The Laboratory of Tree-Ring Research

presents a talk by

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Seeing the light and feeling the heat? Reconstructing canopy disturbance and climate from ring widths

Wednesday, November 12, 2025 - 12:00pm to 1:00pm
Room: Bannister 110

Canopy disturbance events in forests (or 'release events') often increase light availability and growth rates for surviving trees. Using ring widths, release-detection methods identify the onset of rapid growth associated with these events enabling reconstructions of forest disturbance history. Conversely, dendroclimate reconstructions minimize these rapid growth responses by detrending entire ring-width time series to resolve underlying climate signals. Incorporating advantages from both of these approaches, my colleagues and I present a canopy disturbance detrending method that quantifies the subsequent, additional growth from release events as a discrete time series. Our method was recently published in Dendrochronologia (doi.org/10.1016/j.dendro.2024.126195). The method uses radial-growth averaging to detect release events and then power transformation and age-dependent smoothing splines to detrend individual release events, separating canopy disturbance responses from climatic effects. We test our canopy disturbance detrending method on both a coniferous and a broadleaf ring-width chronology from two contrasting temperate forests in eastern North America with known disturbance histories. The resulting disturbance growth time series agrees with the documented forest histories for each forest. Removing the effects of canopy disturbance from the ring-width series in each chronology improves climate correlations with monthly values of temperature and precipitation and may recover more low-frequency variation with past climate compared to other common detrending methods. Our method provides an alternative approach for detrending disturbance events in closed-canopy forests that should be accessible and useful for both ecological and climatological reconstructions.

The University of Arizona