

# James J. Guilinger

University of California, Irvine  
Interdisciplinary Science and Engineering Bldg.. # 3202  
Irvine, CA 92697

Phone: 303-549-2183  
Email: [jguiling@uci.edu](mailto:jguiling@uci.edu)

## Research Interests and Expertise

I am a geoscientist interested in understanding how disturbance events such as wildfire, vegetation conversion, and extreme precipitation impact the surface processes that shape hillslope and headwater riverine systems in mountainous regions. Utilizing these events as a natural experiment, I have gained expertise in hydrogeomorphic monitoring in challenging environments using continuous ground-based observations, historical datasets, and high-fidelity remote sensing methods. I use these datasets to evaluate and improve existing models for sediment yield from burned headwater catchments and further constrain predictions of disturbance impacts over the 21<sup>st</sup> century as geomorphic process magnitude-frequency relationships are altered by climate change.

## Appointments

**Postdoctoral Research Scholar, Dept Civil and Environmental Engineering, University of California-Irvine.** Irvine, CA. October 2021-Present.

- Topic: Post-wildfire hydrogeomorphology
- Sponsoring Scientist: Dr. Efi Foufoula-Georgiou

## Education

**Ph.D., Environmental Sciences, University of California-Riverside.** Riverside, CA. Fall 2017-September 2021. *Dissertation: Multiscale analysis of sediment cascades in burned upland catchments, southern California, USA.* Advised by Dr. Andrew B. Gray, coadvisor: Dr. Nicolas C. Barth

**M.S., Geology, Idaho State University.** Pocatello, ID. August 2015-August 2017. *Thesis: Appraisal of suspended sediment sources and flux through Marsh Creek, SE Idaho: complexities revealed by high-resolution spatial and temporal data,* advised by Dr. Benjamin T. Crosby

**B.S., Geosciences, Boise State University.** Boise, ID. August 2010-May 2014. *Undergraduate research: Quantification of soil inorganic carbon on a fluvial terrace sequence,* Undergraduate research advisor: Dr. Jennifer Pierce

## Awards

- Outstanding Service Award for Grad Student Excellence, UCR Env. Sciences, May 2021 (\$500)
- Grad Student Mini-Scholarship, Deverian Award, UCR EDGE, October 2020 (\$800)
- Outstanding Teaching Assistant, UCR Env. Sciences, 2020
- Joint Fire Science Program Graduate Research Innovation Grant (\$25,000), Spring 2020
- UCR Graduate Research Mentor Fellowship, 1 quarter of tuition/stipends (\$10,000), January 2020
- NCALM Seed Grant for 40 km<sup>2</sup> of airborne lidar (~\$20,000 of data acquisition), January 2019
- Most Outstanding Student Poster, GIS Day at UCR, November 2018
- Most Outstanding Student Poster, UCR Center for Conservation Biology, May 2018
- UCR Chancellor's Distinguished Fellowship, 2 years of tuition/stipends (~\$40,000), Fall 2017
- Most Outstanding Teaching Assistant, Idaho State Geosciences, May 2017.
- Most Outstanding Graduating Senior, Boise State Geoscience Department, May 2014.
- Boise State University, Field Camp Scholarship (\$500), May 2013.
- NSF-REU/EPSCoR Undergraduate Research Fellowship (\$~5000), Spring-Summer 2013.

### **Refereed Publications** (\*=undergraduate mentee)

- Jumps, N., Gray, A.B., **Guilinger, J.J.**, Cowger, W.C. 2022. Wildfire Impacts on the Persistent Suspended Sediment Dynamics of the Ventura River, CA. *Journal of Hydrology: Regional Studies*. In Press.
- Honious, S.A., Hale, R.L., **Guilinger, J.J.**, Crosby, B.T., Baxter, C. (2021). Geomorphology and turbidity structure discontinuities in the rates and controls of metabolism along a 75-km stream segment *Ecosystems*. <https://doi.org/10.1007/s10021-021-00661-5>.
- Cowger, W., Gray, A.B., **Guilinger, J.J.**, Fong, B.T.\*, Waldschläger, K. (2021). Concentration Depth Profiles of Microplastic Particles in River Flow and Implications for Surface Sampling. *Environmental Science and Technology*. 10.1021/acs.est.1c01768.
- Guilinger, J.J.**, Gray, A.B., Barth, N.C., Fong, B.T.\* (2020). The evolution of sediment sources over a sequence of post-fire sediment-laden flows revealed through repeat high-resolution change detection. *Journal of Geophysical Research: Earth Surface*. 125(10), e2020JF005527.

