UNIVERSITY OF CALIFORNIA MERCED | School of Natural Sciences

Quantitative & Systems Biology
Ph.D. Dissertation Defense
Candidate: Jeffrey Lauder

From the Cell to the Stand: Trait-Based Approaches to Understanding Forest Response to Climate Change

Date:

April 22, 2020

Time:

2:00 – 3:00 PM

Location:

Zoom Call (click here to attend or see given link)

Link: https://ucmerced.zoom.us/j/97509451729

Abstract:

Decreased moisture availability and increased temperatures have driven dramatic shifts in forest density and composition, and widespread drought-induced tree mortality. For example, the California drought of 2012-2016 was more severe than any observed in the previous 1200 years and left more than 130 million dead trees in the Sierra Nevada. This mass tree mortality may have myriad implications for water resources, fire prevalence, and land management. However, it also provides a unique opportunity to test hypotheses regarding drivers of tree mortality in a natural setting. Physiological traits such as growth and wood anatomy influence drought resistance. What remains unknown is how growth and wood anatomy interact to influence likelihood of drought-induced mortality, as well as other processes such as pest defense and reproduction. I analyzed the effects of growth, growth variability, and wood anatomy on likelihood of mortality and reproductive capacity in Pinus ponderosa and P. jeffreyi relative to drought and competition in the Sierra Nevada mountains of California. Here I show that trees with traits that theoretically confer drought tolerance died during extreme drought, likely due to tradeoffs in resource use between drought defense and pest defense that may influence reproductive capacity. Further, I identify novel predictors of mortality such as growth variability and between-year variation in wood anatomy that can improve predictive power of current models of forest response to climate change.

Bio:

Jeffrey is a lifelong explorer and researcher of the Sierra Nevada mountains. Born and raised in California, he received his undergraduate and master's degrees from CSU Chico, working in tropical forest ecology and aquatic ecology. He worked with governmental agencies and non-profit organizations before returning to academia for his dissertation research. Jeff has more than 10 years of research experience in the Sierra Nevada, from amphibian ecology in Yosemite National Park to tree physiology and forest ecology across the range. His research interests include examining how climate change has already impacted and may continue to impact Sierra Nevada ecosystems.

More Information:

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