



# THE LABORATORY OF TREE-RING RESEARCH

presents a talk by

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*Tree-ring  $\delta^{13}\text{C}$  tracks flux tower ecosystem  
productivity estimates in a NE temperate forest*

Wednesday, March 26, 2014 - 12:00pm to 1:00pm

Room: Bannister 110

We investigated relationships between tree-ring  $\delta^{13}\text{C}$  and growth, and flux tower estimates of gross primary productivity (GPP) at Harvard Forest from 1992 to 2010. Seasonal variations of derived photosynthetic isotope discrimination ( $\text{D}_{13}\text{C}$ ) and leaf intercellular  $\text{CO}_2$  concentration ( $c_i$ ) showed significant increasing trends for the dominant deciduous and coniferous species.  $\text{D}_{13}\text{C}$  was positively correlated to growing-season GPP and is primarily controlled by precipitation and soil moisture indicating that site conditions maintained high stomatal conductance under increasing atmospheric  $\text{CO}_2$  levels. Increasing  $\text{D}_{13}\text{C}$  over the 1992-2010 period is attributed to increasing annual and summer water availability identified at Harvard Forest and across the region. Higher  $\text{D}_{13}\text{C}$  is coincident with an enhancement in growth and ecosystem-level net carbon uptake. This work suggests that tree-ring  $\delta^{13}\text{C}$  could serve as a measure of forest GPP and be used to improve the calibration and predictive skill of ecosystem and carbon cycle models.