SILVANA CASTILLO GUERRA
PhD. Candidate | Department of Geography
University of California Santa Barbara
s_castilloguerra@ucsb.edu - LinkedIn - GitHub

EDUCATION

University of California Santa Barbara — Santa Barbara, United States
PhD. in Geography — Expected June 2026
PhD. Emphasis in Climate Sciences and Climate Change

University of British Columbia — Vancouver, Canada
MSc. in Geological Sciences — 2020

EAFIT University — Medellín, Colombia
B.S. Geology — 2017

RESEARCH INTERESTS

Understanding how climate variability and atmospheric dynamics influence hydroclimate hazards and compound extremes by integrating climate datasets and geospatial analysis to support risk assessment and adaptation planning.

RESEARCH EXPERIENCE

Graduate Student Researcher
University of California Santa Barbara — September 2021-Present

- Developed a post-fire debris flow inventory for California (2014–2022) by integrating landslide records and wildfire perimeters which enabled analysis of rainfall and storm conditions most strongly linked to hazard occurrence.
- Integrated satellite imagery, rain gauge data, radar reflectivity, reanalysis datasets and environmental variables to develop a Random Forest model useful for assessing drivers and monitoring probability of hazard.
- Computed future fire weather indices using downscaled climate projections (MACA, CORDEX) and analyzed projected changes in short-duration rainfall to assess potential shifts in post-fire debris-flow hazard.
- Automated geospatial data processing workflows in Python, enabling reproducible analyses and efficient data management.

Graduate Student Researcher
University of British Columbia — January 2019- April 2020

- Developed landslide susceptibility models using statistical and heuristic approaches (e.g., Random Forest, Flow-R) to identify prone areas.
- Analyzed spatial relationships between environmental drivers and hazard occurrence, producing maps and visualizations for potential use in planning and decision-making.
- Conducted aerial photo interpretation and database management for geospatial analyses.

Undergraduate Student Researcher
EAFIT University — July 2016- May 2017

- Conducted lithology and structural data collection to construct a stratigraphic cross-section of the El Floral – Ciénaga de Oro geological formation.

- Performed rock sampling and petrographic analysis of thin sections to characterize mineralogical and textural properties.
- Carried out stratigraphic analysis to reconstruct depositional environments and interpret the geological history of the formation.

TEACHING EXPERIENCE

Teaching Assistant, Department of Geography
University of California Santa Barbara

Led discussion sections and short lectures, assisted students with course content and technical tools (Python/Jupyter notebooks), graded assignments and exams, reviewed materials in class, and held office hours.

- Geography 6: Sex, Drugs and Geography — Spring 2025
- Geography 13: Introduction to GIS programming — Winter 2025
- Geography 5: People, Place and the Environment — Fall 2021, Spring 2023, Fall 2024
- Geography 8: Global Warming — Winter 2022, 2023
- Geography 140: Historical Geography — Fall 2022

Teaching Assistant, Department of Earth, Ocean and Atmospheric Sciences (EOAS)
University of British Columbia

Assisted students and instructors with course materials, graded assignments and exams, and held office hours.

- EOAS 110: The solid Earth: A dynamic planet — Fall 2018, 2019; Winter 2019
- EOAS 326: Earth and life through time — Fall 2019

MANUSCRIPTS UNDER REVIEW / WORKING PAPERS

Castillo, S., Jones, C., & Carvalho, L. (2025). *Structural Properties and Reflectivity Patterns Of Precipitation Systems Linked To Post-Fire Debris Flows In California.* Manuscript under review, *Meteorological Applications.*

Castillo, S., & Jones, C. (2025). *Rainfall conditions of post-fire debris flows between 2012–2023 across regions in California.* SSRN Working Paper. Available at http://dx.doi.org/10.2139/ssrn.5138368.

