## MASTER THESIS OFFER OF CEPLAS
## (FOR COMPUTATIONAL MASTER STUDENTS FROM TECHNICAL UNIVERSITY OF MADRID, UPM)

### Title of Master Thesis

Comparative transcriptomics to analyse the effect of rootstock on *Pinus pinaster* scion response to water deficit

### Description of student´s tasks

The project seeks to explore the response of *Pinus pinaster* to drought using transcriptomic analysis, studying the effect of rootstocks, that show different responses to water stress, in grafted scions. We hypothesize that differences in the water stress response of scions grafted on rootstocks with different drought sensitivity may be related to different transcriptional responses that are integrated in the different graft types, as observed in angiosperms. To test this hypothesis, I will focus on studying modifications of biological processes through changes in the expression pattern of genes involved in the response to water stress in the previously analysed reference progeny of *P. pinaster*, using grafts combining drought-tolerant and drought-sensitive rootstocks and scions. This study will provide information about molecular mechanisms integrated in the physiological response of each specific genotype and graft, unravelling if the use of drought tolerant rootstocks may improve the response to water stress of elite *Pinus pinaster* genotypes sensitive to water deficit.

### Prerequisites: *(languages, informatics skills, bioinformatic skills, other knowledge, etc)*

PhD in forest tree genomics, graduated in Biotechnology, with a Master's degree in molecular biology, bichemistry and biomedicine, and currently studying a Master's degree in computational biology. I have taken additional courses in programming languages phyton and R, and I am currently taking a course in Java language.

### Training Project

EXTERNAL PRACTICES/MASTER THESIS. The main goal of the external practices is to guide the student in the application of the previously acquired knowledge in real tasks, in a research group, an environment that realistically represents future working conditions in which students willbe incorporated. In this way, the student will become familiar with a working environment (work

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| schedule, responsibility, attitude, organization, coordination of activities with other colleagues, collaboration, communication skills, etc.), with the appropriate working methodology in the professional scenario, contrasting and applying the academic knowledge acquired. |

**Activities that will be performed in the academic internship/ Master Thesis:**

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| Statistical and bioinformatic analyses of transcriptomic data obtained by mass sequencing (Illumina) of scion needles from four graft constructs, made of scions and rootstocks previously characterized which show contrasting responses to drought, using the bioinformatic packages FastQC, Sortmerna.sh, Salmon and Deseq2. |

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| **Nº of positions offered**: | **1** |
| **Has the student dealings with underage persons?** | **yes** |
| **Starting date:** | **2 de enero 2023** |
| **Fecha de fin:** **(End date)** | **15 de julio 2023** |
| **Horas semanales**: **(Weekly hours)** | **35** |
| **Horario jornada laboral**: | **8:00-15:00** |

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| **(Working hours)** | |
| **Importe Ayuda/Bolsa de estudio**:<br>**(Amount of fellowship / remuneration)** | **0 €/mes** |
| **Tutor académico**:<br>(Academic tutor (UPM))<br>Email: | **María Garrido Arandia**<br>**maria.garrido@upm.es** |
| **Departamento tutor académico**:<br>**(Dept. of academic tutor)** | **Departamento de Biotecnología-Biología Vegetal** |
| **Tutor empresa**:<br>**(External tutor)** | **María Teresa Cervera Goy** |
| **Email tutor empresa:**<br>**(Email external tutor)** | **cervera@inia.csic.es** |
| **Departamento tutor empresa**:<br>**(Dept. of external tutor)** | **Ecología y Genética Forestal, ICIFOR** |
| **Ubicación de la estancia de las practicas**<br>**(Location of the internship)** | **Carretera de La Coruña, km 7,5. 28040 Madrid** |
| **ENTIDAD COLABORADORA**:<br>**(Collaborating Entity)** | **ICIFOR, INIA, CSIC** |

POLITÉCNICA

CBGP
CENTRO DE BIOTECNOLOGÍA Y GENÓMICA DE PLANTAS
UPM-INIA

EXCELENCIA SEVERO OCHOA

CEPLAS
Cluster of Excellence on Plant Sciences

E.T.S. DE INGENIERÍA AGRONÓMICA, ALIMENTARIA Y DE BIOSISTEMAS

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| ***A cumplimentar por Oficina Prácticas ETSIAAB:*** |
| **Créditos a reconocer (Nº ECTS)**: |