Frida Alejandra Perez

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Education

University of California, Los Angeles (UCLA)

Ph.D. in Geography — *Anticipated May 2026*
Dissertation: Drivers of Antarctic Sea Ice Phase
Advisor: Dr. Marilyn Raphael

M.A. in Geography — *Jun 2020*
Thesis: The Spatial and Temporal Variation of Sea Ice Thickness and Volume Around Antarctica

B.A. in Geography — *Jun 2019*

Santa Monica College (SMC)

AA.T Degree — *Aug 2016*

Research Experience

Antarctic Sea Ice Phase *2021–Present*

Developing a framework to analyze day-to-day variations of Antarctic sea ice advance and retreat using satellite observations (1979–2023), with a focus on sub-seasonal variability and atmospheric influences. Integrating different statistical models that allow us to isolate phase anomalies from the solar-driven signal. I then applied Gaussian Mixture Models to identify spatial clusters with similar phase behavior. Currently using the Amplitude-Phase Adjusted Cycle (APAC) model to assess how timing anomalies relate to sea ice extent variability and climate drivers like SAM, ENSO, and Zonal Wave 3.

Influence of the SAO on Antarctic Sea Ice Breakup *2021–2023*

Investigated how the Semi-Annual Oscillation (SAO) influences the timing of Antarctic sea ice retreat, with a focus on the circumpolar trough (CPT) as a dynamic driver of divergence at the ice edge. Developed a custom algorithm to detect daily retreat events using AMSR-E/2 sea ice concentration and applied cross-year windows to isolate inter-annual patterns. Integrated ERA5 reanalysis data to identify CPT location and linked SAO phase with observed retreat anomalies. Results showed that peak SAO events in September—when the CPT sits closest to the coast—correspond to earlier sea ice retreat, especially in the Amundsen and Bellingshausen seas. These findings support the role of sub-seasonal atmospheric variability in modulating regional sea ice phase and breakup timing.

Sea Ice Thickness and Volume in Antarctica *2019–2021*

Explored spatial variability in sea ice thickness (SIT) and volume (SIV) across Antarctic sectors over a 15-year period. I analyzed CryoSat-2 and ENVISAT data alongside surface air and sea surface temperatures to assess energy exchange processes. The study found an inconsistent relationship between SIV and sea ice area. This work underscores the contradictions and our limited understanding of SIT and SIV.

UC Natural Reserve System Ecology and Conservation Program *April–May 2019*

Completed a 50-day field immersion across California's protected reserves through the UC NRS. I conducted ecological surveys, plant identification, and GIS-based mapping while collaborating with conservation scientists. I collected data that contributed to two projects on habitat health and invasive species. The first investigated the effects of serpentine soil on native plant communities at different ecotones. Followed by an examination of legacy effects of land use in different plant communities. This experience developed my field research skills and deepened my understanding of ecosystem-scale change detection.

Sea Ice Decline and the Poleward Temperature Gradient *March–May 2019*

As an undergraduate research assistant, I examined the relationship between Arctic sea ice loss and weakening of the equator-to-pole temperature gradient using 30 years of satellite and reanalysis data. I processed and visualized temperature anomalies across latitudes and linked these to sea ice extent changes. The results supported a gradual reduction in meridional temperature contrast in response to declining sea ice. This project introduced me to climate statistics, remote sensing, cryospheric science, and time series analysis.

Drying Effects on Roots (STRI, Panama) *January–April 2018*

At the Smithsonian Tropical Research Institute, I assisted in an experiment on tropical root biomass using rainfall exclusion sites. I helped install PVC rainout shelters, conducted soil sampling, and measured above- and belowground biomass. The data contributed to a larger project on soil carbon sensitivity to drying in tropical forests. This work strengthened my fieldwork capabilities and exposed me to experimental design in tropical ecology.

PUBLICATIONS

Perez, F et al. (2019). "Mendocino meadow memory: legacy effects of land use on plant communities of Angelo Coast Range Reserve". In: *California Ecology and Conservation Research*.

