

# Dr. Benjamin Purinton

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## Education

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<i>PhD (magna cum laude)</i> , Remote Sensing, University of Potsdam, Germany “Remote Sensing Applications to Earth Surface Processes in the Eastern Central Andes” (Advisor: Prof. Dr. Bodo Bookhagen)	February 2020
<i>MSc</i> , Geology, University of Potsdam, Germany “Validation of DEMs & Derived Geomorphic Metrics on the Southern Central Andean Plateau” (Advisor: Prof. Dr. Bodo Bookhagen)	November 2016
<i>BA (high honors)</i> , Earth & Environmental Sciences, Wesleyan University, USA “The Hydrologic & Geomorphic Impacts of the 2010 Fourmile Canyon Fire, Boulder Creek Watershed, CO” (Advisor: Prof. Peter Patton)	May 2013

## Professional Experience

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November 2022 –	Educator and Developer, First Draft, LLC
June 2023 –	Research Scientist, University of Washington, USA
November 2022 – April 2024	Living and working in Nome, Alaska
June 2020 – October 2022	Post-Doctoral Researcher and Instructor, University of Potsdam, Germany
2017 – 2020	PhD Candidate and Teaching Assistant, University of Potsdam, Germany
March 2015 – 2019	Fieldwork in the Eastern Central Andes for master’s and doctoral theses
Summer 2012	Keck Consortium funded fieldwork for Colorado Front Range bachelor’s thesis
Spring 2012	Geochemistry lab technician at Wesleyan University
Summer 2011	NSF funded research intern at Lamont-Doherty Earth Observatory

## Personal Research Statement

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My scientific research intersects remote sensing and quantitative geomorphology using satellite and field data. I disseminate my work through cutting-edge courses and open-source practices. My current projects include generation of high-resolution surface models from satellite data. I also work in web application development, teaching programming to beginners.

## Skills

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### Programming:

- Python, Bash scripting (5+ years) — Geospatial and statistical tasks with publication of algorithms
- Ruby, Rails, JavaScript, SQL, HTML, CSS (3+ years) — Full-stack web application development

### Software:

- GIS and Remote Sensing — QGIS, ArcGIS, GMT, GDAL/OGR, ENVI, PCI-Geomatica, SNAP
- Point Clouds — Agisoft Metashape, Pix4D, CloudCompare, LAStools, PDAL
- Topographic Analysis — TopoToolbox (Matlab), LSDTopoTools (Command Line)
- Other — Adobe Illustrator, LaTeX, markdown, pandoc

### Methods:

- Technical scientific writing and communication to wider audiences
- Quantitative statistical analysis of large environmental datasets, including principles of machine learning
- Optical and radar satellite data management, image processing, and analysis
- Collection and processing of precise geodetic measurements
- Structure-from-Motion processing of photo surveys to generate point clouds and digital surface models

## Teaching

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### Teaching Assistant, University of Chicago:

- Full-stack Application Development (BUSN 36110/20550, 8 sections per year)

### Instructor, University of Potsdam:

- Introduction to GIS Lab Section (GIS1, Winter 2017, 2019, 2020)
- Data Analysis and Statistics (RCM03, Winter 2020, 2021)
- Optical Remote Sensing (RSM01, Summer 2021, 2022)

### Co-Instructor, University of Potsdam:

- Terrestrial and Airborne Lidar and Photogrammetry (RSM02, Summer 2019)
- Advanced Topics in Data Analysis and Programming (DAP05, Summer 2020)
- Reading and Discussion Seminar (VCM04, Summer 2020)
- Spatial Data Analysis with Numerical Methods (DAP04, Winter 2021)

## Honors and Awards

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Peirce Prize for Excellence in Geology, Wesleyan University, USA

May 2013

Phi Beta Kappa Distinction, Wesleyan University, USA

May 2013

## Proposals

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Third Party Mission SPOT6 Proposal 67754 from ESA

Granted June 2021

TanDEM-X DEM Science Proposal CALVAL1028 from the DLR

Granted February 2017

RapidEye Science Archive Proposal 00195 from BlackBridge GmbH (now Planet, Inc.)

