

From forests to floodplains to functioning watersheds: Catalyzing collaborative research and inclusive training partnerships between Western Colorado University and DOE's National Laboratory system

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Changing climate and disturbance regimes are driving major changes to forest ecosystems and watershed function. These changes pose direct risks to current and future human generations, especially socio-economically disadvantaged communities. Improving our understanding of the causes and consequences of these ecosystem changes, and what kinds of actions would improve outcomes, requires new collaborations that bring together researchers in physical and biological sciences to test hypotheses with landscape-scale experiments. Addressing these issues also compels strong and sustained investment in inclusive training for scientists representing all affected human communities.

To meet these needs, this project will advance new and long-term partnerships between faculty and students at Western Colorado University and researchers at the Lawrence Berkeley and SLAC National Accelerator Labs, focusing on the meeting the two key objectives. First, we will develop **collaborative research on climate-driven impacts to ecosystems and watershed system functionality**, linking forests to floodplains in western Colorado. Second, we will create new **educational opportunities that provide innovative training to diverse students** through immersion in real-time research that can provide new knowledge essential to improved social and ecological outcomes.

Over a four-year timeframe, we will develop a suite of synergistic research activities linking current and planned DOE research in watershed function with Western's growing expertise in ecological and environmental sciences and engagement with land management agencies planning large-scale interventions. Together, these endeavors will allow us to test hypotheses around effects of disturbances such as fire, novel silvicultural treatments, and stream restoration, on ecosystem function under a changing climate. Our research will further serve as the foundation for three innovative and linked training initiatives at Western, a small, rural university uniquely situated to support students from underserved rural communities in western Colorado. These include: a) a new Environmental Science program that immerses diverse students directly into cutting-edge research, b) expanded fellowship opportunities for underrepresented and first-generation students in Western's MS and MEM programs, and c) mentoring and curriculum that builds data and narratives from our research activities into engaging classroom materials and activities.

The initiatives we propose will advance critical science questions and provide inclusive training for students who would not otherwise have access to such opportunities. These in turn will facilitate the

development of long-term partnerships between DOE and a rural university, to link the next generation of diverse, innovative scientists to fulfilling career opportunities addressing environmental challenges.

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