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

Título de las prácticas (Title of the internship):

Bioinformatics-driven acquisition, manipulation, and analysis of venom data

Descripción de las funciones del alumno (Description of the student's tasks)

Cone snails, a group of more than 700 species, have been one of the focuses for new drug discovery. These cone snails capture their preys using a diverse and unique group of bioactive neurotoxins. These neurotoxins are usually named conotoxins or conopeptides, that have proven to be valuable pharmacological probes and potential drugs.

The project aims to identify, characterize, and classify new conopeptides for potential therapeutic application, through genomic analysis of the data acquired by high throughput sequencing as well as data retrieved from different public servers.

This work will be performed under the supervision of Dr. Thomas Suply in Domiconus.

[Domiconus - Conotoxins for health](#)

Requisitos (Prerequisites): *(indicar titulación y curso) (give Grade and academic year); otros requisitos adicionales (idiomas, informática, otros conocimientos, etc) (other additional prerequisites (languages, informatics, other knowledge, etc))*

M2 Student with experience in coding and scripting, at least, use of python, bash, and R. Experience with clusters. The student should be used to use and adapt established bioinformatics pipelines that are used in genomics (Bowtie2/MEME suite/Homer suite/Deep tools/various R pipelines/STAR/DESeq).

It is expected that the student is fluent in English and French.

Proyecto formativo (Training Project)

Module EXTERNAL PRACTICES. 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, responsibility, attitude,



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organization, etc.), and with the adequate working methodology in professional reality, contrasting and applying the acquired academic knowledge.

Actividades a desarrollar en la práctica académica (Activities that will be performed in the academic internship):

The student can dedicate most of her/his time to working on the individual scientific Project.

Task 1 Data acquisition through high throughput sequencing.

Task 2 Data retrieval through the different servers and publications.

Task 3 Experiments to study the target genes of conopeptides in cells.

Task 4 Development of a pipeline to study the genomics of the different conopeptides and classify them. Study the mis regulation of target genes in different set of cells after venom application.

Task 5 Analyses on transcriptomics data.

Task 6 will be the documentation of the project including the pipeline.

Regular weekly meetings with the supervisor, and monthly presentations to the team.

References

Abalde, Samuel & Dutertre, Sébastien & Zardoya, Rafael. (2021). A Combined Transcriptomics and Proteomics Approach Reveals the Differences in the Predatory and Defensive Venoms of the Molluscivorous Cone Snail *Cylinderochamaea ammiralis* (Caenogastropoda: Conidae). *Toxins*. **13**. 642. [10.3390/toxins13090642](https://doi.org/10.3390/toxins13090642).

Gao B, Peng C, Yang J, Yi Y, Zhang J, Shi Q. Cone Snails (2017) A Big Store of Conotoxins for Novel Drug Discovery. *Toxins (Basel)* ;9(12):397. doi: 10.3390/toxins9120397. PMID: 29215605; PMCID: PMC5744117.

Nº de plazas:

(Nr. of places)

1



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**E.T.S. DE INGENIERÍA AGRONÓMICA,
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¿El alumno tendrá trato habitual con menores? (Has the student dealings with underage persons?)	No
Fecha de inicio: (Starting date)	10/01/2022
Fecha de fin: (End date)	End of June
Horas semanales: (Weekly hours)	35
Horario jornada laboral: (Working hours)	TDB
Importe Ayuda/Bolsa de estudio: (Amount of fellowship / remuneration)	600 €/mes
Tutor académico: (Academic tutor (UPM)) Email:	Dr. Stephan Pollmann
Departamento tutor académico: (Dept. of academic tutor)	Coordination of the UPM Master in Computational Biology



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Tutor empresa: (External tutor)	Dr. Thomas Suply
Email tutor empresa: (Email external tutor)	t.suply@domiconus.com
Departamento tutor empresa: (Dept. of external tutor)	MBA – R&D
Ubicación de la estancia de las practicas (Location of the internship)	FRANCE-GERMANY
ENTIDAD COLABORADORA: (Collaborating Entity)	DOMICONUS
A cumplimentar por Oficina Prácticas ETSIAAB: Créditos a reconocer (Nº ECTS): 9	

Enviar por email a: OFICINA DE PRÁCTICAS ACADEMICAS EXTERNAS – ETSIAAB
secretaria.pei.etsiaab@upm.es – Secretarias: Visitación Pérez / Susana Pardo - Tfno: 913363686)