

Forest, Fire, and Soil Biogeochemistry Undergraduate Research Opportunity for Summer 2026

Explore how environmental changes impact forest ecosystem function through a biogeochemical lens! Our group examines how changing climate conditions, altered fire regimes, and shifting plant community dynamics influence carbon and nutrient cycling in forest ecosystems. Our research focuses on impacts to forest function and resilience, including productivity, post-fire vegetation regeneration, nutrient cycling and carbon storage.

Project Title: *Examining the effects of short-interval wildfire on soil carbon stability in western U.S. conifer forests*

Project Advisor: Dr. Justin D. Gay, University of Montana

Project Description

We seek a motivated intern to join our team investigating how short-interval wildfires influence soil carbon dynamics in subalpine lodgepole pine forests. Soils store the largest pool of carbon in conifer forest ecosystems, playing a critical role in ecosystem functioning and climate regulation. However, shifting wildfire regimes and broader global change may alter the stability of soil carbon, particularly in vulnerable soil layers directly affected by repeated burning at shortened intervals.

The intern will work closely with researchers, graduate students, and other undergraduates to assess how wildfire reburns shape the persistence and vulnerability of soil carbon stocks – and other related ecological topics associated with the broader project. A key focus is comparing two major pools: particulate organic matter carbon (POM-C) and mineral-associated organic matter carbon (MAOM-C).

POM-C consists of relatively fresh, plant-derived material highly sensitive to wildfire through direct combustion and reduced carbon inputs following reburns that limit vegetation regrowth. MAOM-C, often considered more stable due to mineral associations, may still be vulnerable in steep montane systems via post-fire erosion, sediment transport, and altered hydrology. This comparison may help reveal insights to immediate mechanisms for carbon loss and the impact for longer-term persistence. The intern will collect, process, and analyze soil samples from a chronosequence of sites with historic and shortened wildfire reburn intervals. This 10-week internship balances field and lab work, with collaboration opportunities at the University of Montana's Plant Ecology & Global Change Lab and the U.S. Forest Service Missoula Fire Sciences Laboratory.

Intern Responsibilities

- **Fieldwork:** Assist with vegetation surveys and soil sampling in fire-affected forest sites (plant identification skills are a bonus but not required!).
- **Laboratory:** Prepare and process soils for chemical analyses.

- **Data management and analysis:** Help process, store, and analyze data collected
- **Collaboration:** Work closely with researchers in the UM Plant Population & Community Ecology Lab and USFS Missoula Fire Science Lab.

Fieldwork Details

The bulk of the fieldwork will occur over ~2–4 weeks in remote areas of the Sapphire Mountains. However, additional work with project collaborators may take the intern to sites in Lolo and Helena National Forests in Montana. Tasks involve hiking over rugged and steep terrain, carrying heavy gear, and camping in remote sites for up to four nights at a time. This position is based in Missoula, MT, with fieldwork at various locations across western and central Montana.

What We're Looking For

- Interest in forest ecology, fire science, biogeochemistry or soils. With preference to applicants who have taken a soils course.
- Comfort working in remote and challenging outdoor conditions, including hiking and camping (please speak to your experience with this in your personal statement)
- Strong organizational and communication skills.
- Ability to pay attention to detail and to work both independently and collaboratively.

Length of Internship:

10 weeks (400 hours) in a negotiable period between May and August of 2026.

Compensation:

\$7,000 or \$7,500 depending on previous experience. Paid for through a partnership with the Montana Space Grant Consortium

Application

To apply please submit an application on the Montana Space Grant Consortium Summer Internship portal found at this link:

(https://spacegrant.montana.edu/student_research/internships.html).

Applications and two letters of recommendation are due February 28th, 2026.

Please contact Justin Gay (justin.gay@umontana.edu) if you have questions about the position or application process