USDA California Climate Hub
U.S. DEPARTMENT OF AGRICULTURE

UCDAVIS Institute of the Environment

Postdoc in Quantitative Forest Management Research: Assisted Gene Flow and Reforestation Decision Support

Position at the USDA Climate Hub and UC Davis Institute for the Environment
University of California, Davis

Applications are invited for a postdoctoral researcher to work on decision support for improved reforestation outcomes. The position is located in the California Climate Hub at the UC Davis Institute for the Environment. The postdoc will analyze large datasets, build predictive models, run simulations, and develop intuitive interfaces to guide reforestation practices across California and the western US. This position will largely focus on analyses of common-garden datasets and the selection of climate-adapted seed sources for reforestation. This is a 2 + yr position with opportunities for extension, publications, mentorship, professional development, and networking with a variety of scientific collaborators and ecosystem managers. Remote work is possible. Starting salary is negotiable, depending on expertise and experience, ranging between $70,000 to $80,000.

Recent high-severity wildfires have left vast areas in California devoid of living trees, raising the prospect that without reforestation much of these areas could convert to shrublands or grasslands. Simultaneously, climate adaptation mismatch–between the climate conditions that local tree populations are adapted to and the climate they now experience–is accelerating, resulting in reduced growth and survival (Fig 1). Strategic reforestation represents an opportunity to adapt our forests to changing climate and to rebuild healthy forests for future generations. We build evidence-based tools to improve reforestation outcomes. The Climate-Adapted Seed Tool (CAST) helps managers choose climate-adapted seed sources. PostCRPT and PReSET respectively predict where reforestation is needed and where it will be most successful.

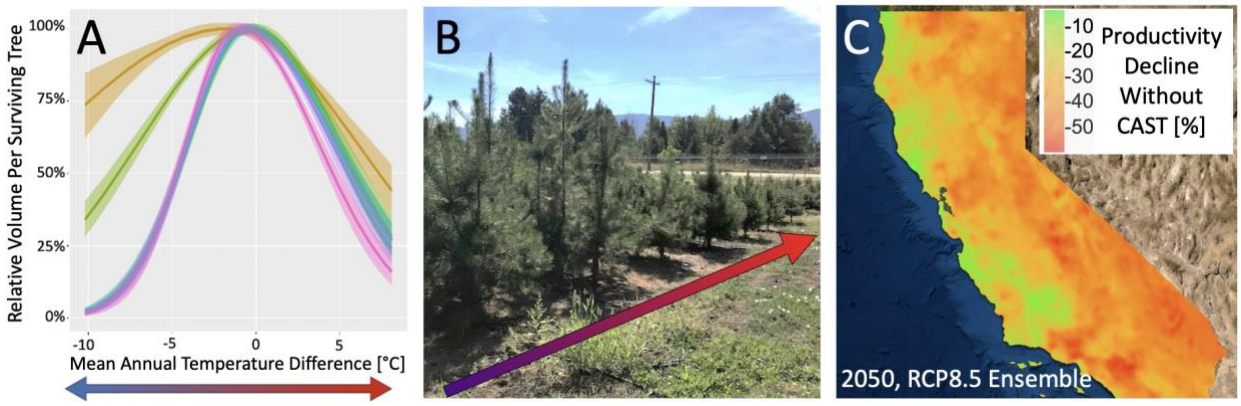

Fig 1. (A) Tree populations tend to be adapted to past climate conditions, and experience substantial declines in growth and survival under disparate climate conditions. **(B)** The effects of climate adaptation mismatch are plain to see to the casual observer in this demonstration provenance test, which represents the right-hand side of panel A. **(C)** In the absence of climate-adapted seed transfer, forests could experience severe declines in growth and survival.

Initial duties will focus on developing approaches for selecting diversified, climate-adapted portfolios of wild-collected native seed varieties for reforestation (see here), as well as broader analyses, and tool development to support the selection of climate-adapted genetic varieties for reforestation. Work to support the implementation of climate-adapted seed transfer (assisted gene flow) will leverage data from hundreds of thousands of trees planted in common garden experiments across Western North America, forest inventory data, and other spatiotemporal datasets and projections (*e.g.*, climate, FIA), to support the selection of nearby genetic varieties that are better adapted to current and anticipated climate conditions. The simple intervention of planting more climate-adapted genetic varieties can yield immense benefits to forest recovery, carbon sequestration, timber production, and fire resistance.

Other projects the postdoc could participate in include postfire reforestation prioritization, remote sensing tree distributions, as well as the potential for new data collection and experiments. Broadly, our goal is to achieve outsized positive impacts by nudging applied resource management toward better outcomes via intuitive and powerful decision-support tools.

Minimum Qualifications:

- PhD in a relevant STEM field (ecology, forestry, geography, statistics, etc.)
- Strong proficiency in data science applications
- Proficiency with scripted geospatial analysis in R (*e.g.*, using the 'terra' and 'sf' packages)
- Demonstrated record of producing reproducible research via scripted analyses
- Evidence of ability to publish research results in peer-reviewed journals
- Proficiency designing simulations, including selection of appropriate probability distributions

Desired Qualifications:

- Experience with Bayesian non-linear model fitting and ensembling
- Proficiency in developing interactive web applications or data dashboards (*e.g.*, R or Python)
- Experience or background in genecology or quantitative genetics
- Proficiency with Google Earth Engine
- Familiarity with the flora and natural history of California and Western North America
- Effective communication with both scientific collaborators and public stakeholders

The team: This project is led by Joe Stewart and Steve Ostoja. Collaborators include Jessica Wright, Emily Moran, Derek Young, Greg O'Neill, James Thorne, Hugh Safford, and others.

To Apply: Please send a CV and letter of interest, explaining your interest in the position, how you match the qualifications, and how the position aligns with your future goals, to Joe Stewart, joestewart@ucdavis.edu, and Steve Ostoja, smostoja@ucdavis.edu. Use the exact subject line "Quantitative Reforestation Postdoc". The start date is negotiable between Sept 30, 2023, and January 6, 2024 – though an earlier date is preferred. We value diversity and welcome applicants from all backgrounds. For qualified international candidates we are willing to explore work visa options.