This investigation aims to extend a previously developed Eastern Hemlock (*Pseudotsuga canadensis*) tree ring chronology into the 1800s. Little is known about the past climate trends of the densely populated New England region (USA) thus, making future predictions difficult. In order for policymakers to be able to adequately prepare for future climate change, past climate and the current rate of change need to be examined within a historical context. Tree-ring chronologies from old growth trees provide the long-term context and annual resolution needed to reconstruct past climate for New England.

In a recent study, Rayback *et al* (2011; *in review*) investigated the dendroclimatological potential of $\delta^{13}C$ ratios from Eastern Hemlock tree rings from a site in New England for the period 1931-2010. They found that the stable carbon isotope ($\delta^{13}C$) ratio chronology was significantly correlated ($P<0.05$) with both mean maximum temperature in May-September ($r=0.53$; $p=0.000$) and cloud fraction in April-June ($r= -0.40$). Photosynthetic assimilation rate was hypothesized as the dominant control over the internal concentration of CO_2. In this study, the $\delta^{13}C$ chronology will be extended back to 1849, making the time series the longest $\delta^{13}C$ chronology yet developed for a tree species in eastern North America. The $\delta^{13}C$ chronology will then be used in a multiple linear regression analysis to reconstruct past temperature and/or cloud fraction for western Vermont. This proxy will be compared with other proxies, including historical climate data, from the region and related to large-scale atmospheric circulation patterns.