



## Functional characterization of genes associated to cork formation by genetic complementation approaches

**Place of work:** ForGen Lab – Forest Genomics and Molecular Genetics Laboratory - Faculdade de Ciências da Universidade de Lisboa (FCUL) <https://forgen.rd.ciencias.ulisboa.pt/>; **Supervisors:** Célia Miguel ([cmmiquel@fc.ul.pt](mailto:cmmiquel@fc.ul.pt)), Ana Milhinhos ([afmilhinhos@fc.ul.pt](mailto:afmilhinhos@fc.ul.pt)) ITQB-NOVA)

The student will be part of a larger project that aims at understanding the role of previously identified cork oak genes associated with cork formation (Lopes et al. 2020, <https://doi.org/10.1093/treephys/tpz118>). Cork is part of the bark that protects plants from environmental stresses, being at the same time a relevant biomaterial for the industry. Therefore, understanding the molecular mechanisms underlying its formation will be important to devise strategies for increased plant resilience and cork production for industrial purposes. The integration in this project will allow the student to have contact with different methodologies used in a molecular genetics lab, including primer design, molecular cloning, plant genetic transformation and phenotyping.

In previous work, the putative orthologs of the cork oak genes of interest have been identified in *Arabidopsis* and loss-of-function mutants with characteristic phenotypes are currently available in the lab. The main objective of this project is to generate genetic complementation lines to check whether the expression of the cork oak genes in *Arabidopsis* loss-of-function mutants can rescue mutant phenotypes. The work plan includes:

- (I) Primer design for amplifying the sequences of the genes of interest in cork oak and the promoter regions of the putative orthologs in *Arabidopsis*;
- (II) Preparation of transformation vectors with *Arabidopsis* promoters driving the expression of cork oak genes;
- (III) Genetic transformation and selection of transformant seedlings of *Arabidopsis*
- (IV) Phenotyping of transformed plants using confocal microscopy

The student selected for this project, after thesis registration, is eligible to apply to the BioISI Junior Programme (supporting 8 students with a 6-month Scholarship (BII), being the selection criterium the academic merit of the candidates.