### **Manuscripts in review/preparation** (\*=undergraduate mentee)

- Guilinger, J.J.**, Gray, A.B., Barth, N.C., USA. Increasing fire frequency reduces channel sediment supplies in steep shrubland-dominated headwater catchments. *In Revision for Geomorphology*
- Burberry, C.M., Flatley, A., Gray, A.B., **Guilinger, J.J.**, Hamshaw, S.D., Hill, K., Mu, Y., Rowland, J.C. Earth and Planetary Surface Processes Perspectives on Integrated, Coordinated, Open, Networked (ICON) Science. *In Revision for Earth and Space Science*.
- Guilinger, J.J.**, Gray, A.B., Guill, R., Varela, M., Engelhorn, G., Stransky, C., Rudolph, J., Laag, R. Source to Sink Dynamics: A Case Study of Postfire Runoff Impacts on an Arid Managed Terminal Lake, Lake Elsinore, CA, USA. *In Prep for Environmental Science and Technology*.
- Rios, K.\*, **Guilinger, J.J.**, Fong, B.T., Gray, A.B. The evolution of soil hydraulic properties across different erosional surfaces in steeply burned terrain. *In Prep for Journal of Hydrology: Regional Studies*
- Fong, B.\*, **Guilinger, J.J.**, Barth, N.C., Gray, A.B. Controls on boulder transport by shallow landslides and debris flows, southern California, USA. *In Prep for Landslides*.

### **Teaching and Outreach Experience**

#### **University of California, Riverside**

- Guest Lectures for Geotechnology and GIS for Earth Sciences on “High-resolution Change Detection Methods”, UC-Riverside, 2018, 2021, 2022.
- Water Resources Lab Instructor and Teaching Assistant (ENSC 101). Environmental Sciences, UC-Riverside, 2018-2020, (3 quarters, each equivalent to 4 quarter units).
- Guest Field Trip Co-leader for UC-Riverside Geology Field Camp on “Post-fire erosion as an important geological process” (1 day), 2020, San Gabriel Mountains, CA.
- Science Fair Judge, 2019, Riverside Unified School District Science Fair (1 day).
- Science Night Presenter, 2018, Alta Loma School District, Stork Elementary, Rch Cucamonga, CA.

#### **Idaho State University**

- Field Trip Co-leader for MILES Program Portneuf River Float Trip (1 day), 2017, Inkom, ID.
- Guest Field Trip Leader for Earth and Environmental Systems Seminar on “Impacts of agricultural practices on fine sediment flux of a low-gradient river system and water quality sensor demonstration”, (1 day), 2017, Marsh Valley, ID.
- Science Showcase Booth Presenter, 2017, Idaho State University (1 day).
- Advanced Geographic Information Systems (GEOL 4404) (1 semester, 3 semester hours), 2017
- Lab Instructor for Dynamic Earth (Earth System Science, GEOL 1100). Geosciences, Idaho State University, 2015-2016 (2 semesters, each equivalent to 3 semester hours).
- Field Geology Capstone Teaching Assistant. Geosciences, Idaho State University, 2014 and 2016, (2 summers, each equivalent to 6 semester hours).
- Volunteer trip co-coordinator for ISU Field Seminar (GEOL 4491), 2015, Volcanism, Ore Deposits, and Surface Processes of the San Juan Mountains, Colorado (5 days).