PRESENTATIONS

Oral Presentations

- Castillo, S., Jones, C., & Carvalho, L. (2025). *Storm Structure Properties and Reflectivity Patterns in Post-Fire Debris Flow-Triggering Events Using Radar Composites.* AGU2025 Fall Meeting, New Orleans, LA, 15-19 Dec.
- Castillo, S., & Jones, C. (2022). *The generation of landslides after wildfire: A case study of 286 occurrences after a rainstorm in January 2019 in the San Gabriel Mountains, Southern California.* AGU2022 Fall Meeting, Chicago, IL, 12–16 Dec.
- Castillo, S., & Jakob, M. (2021). *Methods comparison to predict debris avalanche and debris flow susceptibility in the Capilano Watershed, BC, Canada.* XIII International Symposium on Landslides, Cartagena, Colombia, 22–26 Feb. https://www.issmge.org/uploads/publications/105/106/ISL2020-57.pdf

Poster Presentations

- Castillo, S., & Jones, C. (2024). *Meteorological conditions associated with post-fire debris flows in California.* Establishing Directions in Postfire Debris-Flow Science Conference, South Lake Tahoe, CA 20–22 May 2024.
- Castillo, S., & Jones, C. (2023). *Rainfall conditions of post-fire debris flows between 2013–2023 across ecoregions in California.* AGU2023 Fall Meeting, San Francisco, CA, 11–15 Dec.

AWARDS, FELLOWSHIPS AND HONORS

- **UC Santa Barbara Doctoral Student Travel Grant** – Fall 2025: Funding to attend AGU 2025.
- **Schmidt Family Foundation Research Fellowship** – Fall 2025: Support for PhD research.
- **UC Santa Barbara Department of Geography Research Funding** — Summer 2024
- **Geological Society of America (Environmental & Engineering Geology Division) Landslide Conference Funding** — Spring 2024
- **Fulbright Scholarship** — 2021: Funding for PhD studies in the U.S.
- **COLFUTURO Scholarship** — 2018: Support for international graduate studies.
- **EAFIT University Honors Tuition Scholarship** — 2014–1: Covered tuition for top GPA during the semester.

PROFESSIONAL EXPERIENCE

Intern – GIS Data & Documentation Support Consultant
Inter-American Development Bank June–August 2025

- Supported ESG and climate risk assessments for infrastructure and economic development projects by curating and integrating geospatial and climate datasets.
- Developed ArcPy scripts to automate spatial analyses, including proximity analysis and summarization of vulnerable features within areas of interest, improving workflow efficiency.
- Supported the development of GIS governance documentation to ensure metadata accuracy and reproducibility.

Intern - Geology
SERVIMINAS S.A.S December 2015- June 2016

- Developed geological cross sections, maps, and figures contributing to the successful completion of a geological mapping project.
- Collaborated with multidisciplinary teams to deliver and publish geological bulletins for a national geological survey project, contributing to the dissemination of project findings.

ACADEMIC SERVICE

Mentor, Undergraduate Research Spring 2025 - Present
Mentored an undergraduate student on spatial and temporal patterns of rainfall-triggered landslides in Colombia.

Reviewer, Graduate Application Materials Assistance (GAMA) Program Fall 2024, 2025
Assisted prospective students with preparation and review of application materials for the UC Santa Barbara Geography graduate program.

TECHNICAL SKILLS

- Programming languages: Python (e.g., xarray, numpy, pandas, scikit-learn, geopandas, cartopy), R
- GIS software: ArcGIS Pro, ArcPy

- Other Tools: Flow-R, Adobe Illustrator

LANGUAGES

- Spanish: Native proficiency
- English: Professional proficiency
- French: Limited proficiency

REFERENCES

Charles Jones, Professor
Department of Geography & Earth Research Institute
University of California Santa Barbara
cjones@eri.ucsb.edu

Leila Carvalho, Professor
Department of Geography & Earth Research Institute
University of California Santa Barbara
leila@eri.ucsb.edu

Andres Cardenas-Rozo, Professor
School of Applied Sciences and Engineering – Geology
EAFIT University
acarde17@eafit.edu.co