

Abstract: Terrestrial ecosystems including forests are estimated to have offset nearly a third of carbon-dioxide (CO₂) emissions from human fossil fuel burning and land-use change. At the same time, the terrestrial carbon cycle remains the least constrained component of the global carbon cycle resulting in uncertain projections of future CO₂ and climate. Forest ecosystems act as carbon sinks by assimilating carbon through photosynthesis and storing some of this carbon in woody tissues of trees. In doing so, trees also act as recorders of past and present environmental conditions. In this talk, I will present results from an ongoing continental scale real-time tree growth monitoring effort with the goal of better predicting the vulnerability of forests to climate change and prior work that uses the science of tree-rings (i.e., dendrochronology) to contextualise hydroclimate change in Eurasia.

Bio: **Prof. Mukund Rao** is an Ecoclimatologist and Carbon Cycle Scientist. He received my PhD from Columbia University in 2020. Following this he was a NOAA Climate & Global Change Fellow at University of California Davis and subsequently a Marie Skłodowska Curie Fellow at the Center for Ecological Research and Forestry Applications (CREAF), Barcelona, Spain. He will be starting as an Assistant Research Professor at Columbia University's Lamont-Doherty Earth Observatory in January 2025. His research aims to illuminate the future of ecosystems and the forest carbon cycle in a changing climate by drawing on my expertise in climate science, plant ecophysiology, dendrochronology, earth system models, and remote sensing. His research spans a broad array of spatial and temporal scales from cells to satellites and seconds to centuries. He is currently working on projects related to the role of tree growth in the forest carbon cycle, the vulnerability of forests to increasing heat waves and drought, and the use of dendrochronology to understand past environmental change and timber transport.