# CAMILLE PAWLAK

camipawlak.github.io

## Skills

- Programming (R, Python, MATLAB, Google Earth Engine)
- Remote Sensing Software (ENVI, SNAP)
- GIS Software (ArcGIS Pro, ArcGIS Online, QGIS)
- UAV Flight and Data Management (Map Pilot, Agisoft Metashape, Micasense Atlas, Drone Deploy, DJI GO)
- Database management (Google Big Query/Google Cloud Services)
- FAA UAV License part 107
- Scientific and grant writing

## Education

**Ph.D. in Geography**
In Progress
*University of California, Los Angeles*
Los Angeles, CA

**M.S. in Biological Sciences**
(class of 2023)
*California State Polytechnic University*
San Luis Obispo, CA
GPA 3.9

**B.S. Environmental Science**
(class of 2020)
Minors: GIS, Conservation Biology
*University of California, Los Angeles*
Los Angeles, CA
GPA 3.5

## Experience

**Graduate Student:** *University of California, Geography Department*, Los Angeles (September 2023- present)

- Develop deep learning model to map canopy cover in urban areas California and assess change over time
- Research spaceborne LiDAR and aerial SAR data applications in urban forestry

**Research Associate:** *California Polytechnic State University*, San Luis Obispo (June 2023-present)

- Oversee the enhancement and upkeep of tools and databases at the Urban Forest Ecosystem Institute, including adding new tree species and inventory data and updating species taxonomy
- Provide mentorship and guidance to undergraduate research projects, fostering a collaborative and supportive learning environment
- Lead the development of a comprehensive statewide scoring system for California's urban forests in close collaboration with city governments and non-profit organizations

**On Call Urban Forest Analyst:** *Dudek* (January 2023 – June 2023)

- Used Los Angeles Region Imagery Acquisition Consortium imagery and LiDAR to create canopy cover maps for Los Angeles County

**Graduate Student Researcher**: *California Polytechnic State University*, San Luis Obispo (June 2021- June 2023)

- Expanded and managed the California Urban Forest Inventory, a collection of more than seven million urban trees using Python and Google Big Query (link)
- Analyzed trends in California's urban forest by creating native species lists for 1,173 cities in California by digitizing maps for all of California's Native Trees using ArcGIS Pro and R
- Predicted the location of 39 million trees in California's urban forest as a team creating training data and analyzing the results of a neural network-based tree-counter (link)
- Led a team of five undergraduates to create training data for a neural network
- Processed LiDAR data to create a canopy model for San Luis Obispo, CA
- Explored social trends driving tree diversity in Los Angeles County, CA using census data and the California Urban Forest Inventory
- Created training module to develop UAV pilots both as manual pilots and in preparation for the part 107 FAA exam
- Created webservice to host Maxar imagery for NASA funded grant
- Mapped cacao in the Peruvian Amazon for NASA funded grant
- Communicated research about urban forests through scientific writing, grants, and presentations

**Scientific Consultant:** *Class One Arboriculture* (September 2021- Present)

- Writing and editing scientific literature
- Calculating and assessing statistics for research projects

**UAV and Remote Sensing Technician:** *UCLA Geography Department, Cavanaugh Lab* (June 2020- June 2021)

- Planned and flew dozens of hours of UAV flights along the California coastline and in city parks
- Obtained UAV permits in state parks, private reserves, and city parks
- Processed dozens of geolocated orthomosaics from UAV imagery using custom algorithms and Agisoft Metashape, MATLAB, and Arc Desktop
- Used Arrow Gold RTK GNSS receivers to create geolocation points for UAV imagery
- Worked in collaboration with partners like The Nature Conservancy to plan research projects, designs methods, and undergo research
- Analyzed satellite and aerial imagery to detect vegetation in wetlands using machine learning classifiers (random forest)

**Undergraduate Research Assistant:** *UCLA Geography, Cavanaugh Lab* (June 2019 – September 2019, January 2020 – June 2020)

- Processed and classified Landsat, Planet, and UAV imagery to identify marine vegetation.
- Manually annotated hundreds of kelp beds in UAV and satellite imagery

**DEVELOP Intern:** *NASA Jet Propulsion Lab + Science, Systems, and Applications Inc.* (September 2019 – December 2019)

- Processed SAR imagery (UAVSAR, PALSAR, Sentinel-1), utilized in situ data from the Smithsonian Tropical Research Institute, and used Random Forest to create landcover maps of the Panama Canal Watershed
- Analyzed MODIS derived evapotranspiration across different land cover types during extreme wet and dry years in central Panama

**Undergraduate Research Assistant:** *UCLA Ecology and Evolutionary Biology, Jacobs Lab* (May 2018 – September 2019, January 2020- June 2020)

- Completed diversity surveys of wetlands across the California coast by collecting invertebrates and vegetation
- Created databases of published field data of species occurrence from 1857-present
- Used species distribution models (MaxEnt) to calculate breeding ranges of the Steller's Eider