### **Professional Presentations**

- Guilinger, J.**, Foufoula-Georgiou, E. March 2022. Utilizing repeat high-resolution change detection to understand sediment supply and redistribution dynamics following wildfire. Los Alamos National Lab Hydrology and Surface Processes Weekly Seminar. Virtual Oral Presentation. *(Invited)*
- Gray, A.B., **Guilinger, J.**, 2021. Post-fire sedimentation in the channelized estuary of a small, mountainous river. American Geophysical Union (AGU) Fall Meeting, New Orleans, LA, USA. Oral Presentation.
- Guilinger, J.**, Gray, A.B., Barth, N.C. 2021. Timescale between fires is an important control on postfire channel erosion in steep headwater catchments. AGU Fall Meeting 2021. New Orleans, LA, USA. Oral Presentation.
- Guilinger, J.**, Gray, A.B., Barth, N.C., Fong B.T. April 2021. Sediment supply dynamics of steep burned headwater catchments, Santa Ana Mountains, CA. USGS Landslide Hazard Program Weekly Seminar *(Invited)*
- Guilinger, J.**, Gray, A.B., Barth, N.C. February 2021. Advanced geomorphic assessment of postfire sedimentation hazards. Riverside County Flood Control and Water Conservation Monthly Roundtable Talk. Virtual. *(Invited)*
- Guilinger, J.**, Gray, A.B., Barth N. December 2020. Controls on post-fire sediment export from steep headwater catchments. AGU Fall Meeting (Online), Virtual Poster.
- Guilinger, J.**, Gray, A.B., Barth, N., Fong, B.T., 2020. Using lasers and drones to measure postfire sediment dynamics of headwater catchments, southern California. Virtual Oral Presentation to Watershed Hydrology Seminar, Drexel University, PA *(Invited)*
- Guilinger, J.**, Gray, A.B., Barth, N., Fong, B.T. 2020. Using lasers and drones to further understand the fireflood cycle of recently burned catchments. UCR Environmental Sciences Graduate Research Seminar. Oral Presentation.
- Guilinger, J.**, Gray, A.B., Barth, N., Fong, B.T. 2020. Using lasers and drones to measure erosion: sediment dynamics during a sequence of effective storms in a burned headwater catchment. Holy Fire Research Symposium. USFS Southwest Research Station, Riverside, CA. Oral Presentation. *(Invited)*
- Guilinger, J.**, Gray, A.B., Barth, N., 2019. Seasonal shift of post-fire sediment provenance from channels to hillslopes documented through high-resolution monitoring. American Geophysical Union Annual Conference. San Francisco, CA. Oral Presentation.
- Guilinger, J.**, Gray, A.B., Barth, N., 2019. Seasonal shift of post-fire sediment provenance from channels to hillslopes documented through high-resolution monitoring. Geologic Society of America Annual Conference, Phoenix, AZ. Oral Presentation.
- Guilinger, J.**, Gray, A.B., Barth, N., 2019. Sequence and scale matter: spatiotemporal dynamics of post-fire sediment flux in headwater catchments. 2nd Annual Southern California Geomorphology Symposium, UCSD Scripps Institution of Oceanography, San Diego, CA. Oral Presentation.
- Guilinger, J.**, Gray, A.B., Barth, N. 2018. Characterizing post-wildfire erosion in a steep headwater catchment using nested scales of topographic change detection. UC-Riverside Center for Conservation Biology Wildland Urban Interface Symposium, Riverside, CA. Poster Presentation.
- Guilinger, J.**, Gray, A.B., Barth, N. 2018. Characterizing post-wildfire erosion in a steep headwater catchment using nested scales of topographic change detection. 1<sup>st</sup> Annual Southern California Geomorphology Symposium, California Institute of Technology, Pasadena, CA. Poster Presentation.
- Guilinger, J.**, Gray, A.B., Barth, N., Ajami, H., and Leeper, R. 2017. Using UAVs to characterize hillslope erosional responses in a burned catchment. UC-Riverside GIS Day Conference, Riverside, CA. Poster Presentation.
- Guilinger, J.** and Crosby, B.T. 2017. Catch and Release: A dense, longitudinal array of water quality sondes reveals spatial and temporal complexities in suspended sediment flux. American Geophysical Union Fall Meeting, New Orleans, LA. Poster Presentation.
- Guilinger, J.**, and Crosby, B. 2016. From Source to Confluence – Complex Patterns in Suspended Sediment Transport Revealed by a Dense Longitudinal Sonde Array. Poster Presentation. American Geophysical Union Fall Meeting, San Francisco, CA.
- Guilinger, J.**, and Richardson, R. 2014. A River Runs through It: Geomorphic Assessment of the Lower Boise River. Boise River Enhancement Network Technical Coordination Meeting. Boise, ID. Oral Presentation.

