Journal of Geophysical Research-Earth Surface* 122, p. 1389–1429, <http://doi.org/10.1002/2016JF004011>
15. **DiBiase, R.A.**, Lamb, M.P., Ganti, V., and Booth, A.M., 2017. Slope, grain size, and roughness controls on dry sediment transport and storage on steep hillslopes, *Journal of Geophysical Research-Earth Surface* 122, p. 941–960, <http://doi.org/10.1002/2016JF003970>
14. Whipple, K.X., Forte, A.M., **DiBiase, R.A.**, Gasparini, N.M., and Ouimet, W.B., 2017. Timescales of landscape response to divide migration and drainage capture: Implications for the role of divide mobility in landscape evolution, *Journal of Geophysical Research-Earth Surface* 122, p. 248–273, <http://doi.org/10.1002/2016JF003973>
13. Whipple, K.X., **DiBiase, R.A.**, Ouimet, W.B., and Forte, A.M., 2017. Preservation or piracy: Diagnosing low-relief, high-elevation surface formation mechanisms, *Geology* 45, p. 91–94, <http://doi.org/10.1130/G38490.1>

2016

12. Brantley, S.L., **DiBiase, R.A.**, Russo, T., Shi, Y., Lin, H., Davis, K.J., Kaye, M., Hill, L., Kaye, J., Neal, A.L., Eissenstat, D., Hoagland, B., and Dere, A., 2016. Designing a suite of measurements to understand the critical zone, *Earth Surface Dynamics* 4, p. 211–235, <http://doi.org/10.5194/esurf-4-211-2016>

2015

11. **DiBiase, R.A.**, Whipple, K.X., Lamb, M.P., and Heimsath, A.M., 2015. The role of waterfalls and knickzones in controlling the style and pace of landscape adjustment in the western San Gabriel Mountains, California, *Geological Society of America Bulletin* 127, p. 539–559, <http://doi.org/10.1130/B31113.1>

2013

10. **DiBiase, R.A.**, Limaye, A.B., Scheingross, J.S., Fischer, W.W., and Lamb, M.P., 2013. Deltaic deposits at Aeolis Dorsa: Sedimentary evidence for a large body of water in the northern plains of Mars, *Journal of Geophysical Research-Planets* 118, p. 1285–1302, <http://doi.org/10.1002/jgre.20100>
9. Whipple, K.X., **DiBiase, R.A.**, and Crosby, B.T., 2013. Bedrock Rivers, in *Treatise on Geomorphology*, Vol. 9, Shroder, J., Jr., Wohl, E. (Eds.). Academic Press: San Diego, CA, <http://doi.org/10.1016/B978-0-12-374739-6.00254-2>
8. Lamb, M.P., Levina, M., **DiBiase, R.A.**, and Fuller, B., 2013. Sediment storage by vegetation in steep, bedrock landscapes: Theory, experiments, and implications for post-fire sediment yield, *Journal of Geophysical Research-Earth Surface* 118, p. 1147–1160, <http://doi.org/10.1002/jgrf.20058>
7. **DiBiase, R.A.** and Lamb, M.P., 2013. Vegetation and wildfire controls on sediment yield in bedrock landscapes, *Geophysical Research Letters* 40, p. 1093–1097, <http://doi.org/10.1002/grl.50277>

2012

6. Dixon, J.L., Hartshorn, A.S., Heimsath, A.M., **DiBiase, R.A.**, and Whipple, K.X., 2012. Chemical weathering response to tectonic forcing: A soils perspective from the San Gabriel Mountains, California, *Earth and Planetary Science Letters* 323, p. 40–49, <http://doi.org/10.1016/j.epsl.2012.01.010>

5. Heimsath, A.M., **DiBiase, R.A.**, and Whipple, K.X., 2012. Soil production limits and the transition to bedrock dominated landscapes, *Nature Geoscience* 5, p. 210–214, <http://doi.org/10.1038/ngeo1380>
4. **DiBiase, R.A.**, Heimsath, A.M., and Whipple, K.X., 2012. Hillslope response to tectonic forcing in threshold landscapes, *Earth Surface Processes and Landforms* 37, p. 855–865, <http://doi.org/10.1002/esp.3205>

