

ANTONIO CERVANTES

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OBJECTIVE

Aspiring research scientist and engineer in the fields of wildfire science, atmospheric turbulence, and particle transport.

EDUCATION

Doctor of Philosophy, Civil & Environmental Engineering, University of California, Irvine 2023 - Present

Master of Science, Mechanical Engineering, San Jose State University 2021 - 2023

Bachelor of Science, Mechanical Engineering, San Jose State University 2018 - 2021

President of American Society of Mechanical Engineers (ASME)

Skills: Python, UNIX, High Performance Computing, Matlab, Git, Ansys, Fusion 360, Solidworks

RESEARCH EXPERIENCE

Forest Canopy Wildfire Turbulence, [Boundary Layers & Turbulence Lab](#), UCI Sep 2023 - Present

- Research atmospheric flows through heterogeneous forest canopies and study the effects on wildfires
- Simulate flows through horizontally homogeneous forest canopies for validation
- Validate PALM LES codes with experimental wind velocity data from the Amazon rainforest
- Simulate flow through gaps of various sizes within forest canopy

Wildfire Ember Transport, [Thermo-Fluids complexXity Lab](#), SJSU Feb 2022 - May 2023

- Investigate the influence of turbulence intensity on wildfire ember (firebrand) landing distribution for an improved understanding of spot fire generation and wildfire spread
- Conduct large eddy simulation (LES) of channel flow at several turbulence intensities using high-fidelity CFD codes
- Create a data visualization pipeline for statistical analysis of particle landing distribution
- Develop novel integration of firebrand transport with wildfire model for full physics spot fire generation simulations

Wildfire Bio-Aerosol Transport, [Thermo-Fluids complexXity Lab](#), SJSU Sept 2021 - May 2023

- Develop numerical DEM simulation for an NSF-funded research project of more than 5 million wildfire bio-aerosols understanding of spot fire generation and wildfire spread
- Leverage Python acceleration and parallelization libraries to optimize code for a 99% increase in computation speed
- Create new Python functions for data-driven particle initialization at fire locations for improved physics
- Process large amounts of simulation data for visualizations and animations of more than 100 million data points
- Collaborate with an interdisciplinary team to write and publish a novel biological emissions factor research paper

PROJECTS

Drone Image Semantic Segmentation. Developed a neural network for the classification and segmentation of 1000 drone aerial images. Utilized Tensorflow and Keras to construct a CNN U-Net model to perform segmentation with an accuracy of 85%. Trained U-Net model on high performance computing (HPC) GPU nodes utilizing Cuda toolkit for GPU acceleration. Conducted experiments testing various lighting conditions to find low light conditions resulted in 50% accuracy. ([See video here](#)) ([Github repo](#))

ACHIEVEMENTS

- Graduate Fellowship in Areas of National Need (GAANN) Fall 2023 - Spring 2024
- Dierks-Morgan Scholarship Fall 2022 - Spring 2023
- Davidson Student Scholar Fall 2022 - Spring 2023
- Instructables: Digital Fabrication Student Design Challenge winner July 2022