2024

Erasmus+

CONVOCATORIA DE PRÁCTICAS INTERNACIONALES

Convenio UAM/CEBE

Convenio UAM/CED

Convenio UAM/CERFA

Convenio UAM/CERU

Convenio UAM/SRSI

Facultad de Ciencias

Universidad Autónoma de Madrid

CONVOCATORIA DE PRÁCTICAS INTERNACIONALES

Plazo de presentación de solicitudes: del del 12 de febrero al 25 de febrero de 2024.

Se ofertan un total de 42 estancias de prácticas en los siguientes destinos:

Convenio UAM/CERFA 2024: movilidades con destino Alemania (se ofertan 10 estancias de prácticas).

Convenio UAM/SRSI 2024: movilidades con destino Irlanda (se ofertan 2 estancias de prácticas).

Convenio UAM/CEBE 2024: movilidades con destino Bélgica (se ofertan 11 estancias de prácticas).

Convenio UAM/CED 2024: movilidades con destino Dinamarca (se ofertan 7 estancia de prácticas).

Convenio UAM/CERU 2024: movilidades con destino Reino Unido (se oferta 12 estancia de prácticas).

Para cada convenio, este documento incluye una tabla resumen y la información detallada de cada una de las ofertas de prácticas.

En algunos casos de los convenios UAM/SRSI, UAM/CEBE y UAM/CERU, los supervisores podrán acceder a supervisar a dos estudiantes tras el proceso de entrevista de candidatos. En el Convenio UAM/CERFA siempre se adjudicará un único estudiante a cada oferta.

En el índice, pinchando en cada oferta de prácticas, se accede a la información detallada de la misma.

Prácticas en Alemania Convenio UAM-CERFA

Número de Proyecto	Supervisor	Área de Conocimiento	Lugar de realización	Número de plazas
AL-1	**Carmen Villacañas de Castro**	Biology, Environmental Sciences	Oldenburg	1
AL-2	**Maite Ogueta Gutierrez**	Biology	Münster	1
AL-3	**Iker Irisarri Aedo**	Biology	Hamburg	1
AL-4	**Celia Escudero Hernández**	Biology, Biochemistry, Food Technology	Kiel	1
AL-5	**Marta Mendez Lopez**	Biology, Biochemistry	Münster	1
AL-6	**Borja Ferrero Bordera**	Biology, Biochemistry, Environmental Science	München	1
Al-7	**Carlos Posteguillo**	Chemistry, Chemichal engineering	Berlin	1
AL-8	**Jesus Praena Tamayo**	Biology, Biochemistry	Köln	1
AL-9	**Lukas Huschet**	Biology, Biochemistry	München	1
AL-10	**Maria Teresa Aguado Molina**	Biology	Göttingen	1

Gracias a la colaboración entre CERFA y la **Fundación Ramón Areces**, estas estancias de prácticas tendrán un complemento adicional a la financiación Erasmus +Placement.
https://cerfa.de/ayudas-traineeship-cerfa

Complemento   adicional
(i) ayuda económica a los estudiantes de 400 euros en concepto de ayuda de viaje y (ii) un curso práctico destinado a ofrecer formación sobre gestión de carrera profesional.

> *A continuación, aparece toda la información de cada una de las ofertas*

Proyecto AL-1

Nombre y apellidos del Supervisor / Name and surname of the Supervisor
Carmen Villacañas de Castro

Afiliación del supervisor y Enlace a afiliación / Supervisor affiliation and Affiliation link
Carl von Ossietzky Universität Oldenburg
https://uol.de/en/biology/research-groups/aquatic-ecology-and-nature-conservation

Título del Proyecto/ Project Title
Resting sites characterisation along a land use gradient

Perfil preferencial del estudiante
Biology, Ecology, Environmental Sciences, Limnology.
Preferably MSc; otherwise BSc.

Fechas orientativas/Available Dates
01/06/2024 to 30/09/2024

Programa/ Detailed program of the traineeship period
This short project will be developed within a research framework on the ecological factors that influence the population development of mosquitoes, such as the microclimate in resting sites. This can help us predict the spatio-temporal development of important mosquito vector species of the *Culex* group. Moreover, the microclimatic conditions in resting sites are of high relevance, as they will determine the extrinsic incubation period of viruses, and therefore have an impact on the vectorial capacity of mosquitoes, two key concepts in vector ecology. The characterisation of resting sites will provide insights into the development of efficient control and surveillance measures to minimize the risk of mosquito-borne diseases.

The short project to be carried out aims to characterise the resting sites of mosquitoes along a land use gradient, with emphasis on *Culex pipiens* s.l. as it is the principal vector of the West Nile Virus (WNV). The tasks to be carried out by the trainee will be the following:
- Help prepare and set up the sampling and experimental equipment in the field sites.
- Monitor the field work and collect adult mosquitoes with a hand vaccuum.
- Monitor climatic parameters of the resting sites (temperature, radiation…).
- Monitor temperature at the resting sites and surrounding area using a high-resolution thermal camera.
- Collect data adult presence or absence and abundance.
- Sort out the collected samples in the lab taxonomically (Culicids vs other Diptera, Insecta)
- Write a scientific report and prepare an oral presentation.

Competencias a adquirir por parte del estudiante/ Knowledge, skills and competences to be acquired by the trainee at the end of the traineeship (expected Learning Outcomes)
Experience in practical research, applying their skills and knowledge acquired during their education into a research project and gaining insight into an academic workplace.
- Learning and understanding methods involved in research in an ecological discipline, both under field and laboratory conditions.
- Development of their scientific writing and communication skills.
- Development of their analytical, scientific thinking and problem-solving skills.
- Improvement of their foreign language skills, as well as intercultural competences.
- Expansion of their professional network.

Seguimiento/ Monitoring Plan
- An initial meeting upon arrival will help establish the time and organisational plan.
- Tasks will be fulfilled in cooperation with the host applicant and with a day-to-day communication.
- Weekly discussion of the progress of the tasks and personal learning goals, planning the next phase, and any other issues that may arise during the traineeship.
- Observation and evaluation of the trainee's skills regarding initiative, problem-solving, decision-making, organisation, adaptability, communication, teamwork.

Evaluación/ Evaluation plan
At the end of the traineeship, the student will have to write a scientific report about the project (formatted as a proper scientific article) and give an oral presentation (aprox. 15 min) at the working group weekly seminar.

Conocimientos técnicos o experiencia requerida (si procede) / Technical knowledge or experience required (if applicable)
- Experience in laboratory work (proper and safe handling of chemicals, capable of using a microscope…) and field practices during their studies.
- Previous experience handling insects/insect samples.
- PC Skills: Word, Excel, PowerPoint.
- Fluent English
- Preferably, basic training in data analysis with R or another statistical programme (but it is not compulsory).

Especificaciones extra de la institución de acogida (si procede) / Additional specifications of the host institution (if applicable)

Disponibilidad para evaluar informes de covalidación de créditos: Si / Availability to evaluate credit covalidation reports: Yes

Otra información relevante / Any additional important information
Students will benefit from the *"Ayudas Traineeship CERFA"* consisting of 400 € and a career development course.

Proyecto AL-2

Nombre y apellidos del Supervisor / Name and surname of the Supervisor
Maite Ogueta Gutierrez

Afiliación del supervisor y Enlace a afiliación / Supervisor affiliation and Affiliation link
WWU Münster
stanewsky.uni-muenster.de

Título del Proyecto/ Project Title
Role of GABAergic neurons in the regulation of the circadian clock of the fruit fly

Perfil preferencial del estudiante
Biology

Fechas orientativas/Available Dates
01.06.2024 to 30.09.2024

Programa/ Detailed program of the traineeship period
Life on Earth is determined by the daily changes in light and temperature. In order to prepare and respond to these changes, almost all living organisms have developed a circadian clock, which is able to anticipate to the changes and prepare the organism accordingly, in terms not only of behaviour, but also regulating most physiological mechanisms. Both in mammals and in fruit flies, the visual system as well as specific photoreceptors are involved in the light input pathway into the clock. The circadian clock of Drosophila comprises about 150 neurons in the central brain, which are characterized by rhythmic clock gene expression. In the lab, we are interested on studying the role of the GPI anchored protein Quasimodo (QSM). QSM is involved in the light input pathway into the clock, although is not clear how. It genetically interacts with some membrane proteins to regulate the electrical activity of some of the clock neurons. This interaction leads to a daily switch in the response of these neurons to the neurotransmitter GABA, from inhibitory to excitatory. This GABA-switch depends on the intracellular chloride concentration and it occurs also in mammals and is necessary for the adaptation to long and short days.

The trainee will study the physical interaction of these proteins and their localizations within the brain of the flies, as well as the connections with GABAergic neurons. Additionally the effect of the available mutants will be tested by studying the behaviour of the flies under different environmental conditions (long vs short days and "jet-lag" experiments among others). To test if the Chloride plays a role, two specific sensors will be tested at different times of day.

Competencias a adquirir por parte del estudiante/ Knowledge, skills and competences to be acquired by the trainee at the end of the traineeship (expected Learning Outcomes) (
The trainee will learn how to work in a laboratory and how to work with flies. In the lab he/she will work with Drosophila genetics, perform behavioural and imaging experiments, as well as molecular and cellular biology. The project will as well involve the critical reading and discussion of scientific papers and the presentation and discussion of the results.

Seguimiento/ Monitoring Plan
The trainee will have to write a detailed lab book that will be checked every week to discuss the development of the project so far. Additionally, in the weekly meetings we will speak about next steps and propose solutions about how to proceed in case of problematic results. It is expected that the trainee contributes with his/her own ideas

Evaluación/ Evaluation plan
The trainee will give a presentation two weeks into the project, to present it to the other members of the lab, as well as in the last week, to show the results obtained. The lab book will be also evaluated, in terms of clarity, details and accuracy, as well as the day-to-day lab work. He/She will also take part in the regular journal clubs, where new literature has to be explained.

Conocimientos técnicos o experiencia requerida (si procede) / Technical knowledge or experience required (if applicable)

Especificaciones extra de la institución de acogida (si procede) / Additional specifications of the host institution (if applicable)

Disponibilidad para evaluar informes de covalidación de créditos: Si / Availability to evaluate credit covalidation reports: Yes

Otra información relevante / Any additional important information
Students will benefit from the *"Ayudas Traineeship CERFA"* consisting of 400 € and a career development course.

Nombre y apellidos del Supervisor / Name and surname of the Supervisor
Iker Irisarri Aedo

Afiliación del supervisor y Enlace a afiliación / Supervisor affiliation and Affiliation link
Leibniz Institute for the Analysis of Biodiversity Change
https://hamburg.leibniz-lib.de/ueberuns/mitarbeiter/irisarri.html

Título del Proyecto/ Project Title
Genome-wide analysis of snappers (Lutjanidae) using Museomics

Perfil preferencial del estudiante
This project could be carried out by a last-year bachelor student or master-student in Biology with interest in computational methods.

Fechas orientativas/Available Dates
01.06.2024 to 30.08.2024

Programa/ Detailed program of the traineeship period
Natural history collections are excellent archives of worldwide biodiversity data with a time stamp. By accessing the genomic DNA of museum specimens (Museomics), we can not only sample a large range of species without traveling far away, but we it also opens a window into the species' past history. This projects aims to use a museomics approach on snappers (fish of the Lutjanidae) in order to improve their systematics and taxonomy. The intern will learn how to analyse genome-wide genomic DNA sequences obtained from museum material, including (i) contamination check, (i) data quality assessment, (iii) draft genome assembly, and (iv) phylogenomic analysis. The goal is to reconstruct a robust phylogenomic hypothesis with genome-wide data for snappers, in order to clarify their phylogeny, systematics, and taxonomy. This traineeship will provide the student with key skills in bioinformatic and phylogenomic methods.

Competencias a adquirir por parte del estudiante/ Knowledge, skills and competences to be acquired by the trainee at the end of the traineeship (expected Learning Outcomes)

This traineeship combines relevant biological questions with state-of-the-art techniques for genomic data analysis. The student will develop a good understanding of genomic data analysis and specific knowledge about museomics. They will also acquire good theoretical and practical knowledge of phylogenomics. They will develop expertise with state-of-the art bioinformatic tools and High-Performance Computing (HPC) environments. All these are all highly desirable skills in biology, which is increasingly computational. In addition, the student will interact with other in-house project stakeholders and bird experts and will participate in fortnightly journal clubs on broad topics in evolutionary biology.

Seguimiento/ Monitoring Plan
The student will work in close collaboration with the host to ensure acquisition of the expected theoretical and practical knowledge. Two long initial meetings have been planned to (i) provide an overview of the project, and (ii) give access to the data and computational environment. Short daily meetings and long weekly meetings will be planned to adequately monitor the development of the project and the achievement of milestones, reviewing and solving any

possible setbacks. Once a month, the student will receive feedback from other in-house (LIB) stakeholders of the project.

Evaluación/ Evaluation plan
The objective of this traineeship is to teach the student with key theoretical and practical skills and thus, the main evaluation criteria will be based on learning performance (the specific goals to be defined based on previous experience of the student). The student is also expected to deliver research outputs according to the project milestones. The final project report will be additionally evaluated by in-house (LIB) project stakeholders.

Conocimientos técnicos o experiencia requerida (si procede) / Technical knowledge or experience required (if applicable)
Basic (bachelor-level) knowledge of evolution/genetics is necessary.

Especificaciones extra de la institución de acogida (si procede) / Additional specifications of the host institution (if applicable)

Disponibilidad para evaluar informes de covalidación de créditos: Si / Availability to evaluate credit covalidation reports: Yes

Otra información relevante / Any additional important information
Students will benefit from the *"Ayudas Traineeship CERFA"* consisting of 400 € and a career development course.

Nombre y apellidos del Supervisor / Name and surname of the Supervisor
Celia Escudero Hernández

Afiliación del supervisor y Enlace a afiliación / Supervisor affiliation and Affiliation link
University Hospital Schleswig-Holstein (UKSH) – Christian-Albrechts-University (CAU) Kiel
https://www.ikmb.uni-kiel.de/research/systems-immunology

Título del Proyecto/ Project Title
Autophagy defects in neurons and methylation defects in fibroblasts contribute to major complications of inflammatory bowel disease

Perfil preferencial del estudiante
Bachelor or Master. Biology, Biochemistry, Food Technology

Fechas orientativas/Available Dates
24/06/2024 to 20/09/2024

Programa/ Detailed program of the traineeship period
Inflammatory bowel disease (IBD) is a debilitating chronic gastrointestinal condition resulting from an immune overreaction against microbiota. Intermittent inflammatory flares damage the gut and despite the cells' efforts to repair the tissue and anti-inflammatory treatments, cellular programmes become altered over time. Fibroblasts – the main cells involved in wound healing and tissue remodelling – adopt a pro-inflammatory phenotype capable of avoiding necroptosis that secretes excessive amounts of extracellular matrix and ultimately causing fibrosis, which is a permanent scar that impairs correct functioning (i.e. nutrients are not absorbed). On the other side, membrane potentials from enteric neurons are altered causing permanent changes in motility and chronic pain. These complications are poorly understood and untreatable: fibrotic tissue requires surgical excision whereas dysmotility and pain are only temporarily corrected by additional treatments.

To comprehend intestinal fibrosis, dysmotility and pain, we isolate primary fibroblasts and neurons from mice to induce IBD-relevant damage in vitro. We are focusing on cytokines, microbial-derived components, stressed intestinal epithelial cells (IEC) and pro-inflammatory macrophages (fig.1). Currently, we are focused on exploring how defects in autophagy mechanisms in neurons (lack of Atg16l1 or Xbp1 expression) and DNA methylation defects in fibroblasts (lack of Dnmt3a expression) affects these cells. Complementarily, we have genetically modified mice that lack expression of target genes in neurons or fibroblasts under the control of a tamoxifen-inducible Cre recombinase (Atg16l1-NestinCre/ERT2, Xbp1-NestinCre/ERT2, and Dnmt3a-Col1a2Cre/ER mice). So far, we have generated Dnmt3a-depleted ModeK IEC and 3T3 fibroblast cells, while we isolate primary cells from intestines from mice for characterization in vitro and tissue samples for further examination. In the future, we will also characterize the effects of gene depletion in the mice in the short and long term as well as during inflammation using the dextran sodium sulphate (DSS) model of colitis in vivo.

* A final degree project (FDP) testing immunofluorescence in different cells (2022) and a FDG establishing the workflow for single-cell/single-nuclei RNA-sequencing of fibroblasts/neurons (2023) have resulted from Erasmus+ students contributing to this project thanks to CERFA

traineeship programme. In addition, a MSc thesis was defended in 2023 at Kiel's University, and another one is planned for May 2024.
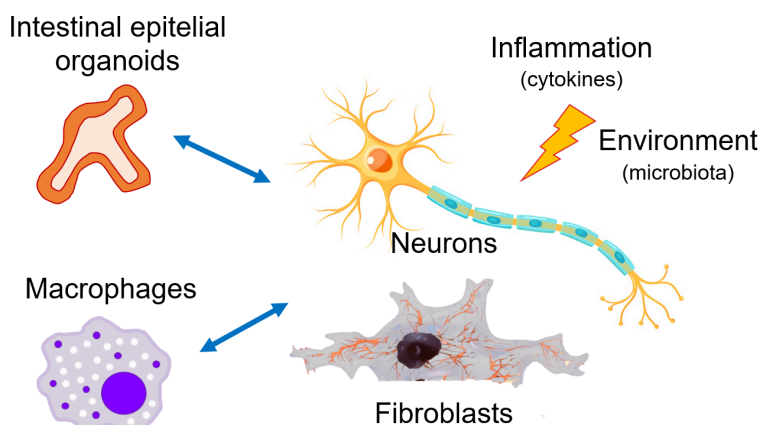

Figure 1: Schematic representation of the project.