#### 2011

3. **DiBiase, R.A.** and Whipple, K.X., 2011. The influence of erosion thresholds and runoff variability on the relationships among topography, climate, and erosion rate, *Journal of Geophysical Research-Earth Surface* 116, F04036, <http://doi.org/10.1029/2011JF002095>
2. Norton, K.P., von Blanckenburg, F., **DiBiase, R.**, Schlunegger, F., and Kubik, P.W., 2011. Cosmogenic <sup>10</sup>Be-derived denudation rates of the Eastern and Southern European Alps, *International Journal of Earth Sciences*, <http://doi.org/10.1007/s00531-010-0626-y>

#### 2010

1. **DiBiase, R.A.**, Whipple, K.X., Heimsath, A.M., and Ouimet, W.B., 2010. Landscape form and millennial erosion rates in the San Gabriel Mountains, CA, *Earth and Planetary Science Letters* 289, p. 134–144, <http://doi.org/10.1016/j.epsl.2009.10.036>

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#### Manuscripts in review

Lohse, K.A., Billings, S., **DiBiase, R.A.**, Kumar, P., Berhe, A.A., and Kaye, J., in review. Signals of Anthropocene disturbance in the critical zone

Marcon, V., Hoagland, B., Gu, X., Liu, W., Kaye, J., **DiBiase, R.A.**, and Brantley, S., in review. Where older, slow-eroding soils are more nutrient-rich than younger fast-eroding soils: Landscapes as collectors or losers of nutrients

\*Neely, A.B., and **DiBiase, R.A.**, in review. Drainage area, bedrock fracture spacing, and weathering controls on landscape-scale patterns in surface sediment grain size

**DiBiase, R.A.**, Comas, X., Hayes, J., Mount, G.J., \*Del Vecchio, J., Guo, L., Lin, H., Zarif, F., Forsythe, B., and Brantley, S.L., in review. Integrated geophysical surveys reveal architecture of a headwater sandstone catchment at the Susquehanna Shale Hills Critical Zone Observatory

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#### Other Publications

Gold, D., et al. (including **R.A. DiBiase**), 2017. Recent geologic studies and initiatives in central Pennsylvania: Roadlog for the 82nd annual field conference of Pennsylvania Geologists, 132 pp.

Whipple, K.X., **DiBiase, R.A.**, Ouimet, W.B., and Forte, A.M., 2017. Preservation or piracy: Diagnosing low-relief, high-elevation surface formation mechanisms: REPLY, *Geology* 45, e422, <http://doi.org/10.1130/G39252Y.1>

**DiBiase, R.A.**, 2014. River incision revisited, *Nature* 505, p. 294-295, <http://doi.org/10.1038/505294a>

**DiBiase, R.A.**, 2011. Tectonic Geomorphology of the San Gabriel Mountains, California, Ph.D. dissertation, Arizona State University, Tempe, Arizona, USA, 247 pp., <http://hdl.handle.net/2286/R.I.14250>

## Research presentations

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More than 20 invited talks at universities and conferences

More than 50 abstracts for presentations at national meetings in past 5 years

## Service to the field and profession

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2019– Advisory committee member, NSF Open Topography Facility

2019– Executive committee member, AGU Earth and Planetary Surface Processes section

2019– AGU Fall Meeting Outstanding Student Paper Awards (OSPA) Coordinator for Earth and Planetary Surface Processes section

2015– Steering committee member, National Center for Airborne Laser Mapping (chair 2019–present)

2017 Co-organizer, 82nd annual Field conference of Pennsylvania Geologists, “Recent Geologic Studies and Initiatives in Central Pennsylvania”, hosted at Penn State 5–7 Oct.

