Elizabeth Johnston, Ph.D.

Climate and geospatial scientist with a Ph.D. in Earth System Science and experience in energy policy. Leverages AI to drive mitigation and adaptation strategies and advance sustainable solutions for human–environment systems.

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Education

Ph.D. Earth System Science | Stanford University

M.S. Marine Science | University of San Diego

B.S. Earth & Environmental Science | Furman University

Selected Publications

Johnston, E.C. (2024) Impact of climate variability on landslide hazard in the western United States. Doctoral Dissertation. Stanford University. https://searchworks.stanford.edu/view/in00000069376

Johnston, E.C., et al. (2021) Quantifying the effect of precipitation on landslide hazard in urbanized and non-urbanized areas. Geophysical Research Letters, 48, https://doi.org/10.1029/2021GL094038

Computational Skills

- **Programming Languages**: statistics/data-science (R, Python); numerical computing/engineering (MATLAB); compiled (C); scripting (bash)
- **Geospatial Analysis**: ArcGIS, QGIS, Google Earth Engine
- **Version Control & Repositories:** Github, Zenodo
- **Data Management & Visualization**: Adobe Creative Suite; Microsoft Office Suite (e.g., Excel, PowerPoint); Google Suite (e.g., Sheets, Slides)

Research Experience

Climate Change Impacts | Stanford University | June 2018 - present
Stanford University provided funding from fall 2017 through fall 2023

- Designed reproducible workflows for geospatial modeling, statistical analysis, machine learning, and data visualization
- Leveraged distributed computing to improve efficiency
- Applied principles of econometrics to infer causality
- Analyzed remotely-sensed data products to detect patterns and trends
- Presented at international conferences and published peer-reviewed journal article that was selected for press release

Isotope Geochemistry | Stanford University | August 2017 - June 2018

- Researched isotopic signatures of tectonically-driven landscape evolution
- Collected, processed, and analyzed samples by mass spectrometry

Trace Metal Geochemistry | University of San Diego | Aug. 2014 - May 2017
Dean's Merit, Stephen Sullivan Memorial, and San Diego Association of Environmental Professionals Scholarships provided funding

- Researched the trace metal geochemistry of an ancient volcanic system
- Planned fieldwork with San Diego Parks and Recreation Department
- Collected rock, soil, and water samples
- Analyzed samples for trace metal concentration (e.g., XRF)
- Assessed mineral composition (e.g., SEM, XRD, microscopy)
- Processed and visualized geospatial and geochemical data
- Mentored high school, undergraduate, and graduate students
- Published master's thesis; presented at international conferences

Physical Science Lab Assistant | Univ. of San Diego | May 2015 - Aug. 2016
Employed by Environmental and Ocean Sciences Department
- Ensured proper safety protocol and data collection, including quality assurance/quality control (i.e., QA/QC) for physical science courses (e.g., Environmental and Ocean Geochemistry; EOSC 452L)
- Resolved technical concerns with laboratory instruments (e.g., FAAS)

Energy Policy Analyst | University of San Diego | December 2013 - May 2015
Employed by Energy Policy Initiatives Center
- Developed greenhouse gas inventories to estimate emissions among the electricity, transportation, waste, water, and agricultural sectors
- Co-authored climate action plans that quantified potential emissions reductions and made recommendations for climate policies

Climate Education | University of San Diego | October 2013 - March 2014
Employed by Energy Policy Initiatives Center
- Examined effects of climate on extreme events, water, and public health
- Conducted standardized interviews about knowledge of local climate impacts with community leaders among public and civil society sectors
- Coordinated with local nonprofits (e.g., SANDAG, San Diego Foundation)

Engineering Communications | Vanderbilt University | May - August 2013
Employed by Vanderbilt University Graduate School of Engineering
- Wrote articles (e.g., about Young Scientist publication) and created informational material for School of Engineering (e.g., research profiles)

Geospatial Modeling | Furman University | Aug. 2012 - May 2013
Furman Advantage Fellowship provided funding
- Applied ArcGIS and remotely sensed imagery to assess landslide hazard
- Presented at international conference and was covered in local news

Incentivizing Carbon Mitigation | Upstate Forever | May - August 2011
Shi Sustainability Fellowship provided funding
- Analyzed and reported the feasibility of a local carbon offsets program
- Conducted literature reviews, held focus groups with local businesses, and distributed an online survey which received over 500 responses

Fluvial Sediment Transport | Furman University | August 2009 - May 2010
Howard Hughes Medical Institute (HHMI) provided funding
- Researched particulate organic carbon transport by first-order streams
- Collected sediment and storm water samples (e.g., ISCO), processed and analyzed samples (e.g., LOI), and analyzed data