Competencias a adquirir por parte del estudiante/ Knowledge, skills and competences to be acquired by the trainee at the end of the traineeship (expected Learning Outcomes)
General knowledge on aseptic techniques, cell culture work and in vitro assays.
Culture of cell lines and enteric fibroblasts.
Immunohistochemistry, immunofluorescence, and microscopy.
Experimental design and analyses.

Seguimiento/ Monitoring Plan
Celia will directly train and supervise the student <u>daily</u> at the beginning. After a few weeks, the student should be able to work alone, and be independent to follow different protocols and handle the fluorescence microscope. Therefore, Celia's supervision will be adjusted to the level of independence and confidence shown, from daily, to every-other-day or weekly meetings, also according to the project requirements. The student will be invited to the weekly lab meetings and journal clubs with other lab members to get a better insight into the field and openly discuss science.

Evaluación/ Evaluation plan
The student's progress, including new abilities and independence, will be evaluated weekly by Celia. She will also provide with feedback that will promote the student's learning and evolution towards independent lab work and experimental design. At the end of each month, a formal evaluation meeting will be scheduled to assess the student's and the project's progress, make space for reflection and provide additional feedback. A closing evaluation meeting will take place in September to assess what aspects could be referred to again if a new traineeship relationship would start, and what both would do differently next time.

Conocimientos técnicos o experiencia requerida (si procede) / Technical knowledge or experience required (if applicable)
Previous experience in cell cultures and microscopy will be positively evaluated.

Experience working with animals is not required.

Especificaciones extra de la institución de acogida (si procede) / Additional specifications of the host institution (if applicable)

Sign a hosting agreement in advance. Management of the admissions to the facilities once the student arrives.

Disponibilidad para evaluar informes de covalidación de créditos: Si / Availability to evaluate credit covalidation reports: Yes

Otra información relevante / Any additional important information
Students will benefit from the *"Ayudas Traineeship CERFA"* consisting of 400 € and a career development course.

Nombre y apellidos del Supervisor / Name and surname of the Supervisor
Marta Méndez López

Afiliación del supervisor y Enlace a afiliación / Supervisor affiliation and Affiliation link
WW Universitaet Muenster. Uniklinikum Muenster
https://www.medizin.uni-muenster.de/physiologiei/das-institut/mitarbeiterinnen/wissenschaftliche-mitarbeiterinnen/juengling-kay-dr-priv-doz.html

Título del Proyecto/ Project Title
Brain regional activity mapping following fear extinction in the mouse models NPSR-i107N and NPSR1 N107

Perfil preferencial del estudiante
Last course of Bachelor or Master (any course) in Biology or Biochemistry

Fechas orientativas/Available Dates
15/12/2024 to 31/05/2025

Programa/ Detailed program of the traineeship period
The neuropeptide S system, consisting of neuropeptide S (NPS) and its G protein-coupled receptor (NPSR1), is expressed in central nervous systems of humans and rodents in several brain regions e.g. the amygdala, midline thalamic nuclei, olfactory areas, pre- and parasubiculum and cortical regions. Previous studies, using both pharmacological or genetically modified NPSR1-deficient mice approaches, implicate that the NPS system is involved in cognitive and emotional processes such as memory, addiction, social behavior, or anxiety and fear extinction. To study how the NPS system controls fear behavior, we generated a novel mouse model (NPSR1-I107N) by introducing the human-specific SNP into the mouse NPSR1 gene, which differs from the ancestral variant (NPSR1 I107). We demonstrated that fear extinction is enhanced predominantly in N107-expressing female mice and that the efficacy of fear extinction is a function of genotype, sex, and threat salience (Bengoetxea et al., 2021).

Our data indicate differences in fear extinction based on sex, but the neuronal correlates remain elusive. To clarify the brain regional-specific NPS-neuronal activation following fear extinction between males and females, we will perform either a c-Fos protein immunohistochemistry or an in-situ hybridization of the Arc immediate early gen (IEG) mRNA. catFISH is a within-subject technique, which takes advantage of the differential transcriptional time-course and sub-cellular distribution of IEGs mRNA. Thus, by using this technique (RNAScope fluorescent multiplex, ACD Biotechne) we will identify Arc mRNA in nuclei of NPSR1-positive neurons, which will be identified by its expression of tdtomato mRNA. With this information, it is possible to identify neuronal ensembles being active during extinction.

In addition to the work in the lab, the student will be able to participate in the weekly department seminars, in which both local and guest scientists expose and discuss their most recent work.

Competencias a adquirir por parte del estudiante/ Knowledge, skills and competences to be acquired by the trainee at the end of the traineeship (expected Learning Outcomes)

At the end of this traineeship, the student should be able to successfully prepare and slice deep-frozen mice brain samples for post-processing. The student will be introduced to the fluorescence immunohistochemistry and or RNAScope technique, to label the immediate early genes c-Fos and Arc protein or RNA in the neuronal nuclei. Once labeled, the student will be introduced to the imaging in the fluoresce confocal microscopy and post-processing of the image for quantification, being able to identify and select regions of interest, recognize NPS labeled cells as well as c-Fos or Arc immunoreactive cells. For this last step, we will use the image software ImageJ.

Seguimiento/ Monitoring Plan
The student will work in the laboratories of the Institute of Physiology I, being supervised at all times by both the applicant and the experienced laboratory technicians of the department.

Evaluación/ Evaluation plan
At the end of the stay, the presentation of a short report containing the objective of the work, the description of the materials and methods used, results and conclusions of the study will be required.

Conocimientos técnicos o experiencia requerida (si procede) / Technical knowledge or experience required (if applicable)
Previous lab experience will be favoured.

Especificaciones extra de la institución de acogida (si procede) / Additional specifications of the host institution (if applicable)

Disponibilidad para evaluar informes de covalidación de créditos: Si / Availability to evaluate credit covalidation reports: Yes

Otra información relevante / Any additional important information
Students will benefit from the *"Ayudas Traineeship CERFA"* consisting of 400 € and a career development course.

Proyecto AL-6

Nombre y apellidos del Supervisor / Name and surname of the Supervisor
Borja Ferrero Bordera

Afiliación del supervisor y Enlace a afiliación / Supervisor affiliation and Affiliation link
LMU Munich
https://www.imp.med.uni-muenchen.de/members/mitarbeiter/ferrero-borja/index.html

Título del Proyecto/ Project Title
Engineering reporters to unveil the circadian clock mechanism of soil bacterium *Bacillus subtilis*

Perfil preferencial del estudiante
Master student or Bachelor student after 3rd year. Biology, Biochemistry, Environmental Science

Fechas orientativas/Available Dates
01/09/24 to 31/01/25

Programa/ Detailed program of the traineeship period
It was believed until recently that non-photosynthetic bacteria lacked an internal clock; nevertheless, our lab disproved this notion three years ago. Our goal is uncovering the mechanism of the soil bacterium *Bacillus subtilis'* circadian clock. We offer a five-month traineeship opportunity aiming to teach the principles of circadian microbiology research.

Establishing a solid foundation is the main goal of the first month. During a comprehensive laboratory orientation, trainees learn about existing research projects, team dynamics, and safety procedures. Proficiency in fundamental microbiology skills like microbial identification and aseptic handling will be acquired. Setting the stage for more complex methods, the principles of molecular biology are presented, including DNA extraction, PCR, and gene cloning.

After the second month, acquired skills will be applied in the development of reporter tools for circadian experiments. As the project advances, trainees hone their molecular biology skills. Instruction in data analysis empowers students to analyse and present experimental outcomes.

Microscopy and fermentation techniques are the main topics of the third month. The trainee will be introduced to chemostat cultivations, which furthers the continuous study of microbial development. Developed reporter systems will be used for biofilm subpopulation imagine using fluorescence reporters.

A mid-term review is offered halfway through the program to allow for analysis and modification. Based on that, further reporter systems will be aimed.

Their communication skills are improved as they get ready for the project presentation at the end of the course. An evaluation that includes performance feedback and recommendations for possible future research directions is conducted at the traineeship.

This training program is designed to foster a comprehensive understanding of microbiological research, so that trainees can acquire real-world experience and make valuable contributions to current research projects. The plan's dynamic and adaptable structure enables customized development and the pursuit of individual interests.

Competencias a adquirir por parte del estudiante/ Knowledge, skills and competences to be acquired by the trainee at the end of the traineeship (expected Learning Outcomes)
The student will get a comprehensive set of skills covering circadian biology concepts and molecular biology procedures such as DNA extraction, PCR, and gene cloning. We will refine our understanding of biofilm analysis through microscopy and circadian processes on chemostat procedures. We will build data analysis abilities using statistical techniques and bioinformatics technologies. Through project presentations, the student will acquire competency in scientific communication, efficient teamwork within a research team, and project management. All things considered, this extensive training program guarantees the acquisition of critical abilities, expertise, and information necessary for a prosperous career in scientific research.

Seguimiento/ Monitoring Plan
The monitoring plan involves weekly progress meetings for real-time support on challenges, development, and planning of the trainee. Regular project milestone assessments will track overall progress in research endeavours. The use of laboratory logbooks will be introduced to the trainee and will serve as tool for tracking daily activities and protocols. A mid-term review will facilitate adjustments and provide a comprehensive evaluation of the trainee's performance. Continuous supervision during advanced techniques, including molecular biology and data analysis, will ensure skill refinement. This dynamic monitoring approach ensures the trainee's ongoing development and optimal integration into the laboratory's research initiatives.

Evaluación/ Evaluation plan
Throughout the training's duration, there will be ongoing monitoring and feedback methods as part of the evaluation strategy. Weekly progress meetings evaluate comprehension and work efficiency. Midterm evaluations provide the team time to evaluate and adjust the project. Assessments of proficiency in data analysis and microscopy guarantee talent advancement. While supervisor assessments measure overall performance, biweekly group and institute meetings will promote collaboration and peer feedback. A final presentation, which serves as its capstone, will serve as a final assessment of the trainee comprehension and performance during the project.

Conocimientos técnicos o experiencia requerida (si procede) / Technical knowledge or experience required (if applicable)
Previous laboratory experience is desired, but not necessary.

Especificaciones extra de la institución de acogida (si procede) / Additional specifications of the host institution (if applicable)

An agreement between LMU university and the home university is needed to register the student as exchange student.

Disponibilidad para evaluar informes de covalidación de créditos: Si / Availability to evaluate credit covalidation reports: Yes

Otra información relevante / Any additional important information
Students will benefit from the *"Ayudas Traineeship CERFA"* consisting of 400 € and a career development course.

Proyecto AL-7

Nombre y apellidos del Supervisor / Name and surname of the Supervisor
Carlos Guillén Posteguillo

Afiliación del supervisor y Enlace a afiliación / Supervisor affiliation and Affiliation link
MKS-Atotech
https://www.atotech.com/

Título del Proyecto/ Project Title
Empowering a Greener Future: Maximizing Long-term Energy Storage Efficiency in Hybrid Redox Flow Batteries through Electrolyte Optimization and Electrochemical Advances

Perfil preferencial del estudiante
At least 180 ECTS completed in the degrees of Chemistry or Chemical Engineering and willing to do a curricular practicum at MKS-Atotech. Preferable a master student who wants to complete her/his curricular practicum of 3 months in our company.

Fechas orientativas/Available Dates
01/06/2024 to 31/08/2024

Programa/ Detailed program of the traineeship period
Climate change represents of the main challenges to humankind in the coming decades. Governments and institutions worldwide, such as the EU, are driving a technological revolution through legislative and funding programmes aiming at developing cleaner sources of energy to mitigate its impact. Private enterprises like MKS-Atotech play a pivotal role for the success of this endeavour.

Due to the intermittent nature of renewable energy generation, their widespread use makes necessary their coupling with energy storage systems like batteries. Redox flow batteries (RFBs) distinguish themselves from other batteries because their capacity is based on electrolytes stored in external tanks. RFBs have emerged as excellent alternatives to Li-ion batteries for stationary energy storage thanks to their high capacity flexibility through the exchange of external electrolyte tanks, extended lifetime (20 years) with minimal capacity loss, non-flammability attributed to the use of aqueous electrolytes and cost-effectiveness. Nevertheless, they face significant challenges, many of which are related to the electrochemical reactions during operation, such as electrolyte redox reactions, metal deposition and desorption, hydrogen evolution reaction (HER) or oxygen evolution reaction (OER).

As a plating technologies leader, MKS-Atotech conducts research on RFBs, working in aspects like the optimization of electrolytes and metal deposition. During the traineeship, the student will get integrated into the electrochemistry group of the company, participating in a research project aimed at reducing the parasitic reactions during the charge and discharge of an RFB cell (i.e. HER and OER) with chemical additives. The charge/discharge cycles of a battery will be simulated through electrochemistry experiments in our labs. The performance of different formulations of electrolytes will be assessed using electrochemical and microscopic analysis. The observations of the surface of the electrode will help interpret better the electrochemical data, providing a more in-depth understanding of the physico-chemical processes occurring in the RFB cell.

Competencias a adquirir por parte del estudiante/ Knowledge, skills and competences to be acquired by the trainee at the end of the traineeship (expected Learning Outcomes)

1. Experience to work in an international cross functional team.
2. Participation in scientific discussions about experimental results and next steps.
3. Development of presentation skills, including regular use of English.
4. Scientific literature search.
5. Realization of electrochemical experiments combined with optical inspection for metal plating.
6. Familiarization with electrochemical software (Nova from Metrohm): learn how to write and run a Nova script.
7. Development of data management and plotting skills, including the use of Origin and ImageJ softwares.
8. Acquisition of knowledge about the health and safety culture of a chemical company.

Seguimiento/ Monitoring Plan

The student will be under the direct supervision of the host, Carlos Guillén Posteguillo, who will introduce him/her into the working dynamics of the electrochemistry group, including her/his project. She/he will be sitting in the electrochemistry office with the rest of the team for constant communication and help if needed.

The trainee will weekly present a summary of her/his work during the electrochemistry group meeting that takes place every Friday. Furthermore, he/she will also present in the RFB group at least once a month so colleagues from other labs involved in this research area know of her/his activities.

Evaluación/ Evaluation plan

The student will be continuously evaluated with presentations of his/her activities in several meetings, as described. At the end of his/her placement, she/he will present in 20 min her/his work to other colleagues of the company working in RFBs, including activities, results and learning outcomes. Following the standard practice in the electrochemistry group for completed projects, she/he will write a brief, summarizing closing report. Finally, he/she should write the report necessary to obtain the ECTS credits corresponding to the curricular practicum following the specifications set by his/her university, for which he/she will receive support from the host.

Conocimientos técnicos o experiencia requerida (si procede) / Technical knowledge or experience required (if applicable)

It is recommendable to have completed a course in electrochemistry. At least 180 ECTS completed in the degrees of Chemistry or Chemical Engineering and willing to do a curricular practicum at MKS-Atotech. Preferable a master student who wants to complete her/his curricular practicum of 3 months in our company.

Especificaciones extra de la institución de acogida (si procede) / Additional specifications of the host institution (if applicable)

The student-trainee will have to sign a non-disclosure agreement (NDA).

Disponibilidad para evaluar informes de covalidación de créditos: Si / Availability to evaluate credit covalidation reports: Yes

Otra información relevante / Any additional important information

Students will benefit from the *"Ayudas Traineeship CERFA"* consisting of 400 € and a career development course.

Proyecto AL-8

Nombre y apellidos del Supervisor / Name and surname of the Supervisor
Jesús Praena Tamayo

Afiliación del supervisor y Enlace a afiliación / Supervisor affiliation and Affiliation link
Max Planck Institute for Plant Breeding Research
https://www.mpipz.mpg.de/en

Título del Proyecto/ Project Title
From Arabidopsis to *Arabis alpina*: Investigating the Role of Trehalose-6-Phosphate in Perennial Plant Physiology.

Perfil preferencial del estudiante
Bachelor or Master student in Biology or Biochemistry

Fechas orientativas/Available Dates
01/09/2024 to 29/02/2025

Programa/ Detailed program of the traineeship period
Trehalose-6-phosphate (Tre6P) plays a multifaceted role in plants, acting as a signaling molecule, a storage compound, a facilitator of sugar transport, and an osmolyte. Its synthesis and degradation are governed by two key gene families*: TREHALOSE-6-PHOSPHATE SYNTHASE* (*TPS*) and *TREHALOSE-6-PHOSPHATE PHOSPHATASE* (*TPP*). Disruptions in Tre6P levels profoundly impact plant growth and development. In Arabidopsis, a widely studied annual model plant, variations in Tre6P levels have been linked to changes in embryo growth, branching patterns, root architecture, and flowering processes. However, the role of Tre6P in perennial plants, which endure recurrent stresses over multi-year life cycles and allocate resources differently from annuals, remains underexplored.

Genomic analysis of Arabis alpina Pajares accession has identified seven TPS and ten TPP genes, yet their functions and the impact of Tre6P in perennials have not been fully investigated. Early experiments in *A.alpina* involving the expression of *TPS* from *Escherichia coli* (*otsA*) and *TPP* from *Caenorhabditis elegans* in specific vascular tissue indicate that Tre6P levels significantly influence flowering time, branching, and internode length. We have also created double mutants using CRISPR-CAS9, exhibiting varied growth and developmental phenotypes.

The intern will develop dexamethasone-inducible TPS lines in these mutant backgrounds and, concurrently, undertake targeted mutagenesis of TPP genes in *A. alpina* using CRISPR/CAS9. This research aims to enhance our understanding of sugar metabolism's conserved mechanisms across annual and perennial plants. By focusing on Tre6P's unique functions, tailored to the extended life cycles and specific adaptive needs of perennials, this study will shed light on key aspects like dormancy, senescence, seasonal growth, and long-term stress responses, paving the way for further in-depth research in this field.

