MASTER THESIS OFFER OF CEPLAS

(FOR COMPUTATIONAL MASTER STUDENTS FROM TECHNICAL UNIVERSITY OF MADRID, UPM)

Title of Master Thesis

Genome evolution in the aftermath of a host jump: comparative genomics of the fungal smut pathogen *Melanopsychium pennsylvanicum* with other smuts.

Description of student´s tasks

Smut fungi are a large group of biotrophic plant pathogens that infect mostly monocot species, including economically relevant cereal crops. An exception is made by the smut fungus *Melanopsychium pennsylvanicum*, which infects the dicot host *Persicaria sp*. This project aims to investigate genomic features in *M. pennsylvanicum* and its effector repertoire which might be linked to the host jump from a monocot to a dicot host.

Main tasks in this MSc project are:

- Annotation of repetitive sequences in fungal genomes
- Gene annotation
- Effector repertoire determination and interspecific comparison
- Identification of inter-chromosomal rearrangements.

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

- Language: good written and verbal English skills.
- Coding language: basic knowledge of Python
- Operating system: basic knowledge of Linux commands

Training Project

EXTERNAL PRACTICES/MASTER THESIS. The fundamental goal of the external practices is to guide the student in applying his previously acquired knowledge to real tasks in a group work environment the realistically represents the work conditions the students will encounter in their future roles. In this way, the student will be able to get familiar with a working environment (work schedule, responsability, attitude, organization, etc.), and with the adequate working methodology in professional reality, contrasting and applying the acquired academic knowledge.

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

- Student will get familiar with the softwares: BRAKER, RepeatMasker, SignalP and CHROnicle.
- Student will develop Python scripts to compare genome features between smut pathogens.
- Student will communicate his/her finding to fellow researchers in fortnightly meetings.
- Student will write a scientific report.

Nº of positions offered:	**1**
Has the student dealings with underage persons?	**NO**
Starting date:	**1/02/2021**
End date:	**15/07/2021**
Weekly hours *(only for internship in CEPLAS lab)*:	
Working hours *(only for internship in CEPLAS lab)*:	
Fellowhips *(if any, NOT REQUIRED):* **Remuneration (€/month):**	
Academic tutor (UPM/CBGP): *(you need a Tutor from UPM Master, not involved in the research activity)* **Email**:	
Department/Research Group of UPM/CBGP Academic tutor:	
CEPLAS Internship/Master Thesis Tutor/Director:	
Email CEPLAS tutor:	**g.doehlemann@uni-koeln.de**
Department CEPLAS tutor:	**Biology Department**
Location of the internship (telecommuting?):	**Cologne, Center for Molecular Biosciences**
CEPLAS Institution:	**University of Cologne**
To be completed by Internship Office ETSIAAB-UPM: **Number of ECTS (Nº ECTS)**:	

Send by email to: international.cbgp@upm.es (Pablo Gómez)