My main research theme is to understand the effects of changing atmospheric CO2 concentration ([CO2]) on the physiology, growth, and development of plants. I focus on time periods ranging from low [CO2] of the last glacial period (180 ppm) through elevated [CO2] predicted for the next 50-100 years (700 ppm). Although we know a great deal about plant responses to elevated [CO2] within a single generation, we know far less about how changing [CO2] will alter plant growth and developmental timing over long time spans that encompass evolutionary change. Therefore, there is potential for unexpected responses of plants in the future that cannot be predicted through our current level of understanding. My research has focused on reducing this critical gap in our knowledge base through genetic selection experiments to better understand adaptive responses to changing [CO2], as well as using stable isotope approaches with ancient specimens from the La Brea tar pits in Los Angeles, pack-rat middens from the southwestern U.S., and bogs in New Zealand to measure plant physiology within intact plant communities over 20,000 years of global change.