QUANTITATIVE AND SYSTEMS BIOLOGY COLLOQUIUM:
Ecological consequences of drought and deluge for the eastern Sierra Nevada

Michael E. Loik
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Date:
1/26/2024

Time:
12:30- 1:45 PM

Location:
GRAN 135

About The Speaker:

Michael Loik is trained as a physiological ecologist. He has a BSc in animal physiological ecology (Univ. Toronto), an MSc in plant physiology (Univ. Toronto), and a PhD in plant physiological ecology (Univ. California, Los Angeles). All of Prof. Loik's advisors were physicists who turned into biologists. He has conducted experimental and synthesis studies on plant, population, community, and ecosystem responses to global change, largely in desert and montane biomes, but also in tropical forests and temperate grasslands. Prof. Loik's publications in journals such as Nature, PNAS, BioScience, Ecology Letters, Global Change Biology, and New Phytologist among others have been cited almost 9000 times. Prof. Loik's research on electricity-generating greenhouses was featured in Newsweek, >125 websites, the German version of Jeopardy, and on an episode of The Big Bang Theory. Professor Loik is the Chair of the Physiological Ecology section of the Ecological Society of America, and an inaugural associate editor of sustainability for Nature Scientific Reports.

Abstract:

Longer droughts in California may be a particularly disruptive outcome of global climate change. The ecological consequences of longer droughts are numerous, and extend from individuals to communities and ecosystems. Severe drought reduces plant water content and decreases photosynthetic ability, which can reduce fitness and productivity. The goal of this study was to determine the sensitivity of a snow-dominated high desert ecosystem to dramatic inter-annual fluctuations of annual precipitation. My team for 20 years has monitored photosynthetic physiology, recruitment, community structure and carbon storage alongside decades-old roadside snow fences near Mammoth Lakes, CA. Snow depth affects photosynthesis and growth of adult shrubs, timing of flowering, and also early establishment of seedlings of the dominant shrub and tree species. There are also significant differences in plant community composition where snow fences have continually manipulated snow depth for at least 40 years. Measurements done at different elevations suggest that low temperatures and snow depth likewise affect physiology, growth and recruitment of shrubs and trees. Results from over the years show multiple key climatic sensitivities, but how will combinations of warming, altered precipitation, and biotic interactions play out for the Sierra Nevada in the future?

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