Competencias a adquirir por parte del estudiante/ Knowledge, skills and competences to be acquired by the trainee at the end of the traineeship (expected Learning Outcomes)

The MPIPZ is one of the most important institutes for plant science research in Europe and worldwide, offering opportunities for students to improve their scientific skills. The student will

be able to work with various molecular techniques such as gene expression analysis, cloning, reverse genetics, sanger sequencing, CRISPR/Cas9 genome editing, confocal microscopy, and others that will help the trainee develop a broad knowledge in plant biology. Therefore, this internship offers the opportunity of daily experience in a complete research environment, working with one of the group's postdocs, allowing him/her to develop a broad knowledge of plant biology and modern cutting-edge technologies.

Seguimiento/ Monitoring Plan
The trainee will work closely with one of the postdocs from the group. In addition, the group's academic and technical staff will assist with laboratory tasks and protocols as needed. The monitoring plan will be structured through weekly informal meetings to define short-term goals. The student will participate in group meetings (as an audience member and speaker) and department meetings where results will be discussed to enhance understanding of the scientific process. The supervisor at the sending institution will provide suggestions as needed.

Evaluación/ Evaluation plan
The progress of the trainee will be evaluated daily by the supervisor but also by different members of the group. In addition, individual meetings will be arranged at the beginning of the internship and monthly to define the plan, the short-term goals, and the progress of the project. Finally, the trainee will have the opportunity to participate in group, sub-group and departmental meetings to facilitate the writing of a final report or prepare a presentation with the methodologies employed during the traineeship and the results obtained.

Conocimientos técnicos o experiencia requerida (si procede) / Technical knowledge or experience required (if applicable)
Basic knowledge in genetics and molecular biology. Prior lab experience is a plus.

Bachelor or Master student

Especificaciones extra de la institución de acogida (si procede) / Additional specifications of the host institution (if applicable)

The host institution provides a grant of approx. 700 Euros net.

Disponibilidad para evaluar informes de covalidación de créditos: Si / Availability to evaluate credit covalidation reports: Yes

Otra información relevante / Any additional important information
Students will benefit from the *"Ayudas Traineeship CERFA"* consisting of 400 € and a career development course.

Nombre y apellidos del Supervisor / Name and surname of the Supervisor
Lukas Huschet

Afiliación del supervisor y Enlace a afiliación / Supervisor affiliation and Affiliation link
LMU Munich https://www.imp.med.uni-muenchen.de/members/mitarbeiter/huschet-lukas/index.html

Título del Proyecto/ Project Title
Identification of interactors of the circadian transcription factor BMAL1 using interaction proteomics

Perfil preferencial del estudiante
Master student or Bachelor student close to completion in Biology or Biochemistry

Fechas orientativas/Available Dates
01/06/2024 to 01/10/24

Programa/ Detailed program of the traineeship period
Month 1: Trainee will read literature relevant to the project and will be accompanied group members during experiments to be able to grasp the overall methods used in the laboratory.

Month 2-3: Trainee will be introduced and taught methods on interaction proteomics including: cell lysates, antibody or peptide binding to cell lysates, immunoprecipitation, protein digestion, peptide desalting and cleaning and sample measurement in the mass spectrometer. In addition, the trainee will learn how to perform cell culture to generate the necessary cell number material to do the immunoprecipitation experiments.

Month 4: Trainee will perform data processing and analysis, prepared presentation of the results and presented the project and data in the group/institute weekly meeting.

Competencias a adquirir por parte del estudiante/ Knowledge, skills and competences to be acquired by the trainee at the end of the traineeship (expected Learning Outcomes)

The student will acquire broad scientific skills encompassing multiple aspects of circadian biology and proteomics. This includes basic sample preparation techniques in compatibility with mass spectrometry, cell culture, immunoprecipitation, development of customized chromatographic gradients, and bioinformatic analysis. Furthermore, we will be able to showcase big data processing using the coding language R and other essential software tools such as Perseus. Aside from the experimental part of the project, the student will benefit greatly from our daily and weekly scientific discussions which will allow to gain and improve soft skills such as scientific communication and critical thinking.

Seguimiento/ Monitoring Plan
The basis of the monitoring plan will consist of first daily interactions with the host applicant (Lukas Huschet) as part of a mentoring system that will provide constant input and support to the student. Moreover, through the participation in weekly scientific group meetings and biweekly meetings with the PI Maria Robles, the student will be able to receive valuable input from scientist with expertise in different facets of circadian biology and mass-spectrometry

based proteomics. A mid-term assessment of the progress will ensure correction and successful completion of all objectives by the end of the program.

Evaluación/ Evaluation plan

The evaluation plan will be constituted by daily meetings with the host applicant, which will guide the course of the experimental and scientific development. The active participation of the student in regularly scheduled meetings will ensure monitoring and input from other members of the group. Halfway through the program an assessment will take place, to find conflicts or challenges slowing down the learning process of the student. At the end of the stay, a final oral presentation to the group will ensure fulfillment of the objectives.

Conocimientos técnicos o experiencia requerida (si procede) / Technical knowledge or experience required (if applicable)

Strong biochemistry background, molecular biology and if possible, cell culture skills.

Especificaciones extra de la institución de acogida (si procede) / Additional specifications of the host institution (if applicable)

An agreement between LMU university and the home university is needed to register the student as exchange student.

Disponibilidad para evaluar informes de covalidación de créditos: Si / Availability to evaluate credit covalidation reports: Yes

Otra información relevante / Any additional important information

Students will benefit from the *"Ayudas Traineeship CERFA"* consisting of 400 € and a career development course.

Nombre y apellidos del Supervisor / Name and surname of the Supervisor
Maria Teresa Aguado Molina

Afiliación del supervisor y Enlace a afiliación / Supervisor affiliation and Affiliation link
Biodiversity Museum Göttingen

Título del Proyecto/ Project Title
Stablishing stable marine cultures of *Syllis prolifera* and characterization of its regeneration abilities

Perfil preferencial del estudiante
Bachelor or Master in Biology (Zoology, Developmental Biology, Genetics)

Fechas orientativas/Available Dates
 01/09/2024 to 30/11/2024

Programa/ Detailed program of the traineeship period
Annelida are of great interest because of their regeneration abilities. While regeneration of lost body parts in general is prevalent in all Annelida except leeches (Blanchoud & Galliot, 2022), whole-body regeneration, especially regarding the anterior body region, turns out to be less common (Ribeiro *et al.*, 2019). The Syllidae are particularly species-rich, it is the largest annelid group with 79 genera and over 1100 described species (Martin *et al.*, 2021). As syllids show extraordinary regenerative abilities (Ribeiro *et al.*, 2018), some species from this annelid group have already been suggested as potential model organisms for developmental studies (Weidhase *et al.*, 2016). Syllids are able to regenerate their posterior end completely while the anterior regeneration varies.

For instance, *Syllis prolifera* Krohn, 1852 is able to regenerate completely the posterior end, while shows only a partial anterior regeneration where only the prostomium and some segments grow back. In contrast, *Syllis malaquini* Ribeiro *et al.* 2020is able to completely regenerate in both directions (Ribeiro *et al.*, 2021).

Cultures of *Syllis malaquini* are already stablished at The Georg August University of Göttingen, Animal Evolution and Biodiversity Department. Several experiments regarding its regeneration abilities have been already successfully conducted (Ribeiro et al., 2019, 2020, 2021; Spiess et al., in prep.). However, cultures of *Syllis prolifera* are still not stablished in this institution.

Having this latter species in our aquariums in stable conditions would allow us to perform comparative experiments and discern the differences during the process of complete and incomplete anterior regeneration.

The main objectives of this project are:

1. Sampling *Syllis prolifera* in its natural habitat
2. Establishment of a *Syllis prolifera* culture under laboratory conditions
3. Detailed description of the anterior regeneration process
4. Comparison with complete regeneration of *Syllis malaquini*

Competencias a adquirir por parte del estudiante/ Knowledge, skills and competences to be acquired by the trainee at the end of the traineeship (expected Learning Outcomes)

Sampling techniques in marine environments: Estación Marina de A Graña, El Ferrol (transport to the

  marine station and required sampling material will be provided by the host, excepting appropriate waterproof boots)

- *Syllis prolifera* identification. Learning of taxonomical skills.
- Culture establishment in the aquarium system our department and specimens' management.
- Iconography. Use of optical microscopy equipped with *camera clara* and digital camera. Editing photos with photoshop software. Figure composition.
- DNA extraction, PCR techniques, editing sequences, perform alignments
- Discussion of results
- Writing a memory

Seguimiento/ Monitoring Plan

This study will require a short stay (3-4 days) at the Marine Station A Graña, El Ferrol, at the beginning of the project, followed by a research stay at the Animal Evolution and Biodiversity Department in the city of Göttingen, where the aquarium systems, microscopy and molecular sequencing facilities are located. Return trip from Madrid to the Marine Station and stay at the marine station will be covered by the host. The travel from Madrid to Göttingen and stay of the student in Germany will be covered by this agreement.

Evaluación/ Evaluation plan

The results will be evaluated at three moments:

1. After the sampling trip and taxonomic identification: Number of specimens, reproductive stage and their possible

   relevance will be evaluated. Some specimens will be selected for the following steps.
2. Results from the regeneration experiments, morphological and molecular characterization, and comparison with *S. malaquini* will be evaluated and final analyses performed.
3. A scientific memory will be written including a proper introduction, material and methods, results and

   discussion. The memory, when necessary, can be written once the stay in Göttingen is finished. The final evaluation would be through email and zoom meetings.

Conocimientos técnicos o experiencia requerida (si procede) / Technical knowledge or experience required (if applicable)

Especificaciones extra de la institución de acogida (si procede) / Additional specifications of the host institution (if applicable)

The Receiving Institution/Enterprise will provide financial support to the Student - Trainee for the traineeship for a return trip to Estación Marina A Graña, El Ferrol and research stay there during 3-4 days.

Disponibilidad para evaluar informes de covalidación de créditos: Si / Availability to evaluate credit covalidation reports: Yes

Otra información relevante / Any additional important information: Students will benefit from the *"Ayudas Traineeship CERFA"* consisting of 400 € and a career development course.

Oferta 2024 de Prácticas Internacionales
Prácticas en Irlanda Convenio UAM-SRSI

Prácticas en Irlanda Convenio UAM- SRSI

Número de Proyecto	Supervisor	Área de Conocimiento	Lugar de realización	Número de plazas
IR-1	**Alfonso Blanco**	Citometría de Flujo	University College Dublin (Dublín – Irlanda)	**2**

A continuación, aparece toda la información de esta oferta

CONVENIO UAM/SRSI 2024 – DESTINO IRLANDA

Proyecto IR-1

Nombre y apellidos del Supervisor / Name and surname of the Supervisor
Dr. Alfonso Blanco

Afiliación del supervisor y Enlace a afiliación / Supervisor affiliation and Affiliation link
University College Dublin

Título del Proyecto/ Project Title
Citometría de Flujo.

Perfil preferencial del estudiante
Biología, Biotecnología, Veterinaria, Medicina, Biología Marina

Fechas orientativas/Available Dates
Flexible

Programa/ Detailed program of the traineeship period
Training in the usage and maintenance of flow cytometers and cell sorters: The trainee will be trained on the usage of multiple instrumentation from different brands, characteristics and complexities. To do so, the trainee will work instrument set up, instrument optimization, data analysis and data interpretation for the multiple applications of the facility. Trainee will be involved in the project, protocol and data discussion and it´s expected, by the end of the training period will be able to provide expert advise to novel users.
In order to provide a deeper knowledge of the full process, the trainee will be involved in different projects. The trainee will process, prepare and analysis samples of cell culture, tissue

and/or whole blood. The participant will be fully involved in the optimization of the method, data analysis, data reanalysis and reporting.

By the end of the traineeship, the trainee will prepare a summary report and present her job.

Competencias a adquirir por parte del estudiante/ Knowledge, skills and competences to be acquired by the trainee at the end of the traineeship (expected Learning Outcomes)

The trainee will be familiar with the full cytometry technology and methodology, from sample collection, establishment of protocols, instrument optimization and maintenance, data acquisition, data analysis and reporting.

The trainee will be familiar with the full process of sample analysis by flow cytometry as will be highly exposed to multiple applications from several groups that are using the core facility, so he/she will increase communication and interpersonal skills.

The trainee will be working supervised, but must learn also to work alone, so it´s expected he/she will increase his/her capabilities of teamwork and self-supervision.

The trainee will be working with state-of-the-art instrumentation: the trainee might need to read, interpret, criticise, and take some responsibilities on board. Timing is crucial in these experiments, so the trainee will increase his/her ability to organise working plans and experiments.

Seguimiento/ Monitoring Plan

will be working mostly of the time side by side with Dr. Blanco as well as users of the UCD Flow Cytometry Core Lab.

Evaluación/ Evaluation plan

It will be a continued evaluation process. The generation of good data and capabilities of reproducibility of certain patterns will be the best way to evaluate trainee's progression and knowledge.

Conocimientos técnicos o experiencia requerida (si procede) / Technical knowledge or experience required (if applicable)

Conocimientos (preferible a nivel de 3º o 4º curso) en Biología, Biotecnología, Veterinaria, Medicina, Biología Marina/Ciencias del Mar

Especificaciones extra de la institución de acogida (si procede) / Additional specifications of the host institution (if applicable)

 NA

Disponibilidad para evaluar informes de covalidación de créditos (Si/No) / Availability to evaluate credit covalidation reports (Yes / No)

Si

Otra información relevante / Any additional important information

Oferta 2024 de Prácticas Internacionales

Prácticas en Bélgica Convenio UAM-CEBE

Prácticas en Bélgica_Convenio UAM-CEBE

Número de Proyecto	Supervisor	Área de Conocimiento	Lugar de realización	Número de plazas
BE-1	Patrice Perrault*	Chemical engineering	Amberes	2
BE-2	Patrice Perrault*	Chemical engineering	Amberes	2
BE-3	Francisco Molina López	Chemical engineering, Chemistry, Mechanical engineering, Physics, Electrical Engineering	Lovaina	1
BE-4	Ángel Miranda Vicario	Physics / Mechanical engineering	Bruselas	1
BE-5	Sergio Gonzalez Cámara	Biology, Chemical engineering, Environmental engineering	Bruselas	1
BE-6	Edna Patricia Gutiérrez Lozano	Biochemistry, Environmental Sciences, Chemical engineering	Amberes	1
BE-7	Michiel Van Tendeloo	Biochemistry, Biology, Chemical engineering, Environmental Sciences	Amberes	1
BE-8	Ana Barragán	Computer science, physics, mathematics, biomedical engineering	Bruselas	1
BE-9	Iris De Corte	Biochemistry, Environmental Sciences, Chemical engineering	Amberes	1

*Patrice Perrault oferta dos proyectos diferentes

A continuación, aparece toda la información de cada una de las ofertas

Proyecto BE-1

Nombre y apellidos del Supervisor / Name and surname of the Supervisor
Patrice Perreault

Afiliación del supervisor y Enlace a afiliación / Supervisor affiliation and Affiliation link
Department of Bioscience Engineering/Faculty of Science

Título del Proyecto/ Project Title
Design of an electrothermal fluidized bed reactor

Perfil preferencial del estudiante
Chemical Engineering

Fechas orientativas/Available Dates
To be discussed with the student

Programa/ Detailed program of the traineeship period
The electrification of the chemical industry is crucial to reduce the CO2 emissions due to the combustion of fuels to provide the high temperatures required for chemical transformation. An electrothermal fluidized bed (e-FB) is obtained when flowing an electrical current in a fluidized bed of electrically conducting particles: the electrical energy is converted into heat via the Joule effect due to the particles' resistivity. To do so, two electrodes are immersed in the bed (Fig 1). The electrification of FBs is more than a mere heating mechanism: it affects the hydrodynamics of the bed.
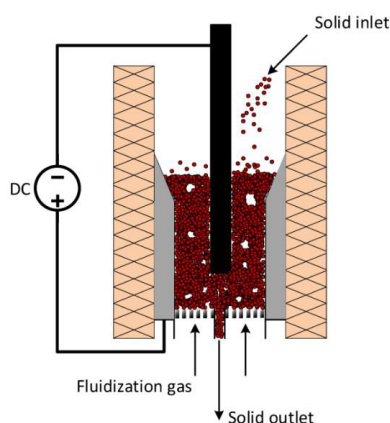

Fig. 1: Overview of an electrothermal fluidized bed

For the design of e-FB, the heating requirements need to be considered (specific electrical resistance of both the catalysts and electrically conductive particles), on top of the conventional fluidized bed reactor design. The solids composing the bed will be selected, and the solids specific electrical resistance will be characterized using an in-house build apparatus consisting of electrodes connected to a Wheatstone bridge. Using repeated resistance measurements at various interelectrode distances, the electrode-bed contact resistance can be quantified and removed, thus allowing to precisely quantify the bed resistance at the relevant temperature, allowing the selection of a power supply. Thermal and electrical insulation for safe operation will then be designed, followed by all peripherals (gas-preheater, off-gas cooling and cyclones and filters prior to gas analysis). Mixtures of catalysts and conducting particle (carbon, silicon carbide) will also be tested to include the

possibility to decouple the reaction and heat transfer functions (different amounts of particles required for heat transfer and chemical conversion).

