

**1. WildFIRE PIRE: Feedbacks and consequences of altered fire regimes in the face of climate and land-use change in Tasmania, New Zealand, and the western U.S.**

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2. Fire is an important natural disturbance in temperate forested ecosystems and serves as a critical but poorly understood link between climate change and biosphere response. In recent decades, extreme drought, land-cover alteration, and non-native plant invasions in temperate regions around the world have altered natural fire regimes at an alarming rate, and in the process, threatened native biodiversity and human well-being. Identifying the climate and human-related drivers of disturbance-regime change is one of the most challenging issues facing natural resource management. WildFIRE PIRE will utilize the similarities and contrasts in fire, climate, and land-use interactions in three fire-prone settings as a platform for integrated fire-science research and education: Tasmania, New Zealand, and the western U.S. It will employ state-of-the-art field, laboratory, and modeling tools to advance our understanding of regional and hemispheric fire-climate linkages and land-use feedbacks. The team's diverse expertise allows novel interdisciplinary approaches and synergistic comparisons of fire history, ecology and management approaches in different biogeographical settings. Discoveries from cutting-edge science will help inform current fire management and decision making and educate the next-generation of fire scientists and managers. By bringing together fire-science disciplines that do not usually collaborate and utilizing the contrasts and similarities of the study regions, we will gain understanding not possible in a single region with a single approach. Educational and research activities will be integrated through undergraduate internships and graduate and postdoctoral fellowships. New team-taught courses, online discussions, and themed video materials will be developed and made available to other academic institutions, government agencies, and NGOs. Young filmmakers will produce video products that will extend outreach through popular science and natural history web platforms. Two international scientific workshops intended to help educate and train students and professionals about international issues in fire science, global change, and land management will also be supported.

3. **Intellectual Merit:** The intellectual merit of WildFIRE PIRE lies in its contribution to understanding fire as an Earth system process influenced by climate, land-use, and humans. Understanding the consequences of altered fire regimes and the feedbacks to land cover, disturbance regimes, carbon cycling, and climate change is recognized by the USGCRP and IPCC as a major challenge in global change research. It is also a subject of long-standing interest in the disciplines of geography and ecosystem science. The multi-faceted and multi-scalar approach of this investigation will (1) enable integrated approaches in basic and applied fire science, including comparisons of historical data in fire regime assessments and use of modern approaches to reconstruct past fire activity; (2) expand the matrix of natural experiments offered by individual regions; and (3) provide much-needed information in support of ecosystem science and management in all regions. The research contributes to initiatives that seek to characterize the consequences of climate change and variability and land-cover conversion through (1) an examination of key biospheric variables, (2) the use of paleo- and modern environmental data to link responses among sites, regions, and hemispheres; and (3) an analysis of the feedbacks between fire regimes, land-cover, humans, and climate change.

4. **Broader Impacts:** The broader impacts of WildFIRE PIRE lie in its objectives to address national and international needs for information about fire, climate change, and sustaining ecosystem services; to provide current science information in support of fire management and decision making needs; and to train the next generation of fire scientists and managers. The project will (1) deepen understanding of human-environment interactions, necessary to guide current and future land-use decisions; (2) support international scientific partnerships and training opportunities; (3) create international education experiences for 23 U.S. students and early-career scientists in ecosystem-based research and science filmmaking; (4) contribute to global paleofire databases; and (5) promote diversity in STEM disciplines. By forging this international partnership, we are laying the foundation for long-term scientific and career development, information outreach, and new educational materials in the critical field of fire science.

5. **Relevant Program Offices:** Geography and Regional Science, Ecosystem Science