**Herbarium Technician***: UCLA Herbarium* (March 2019 – June 2019)

- Digitized herbarium specimen as part of the California Phenology Thematic Collections Network Project
- Collected wetlands vegetation and created herbarium specimen

**Restoration Intern/Volunteer Supervisor:** *TreePeople* (June 2018 – September 2018)/(March 2018 – June 2021)

- Planted and cared for hundreds of trees and chaparral species in Los Angeles and the Angeles National Forest
- Collected and cleaned seeds for the TreePeople nursery
- Help lead volunteer events by teaching the volunteers plant care

## Teaching Experience

**Teaching Associate:** *California Polytechnic State University*, San Luis Obispo (April 2022 – June 2022/ September 2022 - June 2023)

- Lab instructor: Introductory Ecology and Evolution, Introductory Botany
- Teaching Assistant: Advanced GIS, Field Botany
- Led discussion sections of 25 students
- Taught programming and statistics in R and Python
- Designed and graded exams

## Publications

Ventura, J., **Pawlak, C.**, Honsberger, M., Gonsalves, C., Rice, J., Love, N., Han, S., Nguyen, V., Sugano, K., Doremus, J., Fricker, A. G., Yost, J., & Ritter, M. (2023). Individual Tree Detection in Large-Scale Urban Environments using High-Resolution Multispectral Imagery. [Under Revision]. https://doi.org/10.48550/arXiv.2208.10607.

Rendon, P., Love, N., **Pawlak, C.**, Yost, J., Ritter, M., & Doremus, J. (2024). Street tree diversity and urban heat. *Urban Forestry & Urban Greening*, *91*, 128180. https://doi.org/10.1016/j.ufug.2023.128180

**Pawlak, C. C.***, Love, N. L. R.*, Yost, J. M., Fricker, G. A., Doremus, J. M., & Ritter, M. K. (2023). California's native trees and their use in the urban forest. *Urban Forestry & Urban Greening*, *89*, 128125. https://doi.org/10.1016/j.ufug.2023.128125

Cavanaugh, K. C., Cavanaugh, K. C., **Pawlak, C. C.**, Bell, T. W., & Saccomanno, V. R. (2023). CubeSats show persistence of bull kelp refugia amidst a regional collapse in California. *Remote Sensing of Environment*, *290*, 113521. https://doi.org/10.1016/j.rse.2023.113521

Saccomanno, V. R., Bell, T., **Pawlak, C.**, Stanley, C. K., Cavanaugh, K. C., Hohman, R., Klausmeyer, K. R., Cavanaugh, K., Nickels, A., Hewerdine, W., Garza, C., Fleener, G., & Gleason, M. (2023). Using unoccupied aerial vehicles to map and monitor changes in emergent kelp canopy after an ecological regime shift. *Remote Sensing in Ecology and Conservation*, *9*(1), 62–75. https://doi.org/10.1002/rse2.295

Love, N. L. R., Nguyen, V., **Pawlak, C.**, Pineda, A., Reimer, J. L., Yost, J. M., Fricker, G. A., Ventura, J. D., Doremus, J. M., Crow, T., & Ritter, M. K. (2022). Diversity and structure in California's urban forest: What over six million data points tell us about one of the world's largest urban forests. *Urban Forestry & Urban Greening*, *74*, 127679. https://doi.org/10.1016/j.ufug.2022.127679

Houskeeper, H. F., Rosenthal, I. S., Cavanaugh, K. **C., Pawlak**, C., Trouille, L., Byrnes, J. E. K., Bell, T. W., & Cavanaugh, K. C. (2022). Automated satellite remote sensing of giant kelp at the Falkland Islands (Islas Malvinas). *PLOS ONE*, *17*(1), e0257933. https://doi.org/10.1371/journal.pone.0257933

## Datasets

Baiza, J., **Pawlak, C.**, Baehr, A., Yost, J., Ritter, M., & Fricker, A. (2022). *Mapping Social and Environmental Justice Across California Schools* (Version V4) [dataset]. Harvard Dataverse. https://doi.org/10.7910/DVN/7NNBJD

Becerra, M., Rivera, O., **Pawlak, C.**, Crocker, A., & Pinto, N. (2022). *Base de datos de cobertura de cultivos de cacao en la Amazonia Peruana* (Version V3) [dataset]. Harvard Dataverse. https://doi.org/10.7910/DVN/XMQNC2

## Magazine Articles

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**Pawlak, C.,** Love, N., Yost, J., Ritter, M. (2023). Native to Where? California's Native Trees and Their Use in the Urban Environment. *Western Arborist*.

Komen, J., Falco, C., **Pawlak, C.,** & Hodel, D. (2023). Gallery Characteristics of the Invasive Shot Hole Borer and Extent of Accompanying Fusarium Dieback Disease Spread in Relation to the CODIT Model and Principles in London Plane Trees. *Western Arborist*.