Granted June 2016

## Workshops

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"International Teaching Professionals Pedagogy Workshop", University of Potsdam

August 2020 – June 2021

"From point clouds and full-waveform data to DEM analysis", University of Potsdam

October 2019

"Global DEM Benchmarking", European Union Joint Research Council, Milan

January 2019

## Invited Talks

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German Research Centre for Geosciences (GFZ), Section 5.1: Geomorphology

October 2018

## Languages

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English — Native

German — Intermediate Level (CEFRL Level B2 Equivalent)

## Journal Referee

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Journal of Geophysical Research, Earth Surface Dynamics, Earth Surface Processes and Landforms, Remote Sensing, Science of the Total Environment

## Publications

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### Peer-Reviewed Articles

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- [8] A. Rheinwalt, **B. Purinton**, and B. Bookhagen. "Curvature-based pebble segmentation for reconstructed surface meshes". In: *Earth Surface Dynamics* 13.5 (2025), pp. 923–940. doi: 10.5194/esurf-13-923-2025. URL: <https://esurf.copernicus.org/articles/13/923/2025/>.
- [7] **B. Purinton**, A. Muetting, and B. Bookhagen. "Image Texture as Quality Indicator for Optical DEM Generation: Geomorphic Applications in the Arid Central Andes". In: *Remote Sensing* 15.1 (2023), p. 85. doi: 10.3390/rs15010085. URL: <https://www.mdpi.com/2072-4292/15/1/85>.
- [6] **B. Purinton** and B. Bookhagen. "Beyond vertical point accuracy: Assessing inter-pixel consistency in 30 m global DEMs for the arid Central Andes". In: *Frontiers in Earth Science* (2021). doi: 10.3389/feart.2021.758606. URL: <https://www.frontiersin.org/articles/10.3389/feart.2021.758606>.

- [5] **B. Purinton** and B. Bookhagen. "Tracking Downstream Variability in Large Grain-Size Distributions in the South-Central Andes". In: *Journal of Geophysical Research: Earth Surface* 126.8 (2021), e2021JF006260. doi: 10.1029/2021JF006260. URL: <https://agupubs.onlinelibrary.wiley.com/doi/abs/10.1029/2021JF006260>.
- [4] **B. Purinton** and B. Bookhagen. "Multiband (X, C, L) radar amplitude analysis for a mixed sand- and gravel-bed river in the eastern Central Andes". In: *Remote Sensing of Environment* 246 (2020), p. 111799. doi: 10.1016/j.rse.2020.111799. URL: <http://www.sciencedirect.com/science/article/pii/S0034425720301693>.
- [3] **B. Purinton** and B. Bookhagen. "Introducing *PebbleCounts*: a grain-sizing tool for photo surveys of dynamic gravel-bed rivers". In: *Earth Surface Dynamics* 7.3 (2019), pp. 859–877. doi: 10.5194/esurf-7-859-2019. URL: <https://www.earth-surf-dynam.net/7/859/2019/>.
- [2] **B. Purinton** and B. Bookhagen. "Measuring decadal vertical land-level changes from SRTM-C (2000) and TanDEM-X (~ 2015) in the south-central Andes". In: *Earth Surface Dynamics* 6.4 (2018), pp. 971–987. doi: 10.5194/esurf-6-971-2018. URL: <https://www.earth-surf-dynam.net/6/971/2018/>.
- [1] **B. Purinton** and B. Bookhagen. "Validation of digital elevation models (DEMs) and comparison of geomorphic metrics on the southern Central Andean Plateau". In: *Earth Surface Dynamics* 5.2 (2017), pp. 211–237. doi: 10.5194/esurf-5-211-2017. URL: <https://www.earth-surf-dynam.net/5/211/2017/>.