Teaching Experience

Academic Skills Educator | Stanford University | June - October 2022
- Developed and led workshops that centered planning and resilience

Teaching Assistant | Stanford University | September 2017
- Field assistant for Geological History of the Rocky Mountains (ESS 101)

Instructor | University of San Diego | August 2015 - May 2017
- Taught lab sections for Natural Hazards (EOSC 104L; 4 semesters) and Environmental Geology (EOSC 485L; 1 semester)

Consultant | Center for Teaching & Learning | Furman Univ. | Aug. 2010 - May 2013
- Provided writing and multimedia support to undergraduate students

Outreach & Service

2023 | PhD Pathways Advisory Committee | Stanford Career Education

2022 | Mentor | Girls in STEM

2022 | Graduate Student Food Pantry Volunteer | Stanford University

2021 | Service Award for Diversity, Equity, and Inclusion | Stanford University

2019 | Organizing Committee | Women in Data Science @ Stanford Earth

2018 – 2019 | Executive Board | Stanford University Women in Earth Science

2016 | Instructor | National Ocean Sciences Bowl

2015 | San Diego Association of Environmental Professionals Scholar

2013 | Coral Reef Ecology Research Assistant | Scripps Institution of Oceanography

2013 | Student Ambassador | GSA Switch Energy Awareness & Efficiency

2012 | Conference & Field Trip Assistant | Carolina Geological Survey

Professional Societies

American Association for the Advancement of Science (AAAS), American Geophysical Union (AGU), Geological Society of America (GSA)

Conference Presentations

Johnston, E, Davenport, F, Willenbring, J, Burke, M, Diffenbaugh, N. "Effect of Wildfire Severity on the Longevity of Precipitation-Triggered Landslide Hazard," AGU Fall Meeting 2021 | Poster

Johnston, E, Burke, M, Caers, J, Davenport, F, Wang, L, Muthukrishnan, S, Diffenbaugh, N. "Impact of urbanization on the relationship between antecedent precipitation and landslides: evidence from the San Francisco Bay Area," AGU Fall Meeting 2020 | Talk

Johnston, E, Burke, M, Caers, J, Davenport, F, Wang, L, Muthukrishnan, S, Diffenbaugh, N. "The combined influence of antecedent rainfall and urbanization on landslides: an empirical approach based on data for the Pacific Coast of the United States," AGU Fall Meeting 2019 | Talk

Johnston, E, Caers, J, Wang, L, Davenport, F, Muthukrishnan, S, Diffenbaugh, N. "Multi-scale signatures of climate change on landslide susceptibility: a case study for the Pacific Coast of the United States," AGU Fall Meeting 2018 | Poster

Johnston, E, Pollock, M, Cathcart, E, AlBashaireh, A, O'shea, B, "Investigations of the geochemical controls on anomalous arsenic enrichment in the Santiago Peak Volcanics of Southern California: implications for arsenic distribution in volcanic arc systems," AGU Fall Meeting 2016 | Poster

AlBashaireh, A, Johnston, E, O'Shea, B, Pollock, M. "Evaluation of Arsenic Extent and Mobilization in Soil and Vegetation Surrounding Abandoned, Ultra-Enriched Arsenic Mines in Black Mountain Open Space Park, San Diego, California," GSA Annual Meeting 2016 | Poster

Johnston, E, Cathcart, E, Robinson, T, Phillips, C, O'Shea, B, "Arsenic enrichment associated with historic gold mining in Julian, CA: a case study for ecosystem and public health impacts related to artisanal mining," GSA Cordilleran Section Annual Meeting 2015 | Poster

Johnston, E, Gordon, C, Anders, S, Silva-Send, N. "Urban climate action planning: demonstration of greenhouse gas mitigation tool for analysis of local energy and climate policies," Climate Change Impacts and Responses 2015 | Talk

O'Shea, B, Robinson, T, Johnston, E, Cathcart, E, "Geogenic Arsenic Distribution in Metamorphic Bedrock and Impacts from Historic Gold Mining Operations near Julian, CA," GSA Annual Meeting 2014 | Talk

Ranson, W, Muthukrishnan, S, Johnston, E, Campbell, S, Geier, P, "Ongoing research in slope stability in Upstate South Carolina: field Studies, observations, lineament studies, and landslide modeling," GSA Annual Meeting 2013 | Poster

Johnston, E, Anderson, B. "Particulate organic carbon transport by headwater streams in the piedmont of South Carolina," GSA Southeastern Section Annual Meeting 2013 | Poster