

## **Climate Change and Adaptation: Forestry and land-use change**

Trees established today may have an expected lifespan of 100+ years and their health and growth will be challenged by the rapidly changing climate. However, the rate of adaptation may be too slow for long-living trees given fast changes. Given these challenges, the PhD project shall apply genomic techniques to infer strategic knowledge on adaptation processes in forest trees and to improve strategies and methods for active adaptation and mitigation.

The project could focus on two strategic options for intervention in the adaptive processes: Genetic Diversification (GD) and Assisted Migration (AM). The hypothesis behind GD is that tree species in central and northern Europe (opposite to refugial areas) may be deprived of important genetic variation caused by bottlenecks combined with strong directional selection during northward migration in the Holocene. The hypothesis behind AM is that trees exhibit clear genetic differentiation in important fitness traits reflecting local adaptation, and that future forest regenerations should therefore include seed imported from areas where the *present* climate match the *expected future* climate at any given site.

The overall project goal is to test whether introduction of novel seed sources and genes can contribute to prepare our forests to climate change. The project will take a point of departure in candidate genes already identified in European Beech (*Fagus sylvatica*), the most common deciduous tree in Danish forests. The analyses will be based on both natural stands as well as provenance trials, and will be done in cooperation with international partners. Research stay in France or Italy must be anticipated.

*Contact: Professor Erik D. Kjær ([edk@life.ku.dk](mailto:edk@life.ku.dk)) and Professor J. Bo Larsen ([jbl@life.ku.dk](mailto:jbl@life.ku.dk)), Forest and Landscape, University of Copenhagen*