## Algorithms

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- [4] **B. Purinton**. *Data and Scripts for Journal of Geophysical Research: Earth Surface publication: Tracking downstream variability in large grain-size distributions in the south-central Andes*. July 2021. doi: 10.5281/zenodo.5089789. URL: <https://doi.org/10.5281/zenodo.5089789>.
- [3] **B. Purinton** and B. Bookhagen. *PebbleCounts: a Python grain-sizing algorithm for gravel-bed river imagery*. Version 1.0. 2019. doi: 10.5880/fidgeo.2019.007. URL: <https://github.com/UP-RS-ESP/PebbleCounts>.
- [2] **B. Purinton**. *TanDEM-SRTM-dh: First Release*. Version v1.0.0. July 2018. doi: 10.5281/zenodo.1305779. URL: <https://github.com/bpurinton/TanDEM-SRTM-dh>.
- [1] **B. Purinton**. *DEM Fourier Noise Removal*. 2017. URL: [https://github.com/UP-RS-ESP/DEM\\_fourier\\_noise](https://github.com/UP-RS-ESP/DEM_fourier_noise).

## Conferences

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- [10] **B. Purinton** and B. Bookhagen. "DEM quality assessment and improvement in noise quantification for geomorphic application in steep mountainous terrain". In: *EGU General Assembly Conference Abstracts*. Vol. EGU22-1191. Apr. 2022.
- [9] **B. Purinton** and B. Bookhagen. "Downstream grain-size changes using PebbleCounts in the south-central Andes: Relations to channel steepness and SAR observations". In: *EGU General Assembly Conference Abstracts*. Vol. EGU21-1703. Apr. 2021.
- [8] **B. Purinton** and B. Bookhagen. "Multiband (X, C, L) radar amplitude analysis for a mixed sand- and gravel-bed river in the eastern central Andes". In: *EGU General Assembly Conference Abstracts*. Vol. EGU2020-3943. Apr. 2020. doi: 10.5194/egusphere-egu2020-3943.
- [7] **B. Purinton** and B. Bookhagen. "Decadal rates and spatial distribution of gravel-bed river aggradation and incision from spaceborne DEMs: Applications in the Northwest Argentine Andes". In: vol. 20. *EGU General Assembly Conference Abstracts*. Apr. 2018, p. 2585.
- [6] B. Bookhagen, F. Castino, **B. Purinton**, and M. Strecker. "Sediment aggradation and erosional dynamics of intermontane basins in NW Argentina". In: *EGU General Assembly Conference Abstracts*. Vol. 19. Apr. 2017, p. 10172.

- [5] **B. Purinton** and B. Bookhagen. "Elevation validation and geomorphic metric comparison with focus on ASTER GDEM2, SRTM- C, ALOS World 3D, and TanDEM-X". In: *EGU General Assembly Conference Abstracts*. Vol. 19. Apr. 2017, p. 4510.
- [4] **B. Purinton** and B. Bookhagen. "Processing, validating, and comparing DEMs for geomorphic application on the Puna de Atacama Plateau, northwest Argentina". In: vol. 18. *EGU General Assembly Conference Abstracts*. Apr. 2016, EPSC2016-2806, EPSC2016–2806.
- [3] **B. Purinton** and B. Bookhagen. "Quality assessments and geomorphologic applications of digital elevation models in the central Andes with focus on TSX/TDX". In: *TerraSAR-X / TanDEM-X Science Team Meeting, Oberpfaffenhofen, Germany*. 2016.
- [2] William B Ouimet, David P Dethier, James M Kaste, Sheila Murphy, **B. Purinton**, Hannah Mondrach, and Edward Abrahams. "Characterizing sediment mobilization and landscape response to wildfire and extreme flooding using short-lived fallout radionuclides  $^{137}\text{Cs}$  and  $^{210}\text{Pb}$ , Colorado Front Range". In: *2014 GSA Annual Meeting in Vancouver, British Columbia*. 2014.
- [1] **B. Purinton**. "The Hydrologic and Geomorphic Impacts of the 2010 Fourmile Canyon Fire, Boulder Creek Watershed, CO". In: *2013 GSA Northeastern Section 48th Annual Meeting, Bretton Woods, New Hampshire, USA*. 2013.