Competencias a adquirir por parte del estudiante/ Knowledge, skills and competences to be acquired by the trainee at the end of the traineeship (expected Learning Outcomes

The trainee will develop frontier knowledge on the design of electrothermal reactors (know how not available in the open literature), with the strong support of the promotor. The design of the lab-scale e-FB will be performed using an iterative approach combining textbook engineering models for fluidized beds and an electrical-engineering approach (the 'voltammograms approach').
To complete the design, the heating requirements will be considered (specific electrical resistance of both the catalysts and electrically conductive particles). The solids specific electrical resistance will be characterized using an in-house build apparatus consisting of electrodes connected to a Wheatstone bridge.

Seguimiento/ Monitoring Plan
The trainee will work under the supervision of Prof Patrice Perreault, and will work in collaboration with 1 senior PhD students and/or postdoc working on this project. Prof Perreault and/or the PhD students/postdoc will train the trainee on the design of fluidized bed reactors, as well as how to include the joule effect. For the first month, the trainee will be in close contact with Prof Perreault, 1-2 days per week. For the remaining period, the trainee will be supervised in the form of a weekly meeting (where he/she will have to present the project advancement), and will spend half a day per week for training.

Evaluación/ Evaluation plan
The work will be evaluated during the weekly follow-up meetings. The researchers present their achievements, discuss problems & challenges, as well as proposing a planning for the week to come. In this way, they are confronted to their actual versus planned progress, and to propose corrective measures. If the corrective measures are considered insufficient, we as a group explore other measures (including increasing the workforce involved in a project). These meetings are a platform to exchange and challenge scientific ideas, and for problem solving. The trainee will also be required to summarize her/his ideas in the form of a manuscript.

Conocimientos técnicos o experiencia requerida (si procede) / Technical knowledge or experience required (if applicable)
Reactor design and Heat transfer courses completed. English B1.

Especificaciones extra de la institución de acogida (si procede) / Additional specifications of the host institution (if applicable)

3rd years in process or completed.

Disponibilidad para evaluar informes de covalidación de créditos (Si/No) / Availability to evaluate credit covalidation reports (Yes / No)
YES

Otra información relevante / Any additional important information
Supervisor speaks spanish

Proyecto BE-2

Nombre y apellidos del Supervisor / Name and surname of the Supervisor
Patrice Perreault

Afiliación del supervisor y Enlace a afiliación / Supervisor affiliation and Affiliation link
Department of Bioscience Engineering/Faculty of Science

Título del Proyecto/ Project Title
Design of a simulated moving bed for the recovery of unconverted ammonia from an ammonia cracking system for the production of hydrogen

Perfil preferencial del estudiante
Chemical engineering

Fechas orientativas/Available Dates
To be discussed with the candidate

Programa/ Detailed program of the traineeship period
Hydrogen obtained from cracking of green ammonia (breaking up NH3 into the molecular constituents e.g. H2 and N2) represents a promising solution to the challenges related to hydrogen storage, transportation and production over large distances for future hydrogen energy applications. However, in order to be used for energy applications, high purity H2 is needed and the removal of residual NH3 is necessary. In this project we propose to design and assemble a simulated moving bed process for hydrogen purification. The aim is to design a continuous hydrogen purification process based on adsorption of NH3 downstream of the cracking processes and to lower in this way the NH3 concentration below 100 ppb. The first step is then to design the simulated moving bed (SMB), using an engineering reactor model (coupled heat & mass balance) describing the adsorption and desorption of ammonia on zeolites. The trainee will then do some experiments using a tubular reactor to acquire the numerical values and parameters appearing in the reactor model (effective dispersion, ammonia loading, etc.): Using the breakthrough curves and the regenerating time, the position of the inlets/outlets and valve switching time will be optimized to mimic solid movements in the bed. The desorption of ammonia (regeneration) will be done by passing hot gas through the saturated bed allowing to characterize the regeneration kinetics. If time allows, the trainee will contribute in the definite design of the SMB and its construction (parallel beds with switching valve system and thermal swing using induction heating).
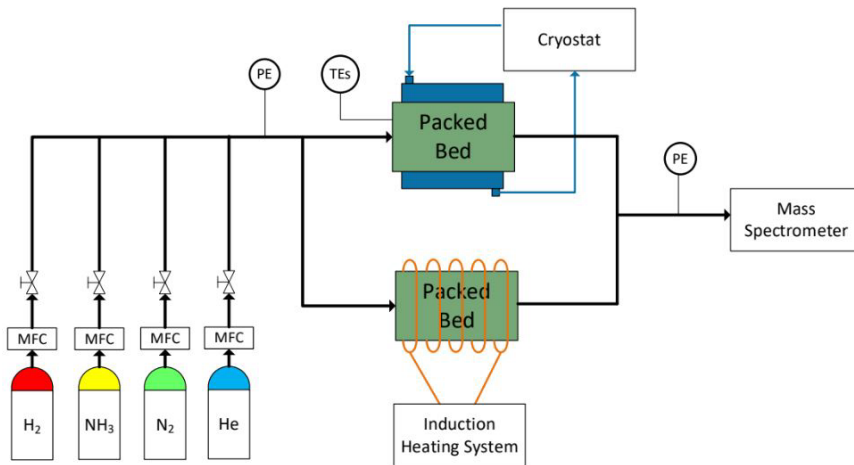
Competencias a adquirir por parte del estudiante/ Knowledge, skills and competences to be acquired by the trainee at the end of the traineeship (expected Learning Outcomes)

The trainee will gain invaluable knowledge of experimental tools used in reactor design and characterization (online quadrupole mass spectrometer for gas concentration analysis, tracer studies for hydrodynamic characterization, etc.), including complex reactor simulation using state-of-the-art kinetic models. As important, the trainee must be able to communicate effectively his/her results. All in all, the main expected learning outcomes are:
- Perform characterization and basic modelling of chemical reactors by application of his/her knowledge on chemical engineering reaction.
- Communicate and discuss proposals and conclusions in multilingual forums and weekly follow-up meetings, specialized and non-specialized, in a clear and unambiguous way in English.
- Prepare a manuscript summarizing his/her work in English.
- Introduction to the field of scientific research, favoring independence and creativity

Seguimiento/ Monitoring Plan

The trainee will work under the supervision of Prof Patrice Perreault, and will work in collaboration with 1 senior PhD students and/or postdoc working on this project. Prof Perreault and/or the PhD students/postdoc will train the trainee on the use of experimental reactor characterization tools, reactor simulation, and kinetic modelling. For the first month, the trainee will be in close contact with Prof Perreault, 1-2 days per week. For the remaining period, the trainee will be supervised in the form of a weekly meeting (where he/she will have to present the project advancement), and will spend half a day per week for training.

Evaluación/ Evaluation plan

The work will be evaluated during the weekly follow-up meetings. The researchers present their achievements, discuss problems & challenges, as well as proposing a planning for the week to come. In this way, they are confronted to their actual versus planned progress, and to propose corrective measures. If the corrective measures are considered insufficient, we as a group explore other measures (including increasing the workforce involved in a project). These meetings are a platform to exchange and challenge scientific ideas, and for problem solving. The trainee will also be required to summarize her/his ideas in the form of a manuscript.

Conocimientos técnicos o experiencia requerida (si procede) / Technical knowledge or experience required (if applicable)

Reactor design and Heat transfer courses completed. English B1

Especificaciones extra de la institución de acogida (si procede) / Additional specifications of the host institution (if applicable)

3rd years in process or completed.

Disponibilidad para evaluar informes de covalidación de créditos (Si/No) / Availability to evaluate credit covalidation reports (Yes / No)
YES

Otra información relevante / Any additional important information
Supervisor speaks spanish

Proyecto BE-3

Nombre y apellidos del Supervisor / Name and surname of the Supervisor
Francisco Molina-Lopez

Afiliación del supervisor y Enlace a afiliación / Supervisor affiliation and Affiliation link
[Surface and Interface Engineered Materials](#), https://www.molina-lopezresearchlab.com/

Título del Proyecto/ Project Title
Emerging Green Thermoelectric Materials

Perfil preferencial del estudiante
 Chemical engineering, Chemistry, Mechanical engineering, Physics, Electrical Engineering

Fechas orientativas/Available Dates
01-05-2024 – 01-09-2024

Programa/ Detailed program of the traineeship period

The increasing demand of flexible energy harvesters requires the development of new sustainable materials and fabrication techniques. Thermoelectric generators (TEG) are robust solid-state devices able to harvest waste heat and transform it into electrical energy, or work as active coolers. The fabrication of traditional TEGs involves the use of critical elements and complex fabrication processes, which limit their application. The program offers a comprehensive learning experience including any of the following aspects depending on the candidate's own interest:

- Understanding Thermoelectric Principles: Explore the fundamental working principles of thermoelectric materials, gaining insights into their applications and potential impact on energy harvesting.
- Material Fabrication: Engage in hands-on experiences with various fabrication techniques, including powder metallurgy and film deposition. Develop skills in crafting materials crucial for thermoelectric applications.
- Thermoelectric Characterization: Acquire expertise in the characterization of thermoelectric materials, focusing on key parameters such as electrical resistivity, Seebeck coefficient, and thermal conductivity. Understand how these properties contribute to the material thermoelectric performance.
- Material Characterization: Learn and apply essential characterization techniques like X-ray diffraction (XRD), scanning electron microscopy (SEM), and energy-dispersive X-ray spectroscopy (EDS) to assess the structural and morphological aspects of materials.
- Device Fabrication: Gain practical experience in the fabrication of thermoelectric devices. Understand the intricacies of device assembly and optimization for enhanced performance.

By combining theoretical knowledge with hands-on practical experience, this training program equips participants with a diverse skill set. The trainees will contribute to the development of innovative and sustainable thermoelectric materials going on in the lab.

Competencias a adquirir por parte del estudiante/ Knowledge, skills and competences to be acquired by the trainee at the end of the traineeship (expected Learning Outcomes)
By the end of the traineeship, participants will have acquired knowledge of solid-state physics and transport phenomena pertaining the operation of thermoelectrics. From the principles governing electrical and thermal transport to the optimization of material and doping. Practical skills will include fabrication techniques such as powder metallurgy or film deposition, basic thermoelectric measurements, and common material characterization techniques (mostly analysis but also data collection if time allows it). Additionally, the program emphasizes the development of teamwork and organizational skills, ensuring that trainees can effectively collaborate and contribute to an academic project.

Seguimiento/ Monitoring Plan
During the traineeship, the participant will define a scope within the proposed topics. To ensure a consistent progress, a timeline will be produced at the beginning with weekly tasks, and scheduled meetings with the daily supervisor (DS), Isidro Florenciano Cano (PhD student), and the principal investigator (PI), Prof. F. Molina-Lopez, will facilitate assessing the progress and redesigning the timeline. This iterative process will allow for timely adjustments and guidance as needed. The interactions with the DS will be daily and with the PI (bi)weekly. Collaboration between the trainee and the host team will be included in the plan. At the conclusion of the traineeship, a comprehensive final report describing the knowledge acquired and key findings is expected.

Evaluación/ Evaluation plan
The evaluation plan will center around assessing learning outcomes in thermoelectric materials, fabrication techniques, and characterization methods. Continuous evaluation will be conducted through daily interactions with the DS, and (bi)weekly interactions with the PI, allowing for quick feedback on the trainee's progress. Additionally, a final report containing a comprehensive overview of the acquired knowledge and practical skills, will serve as a key component of the evaluation process.

Conocimientos técnicos o experiencia requerida (si procede) / Technical knowledge or experience required (if applicable)

Especificaciones extra de la institución de acogida (si procede) / Additional specifications of the host institution (if applicable)

Disponibilidad para evaluar informes de covalidación de créditos (Si/No) / Availability to evaluate credit covalidation reports (Yes / No)

Otra información relevante / Any additional important information

Proyecto BE-4

Nombre y apellidos del Supervisor
Angel Miranda Vicario

Afiliación del supervisor y Enlace a afiliación / Dept Weapon Systems & Ballistics / Royal Military Academy

Título del Proyecto
Development impact testing methodology

Perfil preferencial del estudiante: Physics / Mechanical engineering

Fechas orientativas/Available Dates
 01-09-2023 --- 15-12-2023

Programa/ Detailed program of the traineeship period
Context: Current armour protection requires to stop new type of threats, such as secondary debris (dirt and soli) ejected from nearby explosives events. The student shall be part of this research project for developing a new testing methodology.

Approach: The currents testing standards and norms for testing and evaluation of body armour do not provide any means to assess the actual protection level for very light particles at high speed (from 100 – 1000 m/s). The goal of this research project is to develop an appropriate testing methodology, easy to use in a laboratory environment.

Role of the student: The student shall participate in the testing activities needed for developing the new methodology in collaboration with the laboratory technicians. Also the student shall participate in bibliographic research, interpretation and discussion of the results and drafting reports or presentations.

Competencias a adquirir por parte del estudiante/ Knowledge, skills and competences to be acquired by the trainee at the end of the traineeship (expected Learning Outcomes)

-Testing standards and material behaviour, especially in the dynamic range.
- Interpretation and discussion of scientific results.
- Hands-on-work in a lab.
- Work independently, in an international environment.
-Setting goals and the way to achieve them.
- Regular use of other language.

Seguimiento/ Monitoring Plan
 The student is expected to have close contact with the host, especially at the beginning, in order to be operational as soon as possible. Periodical meetings shall be scheduled in order to follow the progress of the internship.

Evaluación/ Evaluation plan
Fist evaluation will check the basic concepts, after the needed explanations, lessons and bibliographic material are studied.
Techniques and protocols will be explained to the student. The student shall participate in them increasing his/her autonomy.

The student will participate in the discussion of results, and proposal of the next activities. Student shall identify action of interest to improve the formation.

Conocimientos técnicos o experiencia requerida (si procede) / Technical knowledge or experience required (if applicable)
Activities in the Ballistic Laboratory shall involve tests with weapons and ammunition (no direct manipulation), the student must be comfortable working in this environment.
The student may have some programming knowledge. English B2.

Especificaciones extra de la institución de acogida (si procede) / Additional specifications of the host institution (if applicable)

Disponibilidad para evaluar informes de covalidación de créditos (Si/No) / Availability to evaluate credit covalidation reports (Yes / No)
YES

Otra información relevante / Any additional important information
RMA might perform a security screening

Proyecto BE-5

Nombre y apellidos del Supervisor / Name and surname of the Supervisor
Sergio González Cámara

Afiliación del supervisor y Enlace a afiliación / Supervisor affiliation and Affiliation link
Uantwerpen

Título del Proyecto/ Project Title
From Pints to Protein: Valorisation of brewery wastewater as animal feed through Single Cell Protein production

Perfil preferencial del estudiante
Biology, Chemical engineering, Environmental engineering

Fechas orientativas/Available Dates
21-06-2024 --- 20-12-2024

Programa/ Detailed program of the traineeship period

The demand of protein-rich products will increase by 50% over the period 2000-2050. Conventional production of protein is, however, extremely inefficient leading to substantial nutrient losses in the fertilizer-to-food chain. **Single Cell Protein (SCP)**, also known as microbial protein, refers to the use of microbial biomass such as bacteria, yeast, and algae, as **protein source for food or animal feed**. **Aerobic heterotrophic bacteria (AHB)** are one of the most appealing microbes for SCP production due to their **nutrient use efficiency**, **fast growth rates** and **high protein content & quality**.

Producing AHB using industrial food-and-beverage wastewater is a win-win strategy, implementing a **efficient water treatment** approach in these industries that **valorise "waste" organics and nitrogen into microbial protein for animal feed**. However, fluctuations intrinsic to this approach lead to variability in nutritional quality of the SCP, which still challenge the applicability of SCP technology in the feed market.

This project aims to create a **more stable & predictable microbial community**, leading to **better nutritional quality** by using selective co-substrates (biostimulation), optimization of operational parameters, and addition of high-chance-to-thrive bacteria and yeast (bioaugmentation) in a novel nursery concept. Based on biomass yield and quality obtained with lab-scale reactor with synthetic wastewater, the most prosperous configuration will be tested with real **brewery effluent**.

The student will acquire competences in **reactor technology** and **process control** will be complemented with developing skills in a **wide range of analytical techniques.** This research will be performed in **close collaboration with industrial partners.**

Competencias a adquirir por parte del estudiante/ Knowledge, skills and competences to be acquired by the trainee at the end of the traineeship (expected Learning Outcomes) (
The internship will allow them to gain valuable experience in a **diverse and dynamic team**, giving the student a head start in their further career in academia or industry. After the traineeship, it is expected that the intern will be able to independently execute **batch experiments** to study **growth kinetics** of bacteria, as well as **biomass characterization**. The student will also have a

basic understanding of **bioreactor building, operation and control**. Processing data, statistical analysis and communication core results through a scientific presentation are also crucial.

Seguimiento/ Monitoring Plan
The student will be permanently supervised by the lab members during the experiments. This will allow monitoring the student's progress and achievements during their lab work.

Evaluación/ Evaluation plan
The student will be evaluated based on their general progress, lab attitude, motivation and acquired skills and result-oriented thinking. It is also expected from the trainee to present their obtained data in a presentation at the end of the traineeship. This presentation along with a scientific report will be used to evaluate the trainee.

Conocimientos técnicos o experiencia requerida (si procede) / Technical knowledge or experience required (if applicable)
Laboratory experience and knowledge of basic handlings/analyses (pipetting, weighing, preparation of solutions, etc.) is required, together with basic Excel, Word and Powerpoint skills. English B2.