**Guilinger, J.,** Jarrels, D., and Pierce, J., 2013, Quantifying and Extrapolating Soil Inorganic Carbon across the Western Snake River Plain, Idaho, Using Pressurized Calcimetry. Geological Society of America (GSA) Annual Conference, Denver, CO. Poster Presentation.

#### **Published Technical Reports**

**Guilinger, J.,** and Crosby, B.T. 2017. Recommendations for Improving Water Quality in Marsh Creek. ISU Geosciences Thesis Appendix A, Prepared for the City of Pocatello (Funding sources) and Portneuf Watershed Partnership.

McDaniels, R., **Guilinger, J.,** 2015, Idaho Multi-Hazard Risk Profile. Prepared for Idaho Office of Emergency Management and Federal Emergency Management Agency Risk MAP.

Richardson, R., and **Guilinger, J.** 2015. Geomorphic Assessment of the Lower Boise River, Idaho. Prepared for the Boise River Enhancement Network Plan Literature Review.

#### **Published Datasets**

Holy Fire Headwater Sediment Dynamics, Santa Ana Mts, CA, UNAVCO Terrestrial Laser Scanning Dataset U-075: <https://tls.unavco.org/projects/U-075/> and Structure-from-Motion UAV Dataset U-075: <https://tls.unavco.org/projects/U-075/>

Holy Fire Hydrologic Monitoring Datasets: [https://hiscentral.cuahsi.org/pub\\_network.aspx?n=5665](https://hiscentral.cuahsi.org/pub_network.aspx?n=5665)

Worldwide Hydrobiogeochemistry Observation Network for Dynamic River Systems (WHONDRS) Dataset: Cucamonga Creek, Chino, CA. Collected Spring-Summer, 2022.

#### **Science Communication: Short Pieces and Interviews**

[UCR Science Communication Blog Post](#), Feb 2021. *Following the flames: studying post-fire debris flows and floods along the mountain-urban interface.*

Stransky, C., **Guilinger, J.,** and Rudolph, J. 2020. Impacts to Water Quality from Wildfires. Feature Article in Southern California Chapter of Society of Environmental Toxicology and Chemistry Newsletter, Fall 2020 Issue.

Live interview with KTVU San Francisco about published dissertation work, Oct 2020. *Even modest rainfall can cause dangerous debris flows in wildfire burn zones: study* <https://www.ktvu.com/news/landslide-study-draft> ,

UCR News Article Featuring work on post-fire debris flows (J. Bernstein, October, 2020): <https://news.ucr.edu/articles/2020/10/22/wildfires-can-cause-dangerous-debris-flows>

#### **Professional Service**

- Peer reviewer for *Journal of Geophysical Research: Earth Surface*, *Arabian Journal of Geosciences*
- Co-organizer for the AGU EPSP Connects Virtual Monthly Seminars. 2020-Present.
- Primary Convener for: “Point-to Catchment-to Landscape-Scale Effects of Wildfire on Hydrologic, Geomorphic, and Biogeochemical Processes” (3 oral and 2 poster sessions), AGU Fall 2021 and “Advances in the Science of Post-wildfire Surface Processes”, planned for GSA Fall 2022.
- Co-president of the UC-Riverside Environmental Sci Graduate Student Association. 2019-2021 and officer in ISU Geology Club 2015-2017.