2017 Co-organizer, 6th annual Amtrak Club, “Propagation of climate and tectonic signals through landscapes”, hosted at Penn State 19–20 May

2016–2017 AGU Fall Meeting Outstanding Student Paper Awards (OSPA) Coordinator for Earth and Planetary Surface Processes focus group

2013 Student travel grant reviewer, AGU Earth and Planetary Surface Processes focus group

Convener for 8 sessions and town halls at national meetings in past 5 years

Reviewer for over 50 papers and 30 grant proposals in past 5 years

Panelist for 2 NSF programs in past 5 years

## Service to the university and department

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### *University service*

2019–2020 Graduate Water Program Committee (committee member)

### *Department of Geosciences service*

2018– PhD Candidacy Exam rover

2018–2020 Hydrogeology Faculty Search Committee (committee member)

2015–2019 Undergraduate Program Committee (committee member)

2014–2016 Sedimentary Geology Faculty Search Committee (committee member)

2016–2017 Executive committee (committee member)

2014–2016 Graduate admissions committee (committee member)

### *Graduate student committees*

PhD dissertation committee member: David Oakley (2016, Geosciences); Yunxiang Chen (2018, Civil and Environmental Engineering); Yuncheng Xu (2019, Civil and Environmental Engineering); Virginia Marcon (2019, Geosciences)

PhD comprehensive exam committee member: Warren Reed (2017, Ecology); Zilong Li (2019, Civil and Environmental Engineering); Kalle Jahn (2019, Geosciences)

PhD candidacy exam committee member: Seyi Ajayi (2017, Geosciences); Elisabeth Clyne (2018, Geosciences); Judit Gonzales Santana (2018, Geosciences); Benjamin Hayworth (2019, Geosciences); Xiaoni Hu (2019,

Geosciences); Collin Oborn (2019, Geosciences); Haochen Ye (2020, Geosciences), Junzhu Shen (2020, Geosciences)

MS thesis committee member: Rebecca Vanderleest (2015, Geosciences); Lillian Hill (2016, Ecology); Evan Greenberg (2017, Geosciences); Callum Wayman (2018, Geosciences)

#### Courses taught at Penn State

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2020	GEOSC 340	Geomorphology (3 credits, spring)
	GEOSC 310	Earth History (4 credits, spring, w/ D. Fisher)
	GEOSC 497	Virtual field investigations (3 credits, summer, w/ E. DiMaggio, D. Fisher, and A. Smye)
2019	GEOSC 340	Geomorphology (3 credits, spring)
	GEOSC 472A	Geology field school I (3 credits, summer, w/ E. DiMaggio)
2018	GEOSC 340	Geomorphology (3 credits, spring)
	GEOSC 598	Critical Zone Seminar (1 credit, spring, w/ S. Brantley)
	GEOSC 472A	Geology field school I (3 credits, summer, w/ E. DiMaggio)
	GEOSC 303	Introduction to Environmental Geology (3 credits, fall, w/ D. Bice)
	GEOSC 548	Advanced Surface Processes (3 credits, fall)
	GEOSC 587	Academic Careers in Geosciences (2 credits, fall, w/K. Freeman and T. Bralower)
2017	GEOSC 340	Geomorphology (3 credits, spring)
	GEOSC 472A	Geology field school I (3 credits, summer, w/ R. Slingerland and E. DiMaggio)
	GEOSC 303	Introduction to Environmental Geology (3 credits, fall, w/ D. Bice)
	GEOSC 565	Tectonic Geomorphology (3 credits, fall, w/ D. Fisher)
2016	GEOSC 340	Geomorphology (3 credits, spring)
	GEOSC 497C	Making Geologic Maps with ArcGIS (1 credit, spring, w/ E. DiMaggio)
	GEOSC 472A	Geology field school I (3 credits, summer, w/ R. Slingerland and E. DiMaggio)
	GEOSC 303	Introduction to Environmental Geology (3 credits, fall, w/ D. Bice)
	GEOSC 597	SfM Photogrammetry seminar (1 credit, fall, w/ P. LaFemina and K. Mankoff)
	GEOSC 548	Advanced Surface processes (3 credits, fall)
2015	GEOSC 340	Geomorphology (3 credits, spring)
	GEOSC 303	Introduction to Environmental Geology (3 credits, fall, w/D. Bice)
	GEOSC 597E	Seminar in Earth surface processes and sedimentary geology (1 credit, fall, w/ E. Hajek)