Especificaciones extra de la institución de acogida (si procede) / Additional specifications of the host institution (if applicable)

Last year of Bachellor/Master's in Science

Disponibilidad para evaluar informes de covalidación de créditos (Si/No) / Availability to evaluate credit covalidation reports (Yes / No)
YES

Otra información relevante / Any additional important information

Proyecto BE-6

Nombre y apellidos del Supervisor / Name and surname of the Supervisor
Edna Patricia Gutiérrez Lozano

Afiliación del supervisor y Enlace a afiliación / Supervisor affiliation and Affiliation link
UAntwerpen

Título del Proyecto/ Project Title
BioNScrub: Sustainable and innovative nitrogen recovery from agricultural residues

Perfil preferencial del estudiante
Biochemistry, Environmental Sciences, Chemical engineering

Fechas orientativas/Available Dates
01-06-2024 --- 30-12-2024

Programa/ Detailed program of the traineeship period

Globally, the agricultural sector is accountable for the majority of Nitrogen emissions. Roughly half of the N applied as fertilizers is lost to the environment as wastewater or gas emissions. This study aims to analyse the viability of implementing a stripping-scrubbing system coupled with a biological nitrification reactor to recover N from liquid and gas-waste from agricultural activities. The use of a nitrification reactor allows us to reduce the environmental and economic costs of current chemical stripping-scrubbing processes as well as the production of a fertilizer solution.

In this traineeship, a lab-scale experiment will be carried out to explore the biochemical limitations and control strategies of the concept such as the performance of the nitrification reactor and the scrubbing unit as well as the coupling of both elements.

First, the trainee will be instructed in laboratory basic skills that will be evaluated through an internal exam. Second, the trainee will be introduced to the reactors operation and all the practical activities inside and outside the laboratory related to the process. Eventually, the trainee will be the main responsible for the operation activities and the report of outliers, incongruent data, or evolution of the process.

Competencias a adquirir por parte del estudiante/ Knowledge, skills and competences to be acquired by the trainee at the end of the traineeship (expected Learning Outcomes)
The trainee will be part of an international research team full of experts in different
topics that will allow him/her to develop a collaborative working capacity,
oral communication skills and several opportunities to present their work and receive feedback from experts.
By participating in weekly meetings, the Nitrogen cluster, and other academic activities the
the trainee will gain state-of-the-art knowledge in nitrogen management technologies,
reactor design and operation, purple bacteria applications and systemic analysis of N-related problematics.
By working in the laboratory as part of the BioNScrub project, the trainee will receive
specific training about basic laboratory equipment management, N-species analysis,
 microbial community assessment, and data analysis.
In general, this is a great opportunity to improve the competencies related to the academical
Field.

Seguimiento/ Monitoring Plan
Daily supervision by the tutor and lab technician. Weekly meetings with the tutor. Nitrogen cluster meeting every two weeks.

Evaluación/ Evaluation plan

Laboratory rules exam - 2 weeks after initiating the practical activities.

Final report and presentation at the end of the traineeship.

Conocimientos técnicos o experiencia requerida (si procede) / Technical knowledge or experience required (if applicable)
Bachelor of Science, Ms Office (Word, Excel, Powerpoint), laboratory experience desirable, knowledge about wastewater treatment and/or scrubbing processes. Emglish C1

Especificaciones extra de la institución de acogida (si procede) / Additional specifications of the host institution (if applicable) Master level studies

Vaccination certificate of Hepatitis A & Tetanus. Signing lab rules and risk analysis

Disponibilidad para evaluar informes de covalidación de créditos (Si/No) / Availability to evaluate credit covalidation reports (Yes / No)
YES

Otra información relevante / Any additional important information

Proyecto BE-7

Nombre y apellidos del Supervisor / Name and surname of the Supervisor
Michiel Van Tendeloo

Afiliación del supervisor y Enlace a afiliación / Supervisor affiliation and Affiliation link
UAntwerpen

Título del Proyecto/ Project Title
Project title: TOWARDS A NOVEL CLIMATE SOLUTION: A HIGH-TECH BIOREACTOR FOR CO2 CAPTURE

Perfil preferencial del estudiante
Biochemistry, Biology, Chemical engineering, Environmental Sciences

Fechas orientativas/Available Dates
01-05-2024 --- 01-02-2025

Programa/ Detailed program of the traineeship period

GOAL OF THE PROJECT: Test whether an advanced bioreactor with prokaryotes, fungi and invertebrates can bio-accelerate the weathering of silicates to capture CO_2 from industrial point sources.

The intern's research will be part of this overall project and mainly revolve around operating the reactor as well as analysing additional samples to answer specific research questions. In more detail:

- Operate a high-tech bioreactor, with many advanced online instrumentation;

- Cultivate microbes, hunt for earthworms, prepare blends of silicate minerals and organic material;

- Sample the gas, liquid and solid phases for offline characterization of chemical and microbial parameters (e.g. follow-up of the microbial community through 16S gene sequencing);

- Follow up the online control system, process large amounts of data, and assist in transferring these to a neural network that aims to improve the process performance (artificial intelligence);

- Propose process conditions to improve the CO_2 capture efficiencies and rates;

Propose and execute side-line experiments to answer specific research questions;

Competencias a adquirir por parte del estudiante/ Knowledge, skills and competences to be acquired by the trainee at the end of the traineeship (expected Learning Outcomes)

The trainee will learn how to work in an international team and will learn how to work independently.
Several advanced online analysers and manual analyses will be used, improving the student's knowhow on analytics: total (in)organic carbon (TIC/TOC), ion chromatography (IC),
gas chromatography (GC), alkalinity (automatic titration), molecular analysis

(DNA extraction + Illumina sequencing). General lab competences are trained: careful weighing, pipetting, preparing stock solutions, ... The trainee will get acquainted on working with an advanced (pilot) reactor that will have automatic control. Detailed knowledge on investigated bio-/chemical processes will be acquired.
Data processing (Excel and/or Python/R) + understanding

Seguimiento/ Monitoring Plan
Daily supervision by mentor. Weekly follow-up meetings with the trainee's tutor, biweekly meetings with all members involved in the corresponding Project work package, and 3-monthly meetings with the whole project consortium where the trainee could occasionally present the progression.

Evaluación/ Evaluation plan
Final report at the end of the stay. Permanent evaluation in the lab.

Conocimientos técnicos o experiencia requerida (si procede) / Technical knowledge or experience required (if applicable)
Bachelor of Science, lab experience (basic handlings like pipetting, weighting, ... + safety), Microsoft Office (Word, Excel, Powerpoint), and (basic) knowledge of environmental engineering and biochemical processes. English C1

Especificaciones extra de la institución de acogida (si procede) / Additional specifications of the host institution (if applicable)

Vaccination certificate of Hepatitis A & Tetanus. Signing lab rules and risk analysis

Disponibilidad para evaluar informes de covalidación de créditos (Si/No) / Availability to evaluate credit covalidation reports (Yes / No)
YES

Otra información relevante / Any additional important information

Proyecto BE-8

Nombre y apellidos del Supervisor / Name and surname of the Supervisor
Ana María Barragán Montero

Afiliación del supervisor y Enlace a afiliación / Supervisor affiliation and Affiliation link
UCLouvain

Título del Proyecto/ Project Title
OpenTPS

Perfil preferencial del estudiante

Computer science, physics, mathematics, biomedical engineering

Fechas orientativas/Available Dates
01-07-2024 --- 01-10-2024

Programa/ Detailed program of the traineeship period
Radiation therapy is one of the main modalities to treat cancer. Because radiation needs to traverse the healthy tissue to reach the tumor, a full treatment simulation needs to be done before delivering it, in order to ensure that the tumor is well covered and the dose to the healthy organs is minimized. This is done by using dedicated software, known as treatment planning system (TPS), which comprises tools for image processing, dose calculation, and optimization algorithms to find the optimal dose distribution for a given patient. The TPSs used in most hospitals are provided by private companies, reaching a commercial value up to several hundred thousand euros. Recently, our lab has started to develop an in-house and open-source TPS (OpenTPS), to enable the clinical and academic research of new and promising techniques, wihtout the need of using these expensive TPS. The trainee will help us to integrate various novel algorithms in OpenTPS to continue the development and reach a more functional tool. He/she will explore optimization techniques for proton therapy, a type of radiotherapy that can reduce dose to healthy tissue. The trainee would be able to explore also the programming of graphical interfaces, as well as the improvement of the webpage of the OpenTPS project http://www.opentps.org/.

Competencias a adquirir por parte del estudiante/ Knowledge, skills and competences to be acquired by the trainee at the end of the traineeship (expected Learning Outcomes)
Being this project at the frontier of physics, computer science, engineer and applied medicine, the student will gain insight in all these domains, as well as experience in working in multidisciplinary fields. In addition, the student will gain experience on the development of software tools (with python programming) for both research and clinical use.

Seguimiento/ Monitoring Plan
Meetings will be scheduled every week so that we ensure the correct progress of the project. The student will be integrated in a team of 4 members working on different parts of the OpenTPS project.

Evaluación/ Evaluation plan
During the weekly meetings, the student will have to present the progress of the project in a powerpoint. A final presentation at the end of the internship will also be scheduled with all the members of the team.

Conocimientos técnicos o experiencia requerida (si procede) / Technical knowledge or experience required (if applicable)
Fluent in python programming. B2/C1 English, French is a plus

Especificaciones extra de la institución de acogida (si procede) / Additional specifications of the host institution (if applicable). Master level studies

Disponibilidad para evaluar informes de covalidación de créditos (Si/No) / Availability to evaluate credit covalidation reports (Yes / No)
Yes

Otra información relevante / Any additional important information

Proyecto BE-9

Nombre y apellidos del Supervisor / Name and surname of the Supervisor
Iris De Corte

Afiliación del supervisor y Enlace a afiliación / Supervisor affiliation and Affiliation link
UAntwerpen

Título del Proyecto/ Project Title
Urine treatment with the rotating biological contactor

Perfil preferencial del estudiante
Biochemistry, Environmental Sciences, Chemical engineering

Fechas orientativas/Available Dates
01-07-2024 --- 01-10-2024

Programa/ Detailed program of the traineeship period
With this internship, you and your urine could contribute to making the urban sanitation cycle more sustainable! Environmental pressure, urbanization and resource intensity have shifted the focal point of sewage treatment from public health protection to resource efficiency and recovery. Centralized sanitation is limited in its recovery potential. As urine is highly concentrated in N, P and micropollutants, its decentralized treatment has promising application potential. The decentralized treatment of source-separated urine could reduce the nutrient and micropollutant load to central wastewater treatment plants, thus reducing its energy-consumption and boosting its currently limited capacity. Furthermore, it enhances the recovery potential of phosphates, which can be used as fertilizer. This paradigm shift will lead to more resource-efficiency and environmental sustainability within the urban sanitation system.

However, due to its complex matrix and high salinity, undiluted urine is challenging to treat in a decentral setting. The rotating biological contactor (RBC) is a biofilm-based system that has been reported to work on partial nitritation/anammox. This system gives several advantages, such as higher robustness (due to biofilms), less energy consumption and less N2O emissions (due to the passive aeration). However, stable treatment of source-separated urine with partial nitritation/anammox using an RBC has never been achieved before. This is where you could make a change in urine treatment research with your internship!

During this internship, technologies and control strategies for urine treatment, specifically phosphate precipitation with calcium hydroxide and energy-efficient partial nitrification/anammox with a rotating biological contactor, will be investigated and integrated in terms of kinetics, microbiomes, emissions and overall performance (nitrogen & micropollutant removal).

Competencias a adquirir por parte del estudiante/ Knowledge, skills and competences to be acquired by the trainee at the end of the traineeship (expected Learning Outcomes)

The internship will allow the student to gain valuable experience in a divers and dynamic research team, enhancing skills such as collaborative work, communication and critical thinking. The student will gain knowledge in state-of-the-art urine treatment techniques, as well as enhance wet-lab skills. Furthermore, the student will gain more understanding on bioreactor operation and control. Data processing will be done via Excel.

Seguimiento/ Monitoring Plan
There will be daily supervision by the tutor and/or lab technician to monitor the student's general motivation, progress and achievements. There will be weekly meetings with the tutor, as well as biweekly meetings with the nitrogen cluster (group of researchers working on nitrogen removal related topics).

Evaluación/ Evaluation plan
Laboratory rules test (2 weeks after initiating the practical activities)
Permanent evaluation in the lab
Final report and presentation at the end of the stay

Conocimientos técnicos o experiencia requerida (si procede) / Technical knowledge or experience required (if applicable)
Bachelor of Science, Microsoft Office (Word, Excel, Powerpoint), basic laboratory experience
Preferably knowledge on wastewater treatment. C1 English

Especificaciones extra de la institución de acogida (si procede) / Additional specifications of the host institution (if applicable).

Master level studies

Disponibilidad para evaluar informes de covalidación de créditos (Si/No) / Availability to evaluate credit covalidation reports (Yes / No)
YES

Otra información relevante / Any additional important information

Prácticas en Dinamarca UAM-CED 2024

Número de Proyecto	Supervisor/a	Área de Conocimiento	Lugar de realización	Número de plazas
DI-1	Andrés R. Masegosa Arredondo	Programming. Python. Computer science. Mathematics. Machine Learning.	In Copenhagen: Department of Computer Science, Aalborg University (Denmark) https://www.cs.aau.dk/	1
DI-2	Dr Miguel Alena-Rodriguez	Organic chemistry. Pharmaeutical development.	In Copenhagen. Department of Drug Design and Pharmacology, University of Copenhagen https://drug.ku.dk/	1
DI-3	Pedro Miguel Pereira Correia	CRISPR Genome Editing	In Copenhagen. Section for Plant Biochemistry at Copenhagen University https://plen.ku.dk/forskning/transportbiologi/	1
DI-4	Pablo D. Cárdenas	Plant molecular Biology, biotechnology, biochemistry, agronomy	Section for Plant Biochemistry, Department of Pant and Environmental Sciences, University of Copenhagen. Department: https://plen.ku.dk/english/ Group: https://tinyurl.com/PlantBioengineering	1
DI-5	Giorgio Gullotta	Plant biology, Molecular biology, Biotechnology	University of Copenhagen, Denmark. Department of Plant and Environmental Sciences, Department of Plant and Environmental Sciences – Institut for Plante- og Miljøvidenskab - Københavns Universitet (ku.dk)	1
DI-6	Prof. Dr. Søren Bak; Dr. Jan Günther; Malbor Dervishi	Biology, Biochemistry, Chemistry, Environmental Science	In Copenhagen. Department of Plant and Environmental Sciences; Section for Plant Biochemisty https://plen.ku.dk/english/ https://plen.ku.dk/english/research/plant_biochemistry/molecular-evolution-of-specialized-metabolism/	1
DI-7	Prof. Dr. Søren Bak; Dr. Jan Günther; Malbor Dervishi	Biology, Biochemistry, Chemistry, Environmental Science	In Copenhagen. Department of Plant and Environmental Sciences; Section for Plant Biochemisty https://plen.ku.dk/english/ https://plen.ku.dk/english/research/plant_biochemistry/molecular-	1

			evolution-of-specialized-metabolism/	

A continuación, aparece toda la información de esta oferta

Proyecto DI-1

Nombre y apellidos del Supervisor / Name and surname of the Supervisor
Andrés R. Masegosa Arredondo
https://andresmasegosa.github.io/

Afiliación del supervisor y Enlace a afiliación / Supervisor affiliation and Affiliation link
Department of Computer Science, Aalborg University (Denmark)
https://www.cs.aau.dk/

Título del Proyecto/ Project Title
Developing a Python Library for implementing Novel Regularization for Deep Neural Networks.

Perfil preferencial del estudiante
The student should have a strong programming background, preferably in Python, mathematical or computer science studies, be familiar with libraries for Machine Learning such as Keras, Pytorch or Tensorflow.

Fechas orientativas/Available Dates
August 2024 till December 2024.

Programa/ Detailed program of the traineeship period
Weeks 1-2: Orientation and Foundation
- Introduction to the project's goals and scope.
- Deep-dive into the existing literature on neural networks and regularization techniques.
- Refresh Python skills, emphasizing numpy, pandas, and matplotlib for data manipulation and visualization.
- Review the fundamentals of machine learning libraries: Keras, Pytorch, and TensorFlow.

Weeks 3-4: Theoretical Training
- Understanding the mathematical concepts behind deep learning and regularization.
- Weekly workshops on advanced topics in deep learning (e.g., convolutional neural networks, recurrent neural networks, etc.).
- Begin drafting the initial framework for the Python library.

Weeks 5-6: Practical Application
- Start implementing basic regularization techniques in Python.
- Regular meetings with a mentor to discuss progress and troubleshoot issues.
- Begin integrating the developed code into Keras, Pytorch, or TensorFlow.
- Perform initial testing on simple neural network models.

Weeks 7-8: Advanced Development and Testing
- Incorporate novel regularization techniques into the library.
- Extensive testing and debugging of the new library.
- Prepare a comprehensive report documenting the library's functionality, usage, and potential applications.
- Final presentation of the project to the supervising team, highlighting key features and potential future work.

Throughout the program, the trainee will have access to a mentor for guidance and regular progress assessments to ensure they are on track with their learning objectives and project goals.

Competencias a adquirir por parte del estudiante/ Knowledge, skills and competences to be acquired by the trainee at the end of the traineeship (expected Learning Outcomes)
By the end of the traineeship, the trainee will have acquired comprehensive knowledge in deep neural networks and advanced regularization techniques. Skills developed include proficiency in Python programming, especially with libraries like Keras, PyTorch, and TensorFlow. The trainee will be adept in implementing and testing novel regularization methods within these frameworks. Competencies gained include the ability to critically analyze and apply theoretical concepts in practical settings, problem-solving in complex technical environments, and effectively documenting and presenting technical information. The trainee will emerge capable of contributing significantly to the field of machine learning.

Seguimiento/ Monitoring Plan
The monitoring plan involves weekly progress meetings with a mentor to review accomplishments and challenges. Regular hands-on workshops will evaluate practical skills, while bi-weekly written reports will assess understanding and application of theoretical concepts. A mid-term review and a final presentation will provide comprehensive evaluations of the trainee's progress and learning outcomes.