AWARDS

UCLA Dissertation Year Award *Summer 2025 - Spring 2026*

CONFERENCE PRESENTATIONS

Using Sea Ice Phase to Predict Future Maxima *Feb 2025*

UTSA: Antarctic Sea Ice Seminars (Oral Presentation)

Westerly Jet Dynamics in a Changing Climate *Feb 2025*

ICTP: Polar Climates Workshop (Oral Presentation)

Antarctic Sea Ice Phase *Dec 2025*

AGU: Washington, D.C (Selected for Oral Presentation)

Timing of Antarctic Sea Ice Advance and Retreat *Apr 2024*

AAG: Honolulu, Hawaii(Oral Presentation)

Antarctic Sea Ice Retreat and the Influence of the Semi-Annual Oscillation *Dec 2023*

AGU: San Francisco, California (Poster)

The Distribution of SIT and SIV Around Antarctica *Feb 2022*

AAG: Denver, Colorado (Oral Presentation)

An Analysis of SIT during the Anomalous Antarctic Sea-Ice Retreat of 2016 *Dec 2021*

AGU: Virtual (Poster)

The Spatial and Temporal Distribution of SIT and SIV Around Antarctica *Dec 2021*

AGU: Virtual (Poster)

Legacy of Land Use History in Meadow Plant Communities of Coast Range *May 2019*

Blue Oak Ranch Reserve UC Berkeley (Oral Presentation)

The Link between Sea Ice Decline and a Reduction of the Equator-Pole *May 2019*

UCLA Undergraduate Research Symposium(Oral Presentation)

SKILLS

- **Statistical Software**: R, JMP, GeoDa
- **Geographic Information Systems**: ArcGIS, ArcGIS Online, QGIS
- **Remote Sensing Software**: ENVI, IDLE, Google Earth Engine
- **Programming**: Python, NCL Command Language, SQL
- **Modeling**: NCAR's Cheyenne, CESM, CMIP5/6

UNIVERSITY TEACHING EXPERIENCE

UCLA Department of Geography

Primary Instructor: Cartography

- Mapping and geographic data visualization ..... *Summer 2025*

Teaching Fellow

- Earth's Physical Environment ..... *Winter 2025*
- Biodiversity in a Changing World ..... *Fall 2024*
- Population Geography ..... *Spring 2024*

Teaching Associate

- People and Earth's Ecosystem ..... *Fall 2023*

Teaching Assistant

- Climatology ..... *Spring 2021, 2022, 2023*
- Cartography ..... *Winter 2022*
- Tropical Climatology ..... *Fall 2021, 2022*

SERVICE

First-Generation Graduate Student Association *2024-Present*

Board Member — Lead programming, advocacy, and mentorship initiatives to support first-gen graduate students across campus.

Graduate Student Mentor *Fall 2023*

Mentor — Provided one-on-one peer support and professional development guidance for incoming graduate students.

School on Wheels *2019, Present*

Tutor — Volunteer tutor for K–12 students experiencing homelessness, focusing on literacy and academic support.

Geography Graduate Student Association *2020-2021*

President — Coordinated departmental events, represented graduate student concerns, and facilitated student–faculty dialogue.

Professional Travel

ICTP School and Workshop on Polar Climates *Jul, 2024*

Arctic and Antarctic Theoretical, Observational, and Modelling Advances: Trieste, Italy, International Centre for Theoretical Physics

ForceSMIP Hackathon *Aug, 2023*

ForceSMIP Hackathon, ETH Zürich (2023) – Statistical methods for estimating climate change components in CMIP5

CESM Tutorial *Aug, 2021*

National Center for Atmospheric Science (Virtual) - Climate system modeling

Professional Associations

American Geophysical Union (AGU) *2020-Present*

Member

American Association of Geographers (AAG) *2020-Present*

Member

References

Available upon request.