Cal Poly's Geospatial Systems Lab

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CAL POLY

Geospatial Systems Lab

Purpose

Leveraging high-resolution remote sensing to advance environmental science through multidisciplinary research

- Fire fuels and behavior
- Ecosystem composition
- Landscape-level Biomass estimation
- Watershed management
- Multi-temporal Terrain Modeling

1. LiDAR (>300 points/m^2)
2. Multispectral Imagery
3. High-Resolution Orthoimagery

Lab Statistics

Lab Members

>100

20 Lab Assistants

Projects Flown

10+

Area Covered

1500+ Acres

Covering multiple different landscapes from rangeland to Forest

Training

200+ hours

Students trained in advanced remote sensing techniques

Equipment

- 2 heavy-lift UAS systems
- 6-band multispectral camera
- High-resolution Color Camera
- High Density LiDAR system

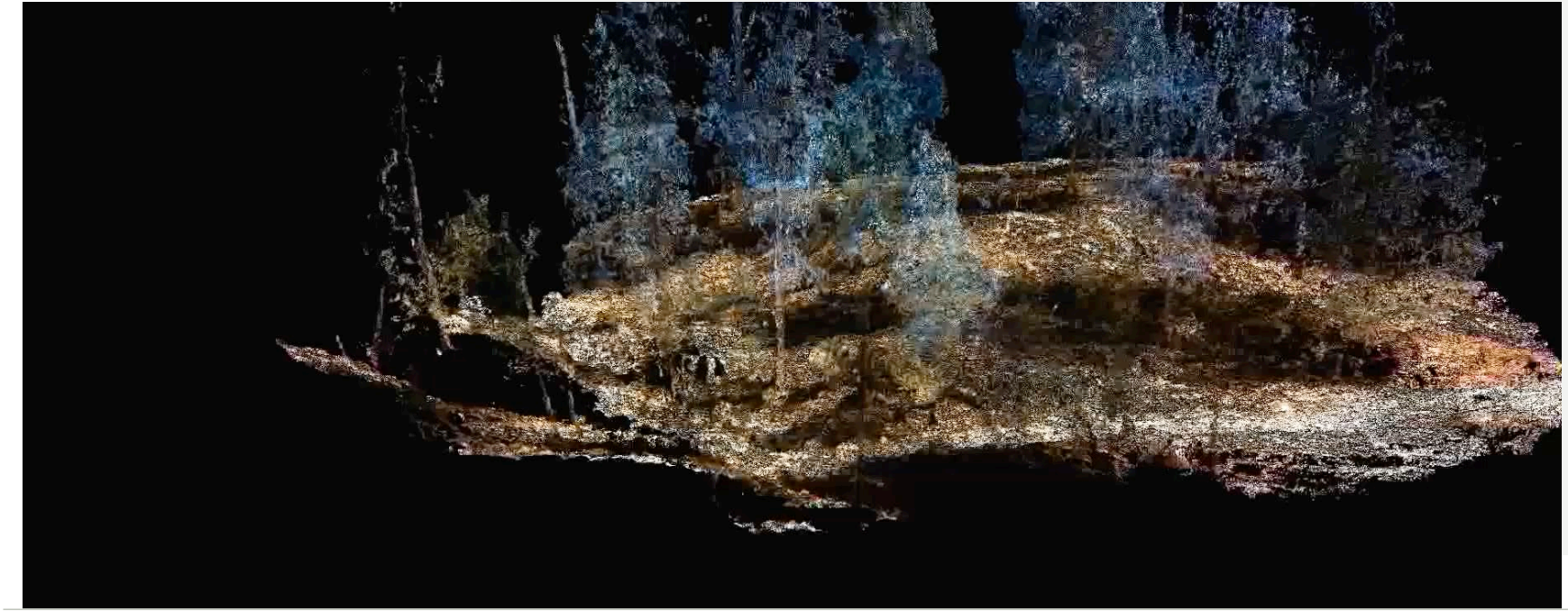
Sony A6000 24.3MP SLR

MicaSense Altum P6
6-band Multispectral

YellowScan Explorer LiDAR

Understory Metrics from Advanced Remote sensing Technology

- Forests are crucial for climate, wildlife, and economy - but **measuring 6.3M acres of CA forest is a massive challenge**
- Using **emerging technologies** to help foresters **collect tree biometrics** more efficiently and over larger areas
- Comparing three methods: drone-mounted **LiDAR**, aerial **photogrammetry**, and **deep learning 3D reconstruction**



Laino, D., Cabo, C., Prendes, C., Janvier, R., Ordonez, C., Nikonovas, T., Doerr, S., & Santin, C. (2024). 3DFin: a software for automated 3D forest inventories from terrestrial point clouds. Forestry: An International Journal of Forest Research. https://doi.org/10.1093/forestry/cpae020

Xi, Z.; Hopkinson, C. 3D Graph-Based Individual-Tree Isolation (*Treeiso*) from Terrestrial Laser Scanning Point Clouds. *Remote Sens.* **2022**, *14*, 6116. https://doi.org/10.3390/rs14236116

Applications of LiDAR Integrated with Multispectral Imagery for Classifying Wildland Fuels

- In 2005, Scott and Burgan developed a wildland fuels classification system to provide inputs into Rothermel's surface fire spread model.
- Advanced technologies can be used to quantify fuel metrics at a large scale
- We apply an integrated LiDAR/multispectral imaging system to discriminate arid land vegetation fuel classes at varying scales