Evaluación/ Evaluation plan
The evaluation plan includes a mid-term assessment focusing on theoretical understanding and initial practical applications, followed by a final evaluation comprising a detailed project presentation and a technical report. Performance will be measured against predefined objectives, with feedback from the mentor assessing the trainee's overall competency and skill development.

Conocimientos técnicos o experiencia requerida (si procede) / Technical knowledge or experience required (if applicable)
The student should have a strong programming background, preferably in Python, mathematical or computer science studies, be familiar with libraries for Machine Learning such as Keras, Pytorch or Tensorflow.

Especificaciones extra de la institución de acogida (si procede) / Additional specifications of the host institution (if applicable)

N/A

Disponibilidad para evaluar informes de covalidación de créditos (Si/No) / Availability to evaluate credit covalidation reports (Yes / No)
Yes

Otra información relevante / Any additional important information
N/A

Proyecto DI-2

Nombre y apellidos del Supervisor / Name and surname of the Supervisor
Dr Miguel Alena-Rodriguez

Afiliación del supervisor y Enlace a afiliación / Supervisor affiliation and Affiliation link
Department of Drug Design and Pharmacology, University of Copenhagen

https://drug.ku.dk/

Título del Proyecto/ Project Title
Synthesis of autoinducing peptides (AIPs) analogues and evaluation of their properties as quorum sensing (QS) modulators in *Staphylococcus aureus*.

Perfil preferencial del estudiante
The student would have hands-on experience in Organic Chemistry and interest in the synthesis of peptides and the performance of biological essays. The student must have a good level of written and spoken English

Fechas orientativas/Available Dates
The internship would begin in June 2024 for a minimum duration of 6 months

Programa/ Detailed program of the traineeship period
We are interested in investigating the cross-talk between bacterial pathogens through the quorum sensing (QS) system. In Staphylococci, the communication is based on secreted autoinducing peptides (AIPs), which are detected by the cognate QS system and activate the system when sufficiently high concentrations are present. The activation leads to the production of virulence factors and an increased expression of the QS components. This population density controlled auto-feedback loop is responsible for the virulence of an infection. The inhibition of the QS circuit has been shown to attenuate infections and represents an alternative approach in dealing with multi-resistant bacteria.

The student will synthesize a library of analogues of naturally occurring AIPs. This will be done by automatic Solid Phase Peptide Synthesis (SPPS) together with novel in-house developed cyclisation methods. Structure-activity relationship studies will be carried out to evaluate the properties of these peptides as bacteria quorum sensing modulators. If time allows it, the data obtained will be employed to feed a Machine Learning software that will help to predict the structure of more potent peptides. The project is framed within a greater area of interest in the lab, in which there are Postdocs, PhD students, and Bachelor students working on.

Competencias a adquirir por parte del estudiante/ Knowledge, skills and competences to be acquired by the trainee at the end of the traineeship (expected Learning Outcomes)
- Automatic and manual Solid Phase Peptide Synthesis (SPPS)
- Organic synthesis and characterization
- Performance of biological essays
- Use and maintenance of basic laboratory equipment and instrumentation (UPLC, LC-MS, Peptide Synthesiser, NMR)
- Presentation of scientific data
- General good practices in a lab

- Basic principles of Machine Learning (optional, depending on progress)

Seguimiento/ Monitoring Plan

Professor Olsen will be the responsible P.I. during the traineeship and Dr Alena-Rodriguez will provide the daily guidance and monitoring. The trainee will join weekly group meetings and should present her progress every 6–8 weeks, depending on the meeting schedule.

Evaluación/ Evaluation plan

It is expected that the trainee writes a report, detailing the obtained results, at the end of the traineeship. Based on the report together with the daily conversation about experiments and the practical competencies acquired in the lab, the student will receive a brief written evaluation of the overall achievements during the stay. This document will be provided by Professor Olsen.

Conocimientos técnicos o experiencia requerida (si procede) / Technical knowledge or experience required (if applicable)

BSc or MSc (MSc preferred) student in Chemistry, Organic Chemistry, Biochemistry, or closely related field.
Good level of English

Especificaciones extra de la institución de acogida (si procede) / Additional specifications of the host institution (if applicable)

N/A

Disponibilidad para evaluar informes de covalidación de créditos (Si/No) / Availability to evaluate credit covalidation reports (Yes / No)
Yes

Otra información relevante / Any additional important information
Contact Dr Alena-Rodriguez (miguel.rodriguez@sund.ku.dk) if interested

Proyecto DI-3

Nombre y apellidos del Supervisor / Name and surname of the Supervisor
Pedro Miguel Pereira Correia

Afiliación del supervisor y Enlace a afiliación / Supervisor affiliation and Affiliation link
Section for Plant Biochemistry at Copenhagen University
https://plen.ku.dk/forskning/transportbiologi/

Título del Proyecto/ Project Title
Grafting-Mediated CRISPR Genome Editing in Monocot Cereal Crops

Perfil preferencial del estudiante
N/A

Fechas orientativas/Available Dates
From 1st June 2024 until 31st May 2025 (flexible)

Programa/ Detailed program of the traineeship period

The project aims to harness the synergy between grafting and CRISPR-based genome editing to overcome the challenges faced in conventional crop breeding, specifically in cereals. The project will test mobile CRISPR/Cas9 reagent delivery via graft junctions between transformable and non-transformable cereal crops, addressing the challenge of genome editing in species resistant to direct transformation.

Week 1-2: Introduction
Introduction to the host institution, laboratory, and research facilities. Meetings with key personnel and supervisors to discuss project goals and expectations. Overview of safety protocols and laboratory procedures. Review relevant literature on grafting techniques, CRISPR-based genome editing, and recent advancements in plant biology. Develop a detailed plan for the traineeship.

Week 3-6: Experimental Implementation
Hands-on training in grafting techniques applicable to monocot cereal grain crops. Conduct grafting experiments under the guidance of experienced researchers. Training on CRISPR techniques, including the design of guide RNAs and delivery methods. Begin experimental trials to assess the success of grafting-mediated CRISPR genome editing. Document and organize data, maintaining accurate records for analysis. Collaborate with supervisor to analyze experimental results.

Week 6 over: Refinement of experimental procedures
Refine grafting and CRISPR protocols based on the insights gained during data analysis. Optimize procedures for efficiency and reproducibility. Document protocols and methodologies.

Competencias a adquirir por parte del estudiante/ Knowledge, skills and competences to be acquired by the trainee at the end of the traineeship (expected Learning Outcomes)

Knowledge of CRISPR techniques, including guide RNA design and delivery methods.
- Competence in performing CRISPR-based genome editing procedures, including molecular biology techniques and genetic manipulations.
- Understanding of various grafting techniques applicable to grain crops.

- Hands-on experience in executing grafting techniques
- Collecting, organizing, and documenting experimental data.
- Experience in working collaboratively with colleagues and project supervisor.

Seguimiento/ Monitoring Plan
Open and continuous feedback loop between the trainee and supervisor. Weekly progress meetings between trainee and supervisor to review completed tasks, discuss challenges faced and guide upcoming activities.

Evaluación/ Evaluation plan

- Short oral presentation within the first month to show the overall plan for the traineeship in a research group meeting.
- Final oral presentation showing overall traineeship experience, and outcomes

Conocimientos técnicos o experiencia requerida (si procede) / Technical knowledge or experience required (if applicable)
- Familiarity with molecular genetics principles, DNA/RNA structure, and gene expression.
- Proficiency in basic laboratory techniques, sterile techniques and aseptic culture practices.
- Ability to collect, organize, and analyze experimental data.
- Ability to work collaboratively in a research team, including effective communication and coordination with mentors and fellow researchers
- Skills in conducting literature reviews and in scientific writing of reports, and summaries.
- Ability to adapt to unexpected challenges in a research setting.
- Proactive approach to problem-solving and troubleshooting.
- While not mandatory, previous research experience, especially in plant biology, would be beneficial.

Especificaciones extra de la institución de acogida (si procede) / Additional specifications of the host institution (if applicable)

N/A

Disponibilidad para evaluar informes de covalidación de créditos (Si/No) / Availability to evaluate credit covalidation reports (Yes / No)
Yes

Otra información relevante / Any additional important information
N/A

Nombre y apellidos del Supervisor / Name and surname of the Supervisor
Pablo D. Cárdenas

Afiliación del supervisor y Enlace a afiliación / Supervisor affiliation and Affiliation link
Section for Plant Biochemistry, Department of Pant and Environmental Sciences, University of Copenhagen.
Department: https://plen.ku.dk/english/
Group: https://tinyurl.com/PlantBioengineering

Título del Proyecto/ Project Title
Back to the Future: Bioengineering an ancient-resilient plant for a food-safe future

Perfil preferencial del estudiante
Plant molecular Biology, biotechnology, biochemistry, agronomy

Fechas orientativas/Available Dates
At least 6 months, dates to be agreed

Programa/ Detailed program of the traineeship period
We need to produce nutritious and accessible food for our growing population without exhausting our planet and its people. Our mission in the Plant Bioengineering group is to bridge molecular, agricultural and food sciences to create the crops of the future! Most of our food comes from only a dozen of plants, making our food system highly vulnerable to plant pests, diseases and climate change. In nature, there are thousands of plants with potential to be part of a future diverse and resilient agriculture, but many of them contain unpleasant compounds. In Back to the Future, we will bring from the past and develop the wild plant Chenopodium album as a new crop. Its seeds have high protein content and were eaten in Denmark during prehistorical times, but contain bitter and anti-nutritional chemical compounds called saponins. We have established a unique collection of C. album from all over Denmark and characterized their protein and saponin contents. In Back to the Future, we combine the latest molecular, agricultural and food sciences and technologies to understand the molecular basis of saponin biosynthesis, its bitterness and plant domestication to develop C. album into a valuable plant for future food security. In your project you will join our effort by identifying and characterizing genes involved in the biosynthesis of saponins and plant domestication for C. album.

Competencias a adquirir por parte del estudiante/ Knowledge, skills and competences to be acquired by the trainee at the end of the traineeship (expected Learning Outcomes)
Plant molecular biology, phylogenetic analysis, analytical chemistry, stable and transient plant transformation, work with plants in vitro, greenhouses, and field.

Seguimiento/ Monitoring Plan
Group meetings once a week. One-on-one meetings as required.

Evaluación/ Evaluation plan
Final presentation/report.

Conocimientos técnicos o experiencia requerida (si procede) / Technical knowledge or experience required (if applicable)
Ideal candidate with lab experience.

Especificaciones extra de la institución de acogida (si procede) / Additional specifications of the host institution (if applicable)

N/A

Disponibilidad para evaluar informes de covalidación de créditos (Si/No) / Availability to evaluate credit covalidation reports (Yes / No)
No

Otra información relevante / Any additional important information
N/A

Proyecto DI-5

Nombre y apellidos del Supervisor / Name and surname of the Supervisor
Giorgio Gullotta

Afiliación del supervisor y Enlace a afiliación / Supervisor affiliation and Affiliation link
University of Copenhagen, Denmark, University of Copenhagen – University of Copenhagen (ku.dk)
Department of Plant and Environmental Sciences, Department of Plant and Environmental Sciences – Institut for Plante- og Miljøvidenskab - Københavns Universitet (ku.dk)

Título del Proyecto/ Project Title
Assigning function to two unknown Transcription Factor

Perfil preferencial del estudiante
Plant biology, Molecular biology, Biotechnology

Fechas orientativas/Available Dates
August 1st – November 30th (approx.)

Programa/ Detailed program of the traineeship period
The MYB family of transcription factors had a significant diversification in the plant kingdom. *Arabidopsis thaliana* counts more than 120 unique *MYB* genes involved in many different essential aspects of a plant life (abiotic/biotic defense, flowering, development, yield ect.). Recent findings suggest that MYB47 and MYB95 might regulate biomass/yield and defense mechanisms in plants. The trainee will join an ongoing PhD project aiming to characterize both *MYB47* and *MYB95* in planta. Your traineeship will ideally span three months, during which you will:

Introduction:
- The first weeks the trainee will gain hands-on experience with general laboratory procedures and safety protocols. (Practical/Theoretical work)
- The trainee will gain a deeper theoretical understanding of: Transcription Factors, protein interactions and gene regulation. (Theoretical work)

Main part:
- The trainee will be introduced to common techniques used in a molecular biology laboratory that fits the project and to work with *Arabidopsis thaliana*, the model plant for genetic studies. (Practical work)
- The trainee will perform independent experiments, analyze results and present findings to our research group. (Practical/Theoretical work)

Conclusion:
- The trainee will prepare and share with our research group the findings and relevant aspects of the project. (Theoretical work)

Competencias a adquirir por parte del estudiante/ Knowledge, skills and competences to be acquired by the trainee at the end of the traineeship (expected Learning Outcomes)
By the end of your traineeship, you will have acquired:

Proficiency in common molecular biology techniques including but not limited to;
- DNA/RNA extraction
- PCR and qPCR

Molecular Cloning

Theoretical knowledge of plant transcription factors and their in vivo functions

Practical and theoretical knowledge regarding plant cultivation and handlings, genetics, and transcript and metabolite analyses.

Experience in experimental design and data analysis and visualization.

Ability to work independently and as part of a team.

Science communication skills.

Seguimiento/ Monitoring Plan

Besides the daily supervision in the lab and case-based necessities, the trainee will be supervised weekly to assess progress in learning lab techniques, conducting experiments, and data analysis. During these weekly meetings, we will discuss findings and troubleshoot issues. The trainee will present their work once or twice to the research group (lab meetings) which will provide opportunities to obtain input and feedback on the project.

Evaluación/ Evaluation plan

The trainee's performance will be evaluated independently from their experimental results. The trainee will be evaluated based on their commitment to the project and investment in the learning process. Special importance will be given to clear and accurate experimental documentation and a general understanding of the project's relevance. The lab meetings and a final dissemination will be part of the trainee's overall evaluation.

Conocimientos técnicos o experiencia requerida (si procede) / Technical knowledge or experience required (if applicable)

For this internship, the following technical knowledge would be an advantage but are not mandatory:

Basic understanding of molecular biology and genetics.

Some experience with common lab techniques.

Knowledge of plant biology.

[Only mandatory] Good written and verbal communication skills in English.

Please note that training will be provided to help you acquire the necessary skills for the project.

Especificaciones extra de la institución de acogida (si procede) / Additional specifications of the host institution (if applicable)

The trainee will join an international and multicultural research group part of a larger section sharing a broad range of equipment and expertise.

Disponibilidad para evaluar informes de covalidación de créditos (Si/No) / Availability to evaluate credit covalidation reports (Yes / No)

Yes

Otra información relevante / Any additional important information

N/A

Proyecto DI-6

Nombre y apellidos del Supervisor / Name and surname of the Supervisor
Prof. Dr. Søren Bak; Dr. Jan Günther; Malbor Dervishi

Afiliación del supervisor y Enlace a afiliación / Supervisor affiliation and Affiliation link
Department of Plant and Environmental Sciences; Section for Plant Biochemisty
https://plen.ku.dk/english/
https://plen.ku.dk/english/research/plant_biochemistry/molecular-evolution-of-specialized-metabolism/

Título del Proyecto/ Project Title
Purification and Identification of ecofriendly saponins from local plant material and elucidation of its biological activity

Perfil preferencial del estudiante
Biology, Biochemistry, Chemistry, Environmental Science

Fechas orientativas/Available Dates
Start date flexible from March 2024; duration at least 6 months

Programa/ Detailed program of the traineeship period
Saponins are valuable plant specialized metabolites that are biosynthesized by various species within the plant kingdom. In nature, saponins are employed by the plant as effective insecticides. Our group recently elucidated, which chemical characteristics are essential in constituting highly insecticidal saponins. These plant specialized metabolites have been used in human culture for centuries due to their cleaning properties for example for washing clothes or human hygiene. Even though these compounds have been used throughout human history and are still employed for food (quinoa, beans, and licorice), beverages (root beer) as well as medicine (constituent of the Novavax COVID-19 vaccine), it is not precisely known how saponins act on biological target systems. We try to learn how saponins interact with different organisms as well as biological membranes in order to formulate a hypothesis of how saponins work on a molecular level.
In order to find valuable plant resources that contain highly abundant saponins, we tap into local plant communities in order to facilitate large-scale purification and identification of saponin toxicity. This will allow us to generate an overview of different saponin structures and correlate their toxicity in order to select highly suitable candidates for large scale purification and future field applications. To elucidate saponin biological activity, we employ a yeast system as well as reconstituted membrane systems.

Competencias a adquirir por parte del estudiante/ Knowledge, skills and competences to be acquired by the trainee at the end of the traineeship (expected Learning Outcomes)

Strong knowledge of chromatography and purification of plant specialized metabolites will be acquired. Additionally, basic knowledge of HPLC and mass spectrometry will be essential to learn. Other spectroscopic methods will be employed and introduced. The depth of knowledge that will be accessible depends on the basic knowledge of the student. We will perform microbial assays with yeast cells that will be spectroscopically monitored and yeast survival will be measured. For other tests of saponin toxicity, the student will learn how to produce large unilamellar vesicles (LUVs) in order to study the effects of extracted saponins on artificial membrane systems.

Seguimiento/ Monitoring Plan

The student will be closely supervised in day-to-day laboratory experimentation and the progress will be evaluated weekly with other peers within the group in order to improve the students experience. The group holds bi-weekly group meetings and larger monthly meetings to discuss and evaluate progress of the project.

Evaluación/ Evaluation plan

The student will be evaluated by leading a seminar in front of the research group or department to get input from as many peers as possible. The outcome of the project will be evaluated by the main supervisor at the end of the research period.