#### **Diversity, Equity, and Inclusion Activities**

- Assisted in the successful proposal and design of a new Diversity, Equity, Inclusivity, and Justice in Earth and Environmental Sciences course (GEO 290), first offered in Spring 2021.
- Co-leader for the *Unlearning Racism in the Geosciences* UCR Grad Pod 1. Jan 2021-June 2021.
- As part of my officer position in Env Sci Grad Student Association, I also served as a co-student chair of the Diversity, Equity, and Inclusion Committee (2020-2021).

#### **Scientific Competencies**

*Computational:* MATLAB, R time series and geospatial analysis, HYDRUS 1D, SMART Semi-Distributed Hydrologic Model, HEC-RAS, MS Excel, Adobe Illustrator, Inkscape

- GIS:* ArcGIS, QGIS, GRASS GIS, RiScan, LAStools, Cloudcompare, Topotoolbox, Geomorphic change analysis, Google Earth Engine, Agisoft Metashape, ENVI 5.0/Classic
- Field Methods:* UAV remote piloting, terrestrial lidar scanning, flow-integrated suspended sediment sampling, water quality sensor deployment, measuring discharge with ADVs and ADCPs, hydrometeorological monitoring, pressure transducer operation, salt dilution gauging, total station surveying, RTK GPS, cobble granulometry, geologic mapping, soil augering/sampling, soil profile descriptions, measuring attitudes/slopes with Brunton, FieldMove mapping application, stream nutrient sampling (OCN), stream microbial sampling
- Lab Methods:* Sample homogenization, pipette grain size method, hydrometer grain size method, soil sieving and textures, laser particle-size analysis, loss-on-ignition, sediment centrifuging, freeze-drying, sample packing for mass spectrometer analysis, pressure calcimetry, gamma ray spectroscopy, x-ray fluoroscopy, pressurized transfer of liquid nitrogen, laboratory safety certifications

### **Certificates and Short Courses**

- Wilderness First Aid Certification, Sierra Rescue Int'l, April 2021  
 Federal Aviation Administration Part 107 UAS Remote Pilot License (CN # 4340402)  
 Avalanche Safety: American Avalanche Association Level 1 Equivalent  
 Mirion Gamma Ray Spectroscopy Shortcourse (3 days), Meriden, CT, Sept 2017  
 Utah State University River Restoration and Sediment Transport Shortcourse (5 days), Logan, UT, Aug 2016

### **Students Mentored**

- Karina Rios (UCR, Spring 2020-Present)  
 Brandon Fong (UCR, 2018-2020, now Ph.D. student at Pennsylvania State)  
 Michelle Gutierrez (UCR, Spring 2018-Spring 2019, now hydrologist in Ramona, CA)  
 Carson Brown (UCR, Spring 2018-Fall 2019, now a scientist at Confluence Environmental)  
 Lisa Dong (UCR Winter 2017-Summer 2018, now GIS Analyst at ESRI)  
 Vicente Melgarejo (UCR, Fall 2017-Summer 2018, now pursuing MPharm at UCSF)  
 Jerad Anderson (ISU, Fall 2016-Spring 2017, now Geologist at Avidian Gold)  
 Katie Chehowy (ISU, Spring 2016-Spring 2017, now Geologist at Suncor)  
 Dusten Lish (ISU, Winter 2016-Spring 2017, now Geologist at Nevada Gold Mines)  
 Mason Wegert (ISU, Fall 2015-Spring 2016, now Software Engineer at Hadoop)

### **References**

Andrew Gray  
 Assistant Professor of Watershed Hydrology  
 Department of Environmental Sciences  
 University of California, Riverside  
 Email: [agray@ucr.edu](mailto:agray@ucr.edu)

Nicolas Barth  
 Assistant Professor of Geology  
 Department of Earth and Planetary Sciences  
 Email: [nic.barth@ucr.edu](mailto:nic.barth@ucr.edu)

Efi Foufoula-Georgiou  
 Distinguished Professor  
 Henry Samueli Endowed Chair in Engineering  
 Departments of Civil and Environmental Engineering and Earth System Science  
 Email: [efi@uci.edu](mailto:efi@uci.edu)