

# RESEARCH PERFORMANCE PROGRESS REPORT

## Research Team

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## Project Overview

Volatile Organic Compound (VOC) characterization in wildfire smoke. Wildfire smoke contains a complex mixture of volatile species which change with fire characteristics, fuel type, smoke age, and other factors. Detailed characterization of smoke plumes encountered by wine grape crops may allow more accurate prediction of potential for smoke taint. Our research team is constructing a low-cost and flexible-use VOC sampler to be rapidly deployed when wildfires occur. The sampler is solar powered and uses satellite communications, allowing deployment in nearly any location. It features a real-time total VOC sensor for automatic smoke event detection, and can sample at a fixed volumetric flow rate sequentially collecting up to 14 samples. Smoke is filtered to remove particulate matter so that only gas phase samples are collected on sorbent tubes housed within the sampler.

## Research Activities

Construction of a low-cost sorbent-tube sampler is underway to allow detailed characterization of smoke exposure in real-world scenarios.

## Key Accomplishments

- A complete prototype was hand-wired to provide proof of concept and basic functionality.
- The prototype unit is being refined and upgraded with printed circuit boards to replace earlier hand-wired prototypes, allowing more reliable and compact assembly. Component layout is being reconfigured for serviceability and to ruggedize the unit.
- The prototype is being tested at UC Davis and additional units are being assembled with a custom circuit board for field deployment.
- Working software with desired functionality including TVOC detection, automatic sampling, and notification messages has been written and is being tested in the prototype unit.

## Future Goals and Aims

The sorbent tube sampler will undergo additional software revision and hardware adjustment as necessary at UC Davis and will be deployed locally for additional testing. Both units are intended to be available for the 2025 fire season to be deployed as needed.