Conocimientos técnicos o experiencia requerida (si procede) / Technical knowledge or experience required (if applicable)

Handling of chemicals and solvents and molecular biology techniques. Chromatography skills are not required but are a big plus.

Especificaciones extra de la institución de acogida (si procede) / Additional specifications of the host institution (if applicable)

N/A

Disponibilidad para evaluar informes de covalidación de créditos (Si/No) / Availability to evaluate credit covalidation reports (Yes / No)
Yes

Otra información relevante / Any additional important information
N/A

Proyecto DI-7

Nombre y apellidos del Supervisor / Name and surname of the Supervisor
Prof. Dr. Søren Bak; Dr. Jan Günther; Malbor Dervishi

Afiliación del supervisor y Enlace a afiliación / Supervisor affiliation and Affiliation link
Department of Plant and Environmental Sciences; Section for Plant Biochemisty
https://plen.ku.dk/english/
https://plen.ku.dk/english/research/plant_biochemistry/molecular-evolution-of-specialized-metabolism/

Título del Proyecto/ Project Title
Purification and Identification of ecofriendly saponins from local plant material and elucidation of its biological activity

Perfil preferencial del estudiante
Biology, Biochemistry, Chemistry, Environmental Science

Fechas orientativas/Available Dates
Start date flexible from March 2024; duration at least 6 months

Programa/ Detailed program of the traineeship period
Saponins are valuable plant specialized metabolites that are biosynthesized by various species within the plant kingdom. In nature, saponins are employed by the plant as effective insecticides. Our group recently elucidated, which chemical characteristics are essential in constituting highly insecticidal saponins. These plant specialized metabolites have been used in human culture for centuries due to their cleaning properties for example for washing clothes or human hygiene. Even though these compounds have been used throughout human history and are still employed for food (quinoa, beans, and licorice), beverages (root beer) as well as medicine (constituent of the Novavax COVID-19 vaccine), it is not precisely known how saponins act on biological target systems. We try to learn how saponins interact with different organisms as well as biological membranes in order to formulate a hypothesis of how saponins work on a molecular level.
In order to find valuable plant resources that contain highly abundant saponins, we tap into local plant communities in order to facilitate large-scale purification and identification of saponin toxicity. This will allow us to generate an overview of different saponin structures and correlate their toxicity in order to select highly suitable candidates for large scale purification and future field applications. To elucidate saponin biological activity, we employ a yeast system as well as reconstituted membrane systems.

Competencias a adquirir por parte del estudiante/ Knowledge, skills and competences to be acquired by the trainee at the end of the traineeship (expected Learning Outcomes)

Strong knowledge of chromatography and purification of plant specialized metabolites will be acquired. Additionally, basic knowledge of HPLC and mass spectrometry will be essential to learn. Other spectroscopic methods will be employed and introduced. The depth of knowledge that will be accessible depends on the basic knowledge of the student. We will perform microbial assays with yeast cells that will be spectroscopically monitored and yeast survival will be measured. For other tests of saponin toxicity, the student will learn how to produce large unilamellar vesicles (LUVs) in order to study the effects of extracted saponins on artificial membrane systems.

Seguimiento/ Monitoring Plan

The student will be closely supervised in day-to-day laboratory experimentation and the progress will be evaluated weekly with other peers within the group in order to improve the students experience. The group holds bi-weekly group meetings and larger monthly meetings to discuss and evaluate progress of the project.

Evaluación/ Evaluation plan

The student will be evaluated by leading a seminar in front of the research group or department to get input from as many peers as possible. The outcome of the project will be evaluated by the main supervisor at the end of the research period.

Conocimientos técnicos o experiencia requerida (si procede) / Technical knowledge or experience required (if applicable)

Handling of chemicals and solvents and molecular biology techniques. Chromatography skills are not required but are a big plus.

Especificaciones extra de la institución de acogida (si procede) / Additional specifications of the host institution (if applicable)

N/A

Disponibilidad para evaluar informes de covalidación de créditos (Si/No) / Availability to evaluate credit covalidation reports (Yes / No)
Yes

Otra información relevante / Any additional important information
N/A

Prácticas en Reino Unido Convenio UAM-CERU

Número de Proyecto	Supervisor	Área de Conocimiento	Lugar de realización	Número de plazas
RU-1	Juan Alday*	Physics (Planetary Science)	The Open University	1
RU-2	Juan Alday*	Physics (Planetary Science)	The Open University	1
RU-3	Jacqueline Stair	Pharmaceutical Sciences,, Analytical Chemistry	University of Hertfordshire	1
RU-4	María Encarnación Micó Amigo	Bioinformática, Ingeniería biomédica, Bioingeneiría	Heriot-Watt University	2
RU-5	Rubén de Dios/Ronan McCarthy	Microbiology	Brunel University London	1
RU-6	Patricia Ortega Ramos	Biología, Ecología	Rothamsted research	1
RU-7	Natalia Jimenez Moreno	Biologia celular	Universidad de Edimburgo, UK	1
RU-8	Dr Maria Dimitriadi	Biologia	University of Hertfordshire	1
RU-9	Isabel Douterelo Soler	Biological Sciences, Environmental Sciences	Sheffield, UK	1
RU-10	Dr. Magda Pascual-Borràs	Química Inorgánica/Coordinación	Newcastle University	2

* El supervisor Juan Alday oferta dos proyectos difernetes

Importante: Debido a las imposiciones generadas tras la entrada en vigor del BREXIT, solo podrán acceder a estas prácticas estudiantes que están matriculados en la UAM. No podrán acceder estudiantes en la opción de recién graduados.

A continuación, aparece toda la información de esta oferta

Proyecto RU-1

Nombre y apellidos del Supervisor / Name and surname of the Supervisor

Juan Alday

Afiliación del supervisor y Enlace a afiliación / Supervisor affiliation and Affiliation link

The Open University (https://www.open.ac.uk/)

Título del Proyecto/ Project Title

Searching for evidence of trace gases on Mars with the ExoMars Trace Gas Orbiter

Perfil preferencial del estudiante

Graduate or undergraduate student in Physics or a closely related discipline.

Fechas orientativas/Available Dates

Any time from 1 August 2024 – 31 December 2024.

Programa/ Detailed program of the traineeship period

The ExoMars Trace Gas Orbiter (TGO) has been making observations of the atmosphere of Mars since March 2018 and its main objective is to provide a detailed inventory of the composition of the Martian atmosphere. The presence of certain gases in the atmosphere, even if in very small amounts, can provide direct evidence of important activity taking place on Mars at present such as active volcanism or chemical processes between dust, water vapour and ultraviolet light. In this project, the applicant will join the team responsible for running the operations of the NOMAD-UVIS spectrometer aboard ExoMars TGO to search for the presence of some of these gases using real spaceflight data acquired by the instrument. Particularly, the UVIS data will be analysed aiming for a detection of sulfur or chlorine-bearing compounds. In the absence of a detection, we will determine the upper limit at which the gases may exist below the sensitivity of the instrument, which is crucial to characterise the activity of planet Mars at present.

Competencias a adquirir por parte del estudiante/ Knowledge, skills and competences to be acquired by the trainee at the end of the traineeship (expected Learning Outcomes)

In this project, the trainee will acquire a diverse skill set through engaging in a compelling exploration of data science, remote sensing, and space research. The key skills to be gained include:

- Develop expertise in managing and analyzing extensive datasets and summarising their characteristics using scientific figures with Python.
- Learn about state-of-the-art techniques to characterise the composition of planetary atmospheres.
- Get a hands-on experience with the analysis of real spectroscopic data from other planets.

- Utilize statistical principles and apply data interpretation skills to practical, real-world scenarios.
- Learn about how the operations and planning of satellite instrumentation are performed.
- Develop collaborative problem-solving skills within a scientific team through effective communication, critical thinking, and teamwork strategies.

Seguimiento/ Monitoring Plan

The progress of the project will be closely monitored with regular meetings, including:

- Weekly team meetings, during which students will provide updates on their weekly progress to the research group.
- Regular dedicated supervisor/student meetings to discuss specific project details, address any challenges, and provide guidance on the research direction.

Evaluación/ Evaluation plan

At the end of the studentship, the trainee will be asked to make a 15-minute presentation summarising the main results and conclusions of the project to the rest of the research group.

Conocimientos técnicos o experiencia requerida (si procede) / Technical knowledge or experience required (if applicable)

Experience with Python programming.

Especificaciones extra de la institución de acogida (si procede) / Additional specifications of the host institution (if applicable)

Disponibilidad para evaluar informes de covalidación de créditos (Si/No) / Availability to evaluate credit covalidation reports (Yes / No)

Yes

Otra información relevante / Any additional important information

Proyecto RU-2

Nombre y apellidos del Supervisor / Name and surname of the Supervisor

Juan Alday

Afiliación del supervisor y Enlace a afiliación / Supervisor affiliation and Affiliation link

The Open University (https://www.open.ac.uk/)

Título del Proyecto/ Project Title

Defining the atmospheric science from the next European rover to Mars

Perfil preferencial del estudiante

Graduate or undergraduate student in Physics or a closely related discipline.

Fechas orientativas/Available Dates

Any time from 1 August 2024 – 31 December 2024.

Programa/ Detailed program of the traineeship period

In October 2028 the European Space Agency will launch its first mission aiming to safely land a rover on the surface of Mars. This rover, named Rosalind Franklin, will include several instrumentation suites dedicated to perform in situ investigations of the surface and atmosphere. Among these instruments, Enfys (welsh word for rainbow) is an infrared spectrometer designed to characterise the mineralogy of the surface. Additionally, the operations of Enfys will include measurements of the Martian sky to gain new information about the characteristics of the dust particles as well as some other atmospheric components, such as the surface pressure or the water vapour content. In this project, the student will help define the capabilities of Enfys to perform atmospheric science through simulations of the sky brightness with a radiative transfer model. Particularly, based on the characteristics of the instrument, the student will help determine and quantify the optimal conditions for the characterisation of the atmosphere.

Competencias a adquirir por parte del estudiante/ Knowledge, skills and competences to be acquired by the trainee at the end of the traineeship (expected Learning Outcomes)

In this project, the trainee will acquire a diverse skill set through engaging in a compelling exploration of data science, remote sensing, and space research. The key skills to be gained include:

- Develop expertise in managing and analysing extensive datasets and summarising their characteristics using scientific figures with Python.
- Learn about state-of-the-art techniques to characterise the composition of planetary atmospheres.

- Utilize statistical principles and apply data interpretation skills to practical, real-world scenarios.
- Apply theoretical principles of radiative transfer to real-world scenarios.
- Develop collaborative problem-solving skills within a scientific team through effective communication, critical thinking, and teamwork strategies.

Seguimiento/ Monitoring Plan

The progress of the project will be closely monitored with regular meetings, including:

- Weekly team meetings, during which students will provide updates on their weekly progress to the research group.
- Regular dedicated supervisor/student meetings to discuss specific project details, address any challenges, and provide guidance on the research direction.

Evaluación/ Evaluation plan

At the end of the studentship, the trainee will be asked to make a 15-minute presentation summarising the main results and conclusions of the project to the rest of the research group.

Conocimientos técnicos o experiencia requerida (si procede) / Technical knowledge or experience required (if applicable)

Experience with Python programming.

Especificaciones extra de la institución de acogida (si procede) / Additional specifications of the host institution (if applicable)

Disponibilidad para evaluar informes de covalidación de créditos (Si/No) / Availability to evaluate credit covalidation reports (Yes / No)

Yes

Otra información relevante / Any additional important information

No

Nombre y apellidos del Supervisor / Jacqueline Stair

Afiliación del supervisor y Enlace a afiliación
University of Hertfordshire (https://www.herts.ac.uk/)

Título del Proyecto
Chemical Analysis of Cannabidiol (CBD) Products

Perfil preferencial del estudiante
The student should have had courses in chemical analysis techniques covering topics such as chromatography and spectroscopy. The students should also have excellent numeracy skills and experience in using Excel type software.

Fechas orientativas/ 1 Septiembre a 31 de Diciembre (Supervisor will have less availabilability in August).

Programa/ Detailed program of the traineeship period
The program will as follows: 1. literature search of CBD related analysis and basic laboratory training included relevant safety forms. 2. Advanced training on relevant instruments such as Raman spectroscopy, and HPLC-MS. 3. Develop sample preparation techniques for CBD related products (such as oils, sprays and gummies). 4. Process the data obtained using Excel but also chemometric software 5. Evaluate and Interpretation of the data obtained to derive conclusions regarding the products examined.6. Write-up results for the project report.
In addition, the student will attend group research meetings and departmental research presentations.

Competencias a adquirir por parte del estudiante/ Knowledge, skills and competences to be acquired by the trainee at the end of the traineeship (expected Learning Outcomes)
Expected Learning Outcomes are as follows: 1. Competency at using various analytical techniques such as Raman spectroscopy and HPLC-MS including instrument hardware and software. 2. Skills to prepare various types of samples for analysis such as extractions, dilutions, and filtering. The trainee will be able to make informed choices in this area. 3. The trainee will have an understanding of the CBD market and related cannabis products and the analysis challenges in this research area. 4. The trainee will have a good knowledge base for data interpretation of large sets of data.

Seguimiento/ Monitoring Plan
The student will work closely with the supervisor and meet at least weekly to monitor research progress spectically. The supervisor will have weekly progress sheets in which the student can highlight any areas of support needed. In addition to the supervisor, there will be technical staff and post-docs to assist.

Evaluación/ Evaluation plan
Again, the student will complete weekly progress sheets to evaluate the progress being made and to highlight areas of support needed. The supervisor will also meet with the student regularly to evaluate results and to provide guidance in the research programme. Written work and lab notebooks will be evaluated too.

Conocimientos técnicos o experiencia requerida (si procede) / Technical knowledge or experience required (if applicable)
Advanced training on relevant instruments such as Raman spectroscopy, and HPLC-MS.

Especificaciones extra de la institución de acogida (si procede) / Additional specifications of the host institution (if applicable)

Disponibilidad para evaluar informes de covalidación de créditos (Si/No) / Availability to evaluate credit covalidation reports (Yes / No)
No.

Otra información relevante / Any additional important information

Proyecto RU-4

Nombre y apellidos del Supervisor / María Encarnación Micó Amigo

Afiliación del supervisor y Enlace a afiliación / Heriot-Watt University, https://www.hw.ac.uk/

Título del Proyecto/ NOVEL METHODS FOR PREDICTING & ASSESSING THE EFFECT OF ANTI-PARKINSONIAN MEDICATION IN PARKINSON'S DISEASE

Perfil preferencial del estudiante Ingeniería Electrónica, Informática, Biomédica

Fechas orientativas/ 1 de Junio al 31 de Diciembre

Programa/ Detailed program of the traineeship period
Here there is an opportunity in the field of signal processing/machine learning to study gait in Parkinson's Disease. As part of this project, the candidate will develop objective, cost-effective, valid and novel methods for real-world gait assessment in Parkinson's Disease. Particularly, the project aims to better characterize the effect of anti-parkinsonian medication in Parkinson's Disease, which is essential to improve its clinical management.

The candidate will support the analysis of data already available and provided by Oregon Health & Sciences University (USA), recorded in laboratory settings with triaxial accelerometers. The candidate will implement, with the support and guidance of the supervisor, a diversity of algorithms for feature extraction (spatiotemporal, signal-processing-based, stochastic analyses, etc.). Based on the features extracted, a machine-learning algorithm will be implemented to classify "ON medication status" vs. "OFF medications status". The classification accuracy will be explored with support vector machine, random forest, ensemble models and partial least square discriminant analysis, after training the models on a subset of the data. In addition, the candidate will support on the interpretation and presentation of results and will draft a scientific article. An understanding of the literature will be part of the traineeship program.

Competencias a adquirir por parte del estudiante/ Knowledge, skills and competences to be acquired by the trainee at the end of the traineeship (expected Learning Outcomes)
- The candidate will enhance his/her expertise in programming with Matlab and signal processing of triaxial accelerometry, particularly tailored to the assessment of gait in patients with Parkinson's Disease with digital health technology. Moreover, the applicant will learn on spectral analysis, non-linear analysis, and other mathematical methods to be implemented with the support of the supervisor.
- The skills of the candidate on statistics and machine-learning will be developed by assessing the effect of anti-Parkinsonian medication. Thus, an understanding of this neurological condition will be developed.

Seguimiento/ Monitoring Plan
The candidate will meet the supervisor 2 times per week. In addition, the candidate will join the weekly meetings of three research groups at Heriot-Watt University: Parkinson's Disease group lead by Dr. Sadeque Reza Khan; Machine-Learning Health group led by Dr. Marta Vallejo and the Health National Robotarium group.

Evaluación/ Evaluation plan
A final presentation from the candidate will be performed at the end of the program. This will be used as an assessment and evaluation. In addition, the candidate will contribute to the

drafting of a scientific article, for which he/she will be the first author, based on his/her contribution.

Conocimientos técnicos o experiencia requerida (si procede) / Technical knowledge or experience required (if applicable)
Expertise on machine learning, signals-processing and programming with MATLAB/Python.

Especificaciones extra de la institución de acogida (si procede) / Additional specifications of the host institution (if applicable)

The candidate will work at the School of Engineering and Physical Sciences (EPS) of Heriot-Watt University (HWU), which has an excellent international research reputation and close ties with the professional and industrial world of science, engineering and technology. Particularly, the strong and well-established electronic and mechanical engineering research of the school would support the implementation of robust and advanced signal-processing methods and biomechanical analyses of an imminent transcendence into the project. Moreover, the candidate will join the CARE and the Machine-Learning Health groups: https://sites.google.com/view/ml-healthgroup/home formed by academics from the EPS and the Mathematical and Computer Sciences School of HWU. These provide a strong network of researchers with a large expertise in the application of advance statistics, machine-learning and artificial intelligence to the study of rehabilitation and neurodegeneration, essential to the implementation of the most suitable and optimized methods for the analysis of the proposed project. In addition, the candidate will be part of a research group National Robotarium: https://www.edinburgh-robotics.org/national-robotarium. This is a world-leading centre for Robotics and Artificial Intelligence that brings innovative solutions to global challenges.