Hodel, D. , Falco, C., **Pawlak, C.,** & Komen, J. (2022). Testing treatment effectiveness for Invasive Shot Hole Borers. *Western Arborist*.

## Media Mentions

Wilson, N. (2023) Urban Tree Diversity and Global Warming. *Cal Poly Bailey College of Science and Mathematics Intersections Magazine*. https://cosam.calpoly.edu/intersections-2023/urban-tree-diversity

Ferreira, G. (2023). Beating the Heat: Students Map California Tree Canopy to Cool Cities as Climate Warms. *Cal Poly News*. https://www.calpoly.edu/news/beating-heat-students-map-california-tree-canopy-cool-cities-climate-warms

## Presentations and Posters

**August 2023 | Into the Canopy | Invited Presentation**
Data-Driven Urban Forest: How We Can Use Data and Tools to Manage Urban Forests. Professional Tree Care Association of San Diego.

**August 2023 | KDD 2023 Southern California Data Science Day | Poster**
OpenCanopy: Leveraging aerial imagery and deep learning to delineate California's urban tree canopy. SIGKDD Conference on Knowledge, Discovery, and Data Mining.

**May 2023 | Cal Poly College of Science & Mathematics 2023 Conference | Presentation**
Trends in California's Native Trees in the Urban Environment. California Polytechnic University, San Luis Obispo.

**May 2023 | ReLeaf Network Retreat | Invited Presentation**
Data-Driven Urban Forest: How We Can Use Data and Tools to Manage Urban Forests. California ReLeaf.

**May 2023 | Digging In: An Exploration of Arboriculture | Invited Presentation**
New Tools for the Urban Forest Ecosystem Institute. The Western Chapter of the International Society of Arboriculture.

**November 2022 | San Luis Obispo GIS Day | Poster**
Trends in California's Native Trees in the Urban Environment. San Luis Obispo GIS Users Group.

**November 2022 | Putting Research to Work | Invited Presentation**
Trends in California's Native Trees in the Urban Environment. The Britton Fund.

**October 2022 | California Urban Forest Council: Lead with Trees Conference | Invited Presentation**

Data-Driven Urban Forest: Using Data to Make Better Species Selections. California Urban Forests Conference.

**June 2022 | Data Strategic Research Initiative, Cal Poly, San Luis Obispo | Poster**

Toward Automatic Urban Forest Inventories with Remote Sensing. Data Strategic Research Initiative, California Polytechnic State University.

## Grants

**The Britton Fund** | June 2022 – November 2022 | $8,000 | Trends in Native Tree Planting in California

**Data Strategic Research Initiatives**, Grant Incubation Competitions | January 2022 | $5,000 | Expansions and Utilization of the California Urban Forest Inventory

## Scholarships

**Graduate Dean's Scholar Award** (2023-2024)

University of California, Los Angeles - $14,500

**David and Frieda Wertman Scholarship** (2021,2022)

California Polytechnic State University - $12,000

**WCISA Annual Conference Student Scholarship** (2022)

Western Chapter of International Society of Arboriculture and the USDA Forest Service - $300

## Mentoring Experience

| Timeline | Institution | Students | Project Title |
|---|---|---|---|
| S 2023 – current | Cal Poly (Frost and SURP Funding) | Sara Arnold, Griffen Guizan, Ryley Chase, Lexxie Crocker, Jessica Baiza | OpenCanopy: mapping urban tree cover in California |
| 2022 - 2023 | Cal Poly | Alice Baehr, Jessica Baiza | Schoolyard canopy cover |
| 2022 - 2023 | Cal Poly | Erin Grady | Climate Suitability of Tree Species in Urban Forests |
| 2022 | Cal Poly (Frost Funding) | Keilana Sugano and Cameron Gonsalves | Mapping Trees of Laguna Lake, CA and Tree Detection in Urban Environments |
| 2022 | Cal Poly | Kylee Nielson | Canopy Cover in Mobile Home Parks |

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| 2022 | Cal Poly | Nathan Johnson, Ben Mangelsdorf, Hunter Glanz, Ryan Zhang | Computer Science Capstone Research: Bird diversity in California's urban forest |
| 2022 | Cal Poly | Olivia Ross | Mapping Santa Cruz Island |
| 2022-2023 | Cal Poly | Cameron Gonsalves and Benjamin Brown | Social Sciences: Tree Health in Laguna Lake Park with UAVs |
| 2022 | Cal Poly | Ben Glossner, Sarah Rietkerk, Jenna Whilden, Eshley Freed-Doerr (COMSCI) | 10Tall: Computer Science. 10tall.calpoly.edu. |
| 2022 | Cal Poly | Ben Mangelsdorf, Ryan Zhang, Nathan Johnson | Data Science capstone course: Bird diversity in California's urban forest |
| 2020-2021 | Cal Poly | Skyler Lu | Mapping California Public and Private Trees |
| 2020-2023 | Cal Poly | Paola Rendon | Economics: Street tree biodiversity and heat island effect |