#### Student advising

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##### *Graduate student advising (Penn State)*

- 2017– Julia Carr (Geosciences PhD candidate): Rock strength controls on feedbacks between tectonics and erosion in Taiwan
- 2017– Joanmarie Del Vecchio (Geosciences PhD candidate): Paleoclimate, paleoecology, and paleoerosion history preserved at Bear Meadows bog, central Pennsylvania
- 2015–2020 Alexander Neely (Geosciences PhD candidate): Bedrock fracture spacing controls on hillslope and channel erosion in steep landscapes
- 2017–2019 Perri Silverhart (Geosciences MS, 2019): Land use versus climate controls on hillslope erosion at a farmed upland watershed in central Pennsylvania (*now at Geosyntec Consultants, Washington, DC*)
- 2015–2017 Joanmarie Del Vecchio (Geosciences MS, 2017): A record of coupled hillslope and channel response to Pleistocene periglacial erosion in a sandstone headwater valley, central Pennsylvania

*Undergraduate thesis advising*

- 2018–2020 Emily Loucks (Geoscience BS in progress): Rock strength controls on hillslope and channel morphology in the Guadalupe Mountains, NM/TX
- 2019–2020 Nazmi Yusri (Geoscience BS in progress): Quantifying the impact of landslides on river morphology in Taiwan using drone surveys
- 2018–2019 Lisa Woodward (Geoscience BS, 2019): Mapping post-wildfire sediment erosion using repeat airborne lidar topography in the San Gabriel Mountains of California
- 2016–2017 Nicholas McCarroll (Geoscience BS, 2017): Quantifying connections between channel-bed microtopography and grain size distribution in mountain streams using Structure-from-Motion
- 2016–2017 Tyler White (Geoscience BS, 2017): Mapping bedrock hillslope morphology with high-resolution imagery and topography
- 2014–2015 Michael Sickler (Geoscience BS, 2015): Sediment storage in upland valley networks, Eastern Central Range, Taiwan

*Undergraduate research advising (non-thesis)*

- 2020 Christian Erikson (NSF GEMT REU summer intern): Grain size and surface roughness mapping from drone surveys in the Liwu River, Taiwan
- 2020 Nancy Weinheimer (NSF CAREER undergraduate research assistant): Geomorphic mapping of the Inyo Mountains, California
- 2020 Allison Clark (NASA PA Space Grant WISER Research Intern): Typhoon impact on boulder transport in the Taiwan Central Range from repeat drone surveys
- 2019 Katie Kohlman (NASA PA Space Grant WISER Research Intern): Grain size mapping of rivers in the Taiwan Central Range using drone surveys
- 2018–2019 Rose Martin (NASA PA Space Grant WISER Research Intern): Aspect controls on periglacial landforms in central Pennsylvania
- 2018 Tara Wu (NASA PA Space Grant WISER Research Intern): Alluvial fans and debris flow mapping in Saline Valley, CA
- 2016 Perri Silverhart (NSF CZO REU summer intern): Evaluating the importance of regolith heterogeneity on catchment hydrology in Garner Run, Susquehanna Shale Hills Critical Zone Observatory
- 2016 Connor Martin (NSF CZO REU summer intern): Geomorphic mapping of Garner Run, Susquehanna Shale Hills Critical Zone Observatory
- 2015 Sarah Granke (NSF CZO REU summer intern): Geomorphic mapping of Garner Run, Susquehanna Shale Hills Critical Zone Observatory