Disponibilidad para evaluar informes de covalidación de créditos (Si/No) / Availability to evaluate credit covalidation reports (Yes / No) Yes, if needed, to be specified with the original institution.

Otra información relevante / Any additional important information
The work of the candidate will be part of an international scientific context, including a close collaboration with the Oregon Health & Sciences University, University College of Dublin, Vrije Universiteit Amsterdam and University of Edinburgh. Particularly Oregon Health & Sciences University has provided the data which will be analysed by the candidate, and the other universities will support on the statistical analysis and the implementation of advanced methods for gait analysis from triaxial accelerometry assessments of patients with Parkinson's Disease.

Proyecto RU-5

Nombre y apellidos del Supervisor / Name and surname of the Supervisor
Rubén de Dios Barranco and Ronan McCarthy

Afiliación del supervisor y Enlace a afiliación / Supervisor affiliation and Affiliation link
Brunel University London (https://www.brunel.ac.uk/)

Título del Proyecto/ Project Title
Role of the second messenger cyclic diguanosine monophosphate (c-di-GMP) in antibiotic resistance in Acinetobacter baumannii

Perfil preferencial del estudiante
The student must be in the 4th year of their Bachelor's Degree or doing a Master's Degree related to biological sciences. Preferentially, the student must have previous knowledge in microbiology, genetics and biochemistry and laboratory experience. The student must be fluent in English as a vehicle language.

Fechas orientativas/Available Dates
From August 1st to December 31st 2024 (open to availability of the student).

Programa/ Detailed program of the traineeship period
A. baumannii has been listed by the World Health Organisation as a multi-drug resistant (MDR) 'critical priority pathogen'. It can cause diverse infections that may remain recalcitrant to treatment. In our group, we have recently developed genome editions tools for the MDR isolate A. baumannii AB5075.

During the stay, the student will participate in two different experimental approaches:

Task 1
The student will learn how to perform molecular cloning in A. baumannii and generate two strains for overexpression of a diguanylate cyclase (DGC) or a phosphodiesterase (PDE) (enzymes that produce/degrade c-di-GMP) to control the c-di-GMP levels. This will be done using established protocols to introduce a site-specific transposon in the chromosome containing the coding gene of either a DGC or a PDE under an inducible promoter. Afterwards, the student will characterize these strains regarding their antibiotic resistance according to their c-di-GMP levels by performing antibiotic resistance assays by disc diffusion and minimum inhibitory concentration (MIC) assays.

Task 2
The student will use these same assays to characterize the antibiotic resistance phenotype of multiple A. baumannii mutants (available in our lab) in genes involved in the c-di-GMP signaling network to address a role of various DGCs and PDEs in the antibiotic resistance.

Competencias a adquirir por parte del estudiante/ Knowledge, skills and competences to be acquired by the trainee at the end of the traineeship (expected Learning Outcomes)

The student will learn routine microbiological and genetics techniques used in a microbiology laboratory (culturing, transformation, molecular cloning), as well as other specific techniques related to the project (induction of gene expression, antibiotic resistance assays, antibiotic resistance quantification by MIC, specificities for the work with a bacterial pathogen). Furthermore, the trainee will be integrated in a dynamic international group and develop soft

skills of interest for the scientific career, such as communication skills, task management, problem-solving abilities, experimental design and critical result analysis. These skills will be invaluable to the student as they make the next steps in their career.

Seguimiento/ Monitoring Plan
Dr. Rubén de Dios will perform daily training, monitoring and troubleshooting. Furthermore, the student will have weekly meetings with both Dr. de Dios and Dr. Ronan McCarthy (Principal Investigator) for supervision and assessment of the project progress and results. During these meetings, the student will learn data presentation and interpretation.

Evaluación/ Evaluation plan
There will be a continuous evaluation of the student's handling of the newly acquired microbiology and genetics techniques . Interest on the project and soft-skill development (team work, communication, troubleshooting) will be considered. At the end of the stay, they will present their results to the group as final evaluation.

Conocimientos técnicos o experiencia requerida (si procede) / Technical knowledge or experience required (if applicable)
The student must know basic genetics, bacterial physiology and molecular microbiology. Preferentially, the student should have previous experience with microbiological techniques and cloning/transformation protocols, although it is not essential.

Especificaciones extra de la institución de acogida (si procede) / Additional specifications of the host institution (if applicable)

The student will have to present an English certificate or alternatively pass an internal English exam to gain admission to Brunel University London.

Disponibilidad para evaluar informes de covalidación de créditos (Si/No) / Availability to evaluate credit covalidation reports (Yes / No)
Yes.

Otra información relevante / Any additional important information
Preferentially, the student should be enrolled in their home University during the entirety of the stay to gain admission to Brunel University London as a visiting student, avoiding the requisite of a visa application.

Proyecto RU-6

Nombre y apellidos del Supervisor / Name and surname of the Supervisor

Dr Patricia Ortega Ramos

Afiliación del supervisor y Enlace a afiliación / Supervisor affiliation and Affiliation link

Rothasmted Research. https://www.rothamsted.ac.uk/people/patricia-ortega-ramos

Título del Proyecto/ Project Title

The more the merrier? Understanding the consequences of cabbage stem flea beetle larval intraspecific competition on larval development and parasitism rate.

Perfil preferencial del estudiante

The student/s should have a background in biology, ecology, or related areas. They should have a keen interest in insect-plant interactions, agroecology, and entomology. They should have excellent attention to detail, organisation, and analytical skills, as well as problem solving, and critical thinking.

Fechas orientativas/Available Dates

Flexible from 1st of July to 20th of December 2024

Programa/ Detailed program of the traineeship period

Firstly, the student will receive an induction to Rothamsted Research, and will be given Health & Safety training. They will be introduced to all the members of our research group and will get in contact with Rothamsted' s studentship officer.
In the first part of the traineeship, they will be taught the background to the concepts of Integrated Pest management, the specifics of the study, and we will define the objectives and expectations of the traineeship. The student will be trained on insect identification and insect dissection procedures. They will apply their knowledge on previously collected samples.
Later in the traineeship (late July), the student will have the opportunity to participate in the annual cabbage stem flea beetle collection campaign and will be trained to catch insects using a wide variety of different traps.
In the last part of the traineeship the student will be taught how to analyse and interpret the obtained data. They will also be guided through the process of creating and delivering a scientific presentation.
The student will also have an opportunity to gain wider scientific experience via attending seminars and planned activities occurring during the studentship e.g. the Groundswell regenerative farming event.

Competencias a adquirir por parte del estudiante/ Knowledge, skills and competences to be acquired by the trainee at the end of the traineeship (expected Learning Outcomes)
Students will gain experience of working in a professional research environment and acquire the following skills:
-         A comprehensive understanding of key concepts in integrated pest management, insect competition, insect rearing and host-parasitoid interactions.

- Technical skills: Insect taxonomy using taxonomic keys, insect dissection procedures, insect rearing procedures, insect trapping techniques.
- Data management and statistical skills: design data recording forms, database input, data analysis and visualization in R and Excel.
- Soft skills: effective communication, how to follow protocols and complete tasks efficiently and accurately, apply critical thinking skills.

Seguimiento/ Monitoring Plan

The student will be supervised on a day-to-day basis by Dr Patricia Ortega-Ramos. Weekly meetings will be held to track progress of set tasks with feedback both ways.

Evaluación/ Evaluation plan

We will set up the objectives and the expected learning outcomes to be achieved during the traineeship. At the end of it, the student will be asked to present their work and findings to the research group. Finally, we will conduct a final evaluation that summarizes their performance and accomplishments.

Conocimientos técnicos o experiencia requerida (si procede) / Technical knowledge or experience required (if applicable)

No technical knowledge or experience required. This project will involve a combination of activities and approaches including field work (including live insect handling), and laboratory work (including entomological identification, insect dissections). Students must be comfortable working in the field and handling dead and live insects.

Especificaciones extra de la institución de acogida (si procede) / Additional specifications of the host institution (if applicable)

Rothamsted Research is the oldest Agricultural research station in the world. Rothasmted is a world-leading, non-profit research centre that focuses on strategic agricultural science to the benefit of farmers and society worldwide. We provide a modern dynamic working environment and actively support and encourage diversity and equality.

Disponibilidad para evaluar informes de covalidación de créditos (Si/No) / Availability to evaluate credit covalidation reports (Yes / No)

No

Otra información relevante / Any additional important information

Project summary:

Oilseed rape (OSR) is an important source of cooking and biofuel oils. However, loss of control options for cabbage stem flea beetle (CSFB; Psylliodes chrysocephala) pests has led to a decline in the area grown leading to the need for less sustainable imports. Without new approaches to CSFB control there is a serious risk to the UK OSR industry. Cultivars more tolerant to larval infestation and pest regulation by parasitic wasps (the natural enemies of CSFB) may offer a solution to combat CSFB in a sustainable and efficient way.

The aim of this study is to better understand the intra-specific competition of CSFB larvae; how the number and size of larvae can affect host location and selection by parasitic wasps. The studentship will:

1. Explore how larval infestation of OSR development affects host plant performance (yield).
2. Understand the effects of intraspecific competition between CSFB larvae on larval development by recording their larval stage and measuring their weight.
3. Study the host preferences of parasitoids of CSFB in relation to plant cultivar, growth stage, larval stage, and larval density.

Nombre y apellidos del Supervisor / Name and surname of the Supervisor

Natalia Jimenez Moreno/ Simon Wilkinson's lab

Afiliación del supervisor y Enlace a afiliación / Supervisor affiliation and Affiliation link

Postdoctoral research associate at University of Edinburgh in Simon Wilkinson's lab (https://www.research.ed.ac.uk/en/persons/natalia-jimenez-moreno; https://www.ed.ac.uk/cancer-centre/research/wilkinson-group)

Título del Proyecto/ Project Title:
Regulation of the degradation of the endoplasmic reticulum by autophagy (ER-phagy) in cancer

Perfil preferencial del estudiante/ Preferentially master student from molecular biomedicine or cellular biology or final year undergraduate student from biochemistry or similar áreas.

Fechas orientativas/Available Dates: August- December

Programa/ Detailed program of the traineeship period

To ensure an optimal function, the endoplasmic reticulum (ER) is subject to turnover and remodelling. To maintain ER homeostasis, ER is removed by a selective form of autophagy, known as ER-phagy, which is emerging as a fundamental pathway in the maintenance of cellular health. In 2018, CCPG1 was identified as an ER-phagy receptor by this lab however the molecular regulation of this protein in this process is unknown. The student's project will focus on understanding how the ER-phagy receptor gets activated and how its activity is regulated in pancreatic cancer cells. During the first part of the traineeship the student will be taught about this process and they will first recapitulate some of the preliminary results from the lab and then study CCPG1 activity using a range of techniques including tissue culture, live imaging, immunofluorescence, immunoprecipitation, immunoblotting and molecular cloning to overall understand better the ER-phagy pathway.

Competencias a adquirir por parte del estudiante/ Knowledge, skills and competences to be acquired by the trainee at the end of the traineeship (expected Learning Outcomes)

By the end of the traineeship the student will increase their knowledge on cellular biology and biomedicine, particularly in the field of proteostasis, autophagy and cancer. On the other hand, they will increase their practical skills in the laboratory with a range of different techniques. In addition, they would be able to generate hypothesis, design experiments and present their data to a specialised audience.

Seguimiento/ Monitoring Plan
The student will be daily supervised by me and weekly supervised by the principal investigator. In addition, all data would be required to be stored in the laboratory's datastore and a summary of the results and conclusions included alongside.

Evaluación/ Evaluation plan

They will have the opportunity to present their data in lab meetings with other groups from the institute.

Conocimientos técnicos o experiencia requerida (si procede) / Technical knowledge or experience required (if applicable)
Background in celular biology is required and some technical knowledge in tissue culture is recommended.

Especificaciones extra de la institución de acogida (si procede) / Additional specifications of the host institution (if applicable)

If considered visiting students (e.g. ERASMUS+), VISA information would be shared by the University of Edinburgh. Student can contact the immigration university department via this link: https://www.ed.ac.uk/student-administration/immigration/contact-us

As a general rule, this is the information shared by the immigration deparment regarding visiting students:

Visiting Students:

Those coming to the University to undertake a short course or undergo research, related to study at their home institution must be registered at the University in accordance with the Visiting and Non-Graduating Student Policy.

Periods of research related to a student's studies in their home country are considered to be 'study', rather than 'work'. This is an important distinction for immigration purposes.

In most cases, students who are coming to the University for less than 6 months will require a standard visitor visa.

Visiting students will need a letter of invitation to apply for a standard visitor visa.

We have information regarding immigration for visiting student on our staff page at: University of Edinburgh

Visiting student – Visit visa: https://www.ed.ac.uk/student-administration/immigration/tier-4-staff/visitors-and-visiting-students/short-term-students

Visa information page: https://www.gov.uk/standard-visitor

Disponibilidad para evaluar informes de covalidación de créditos (Si/No) / Availability to evaluate credit covalidation reports (Yes / No)

Yes

Otra información relevante / Any additional important Information

Proyecto RU-8

Nombre y apellidos del Supervisor / Name and surname of the Supervisor
Dr Maria Dimitriadi

Afiliación del supervisor y Enlace a afiliación / Supervisor affiliation and Affiliation link
University of Hertfordshire
School of Life and Medical Sciences
Clinical, Pharmaceutical & Biological Science
https://www.herts.ac.uk/

Título del Proyecto/ Project Title
Elucidating the cellular and molecular mechanisms underlying Spinal Muscular Atrophy: insights from the nematode *Caenorhabditis elegans*

Perfil preferencial del estudiante
Excellent technical skills. hard working, passion for research, be able to stay for 6 months in total.

Fechas orientativas/Available Dates
1st of June 2024 to 31st of December 2024 (6 months is required for project completion).
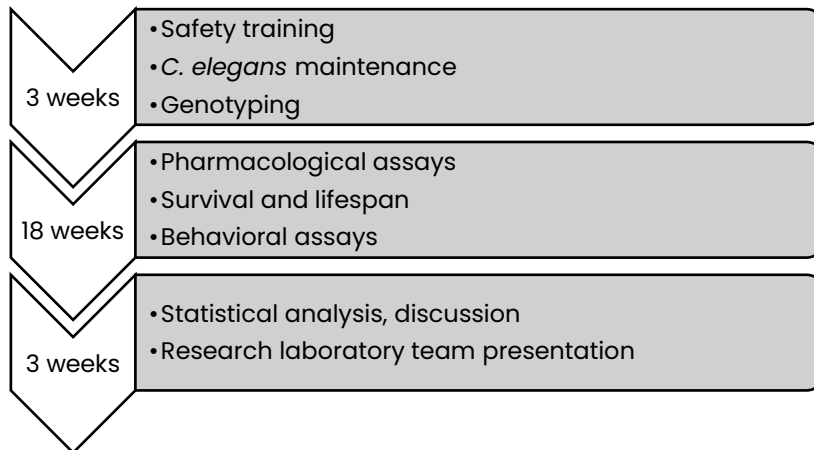
Programa/ Detailed program of the traineeship period
We are interested in the cellular and molecular pathways that underlie the devastating motor neuron disorder Spinal Muscular Atrophy. In the Dimitriadi lab we use the nematode *Caenorhabditis elegans* and a range of pharmacological, genetic and behavioural assays to elucidate disease pathogenesis. The student will be able to choose among different projects that are perturbed in the *C. elegans* SMA model with the ultimate goal to identify the key pathways that are needed to spearhead further therapeutic avenues for SMA treatment options.

Competencias a adquirir por parte del estudiante/ Knowledge, skills and competences to be acquired by the trainee at the end of the traineeship (expected Learning Outcomes)

- Health and safety training in research laboratories focusing on molecular biology, genetics and microbiology.
- Training on a range of techniques encompassing *C. elegans* maintenance, DNA extraction, PCR-genotyping, pharmacological, behavioural and genetic epistasis assays as well as statistical analysis.
- The student will gain a valuable experience working with *C. elegans* as a motor neuron disease model incorporating the principals of the 3Rs and deepening their critical thinking on the molecular pathways involved in the aforementioned disorder.
- The participation at weekly lab and journal club meetings will provide the student with an excellent opportunity to master their communication skills and divulgate complex ideas in a clear and tidy manner, while developing fluency in an international language.

Seguimiento/ Monitoring Plan

3 weeks	• Safety training • *C. elegans* maintenance • Genotyping
18 weeks	• Pharmacological assays • Survival and lifespan • Behavioral assays
3 weeks	• Statistical analysis, discussion • Research laboratory team presentation

Evaluación/ Evaluation plan
Towards the end of their internship, the student will present their projects aims, objectives and results obtained in a research lab meeting; feedback and final evaluation would be provided.

Conocimientos técnicos o experiencia requerida (si procede) / Technical knowledge or experience required (if applicable)
Excellent technical and analytical skills, great organisation skills

Especificaciones extra de la institución de acogida (si procede) / Additional specifications of the host institution (if applicable) n/a

Disponibilidad para evaluar informes de covalidación de créditos (Si/No) / Availability to evaluate credit covalidation reports Yes

Otra información relevante / Any additional important information
n/a

Nombre y apellidos del Supervisor / Name and surname of the Supervisor

Isabel Douterelo Soler

Afiliación del supervisor y Enlace a afiliación / Supervisor affiliation and Affiliation link

The University of Sheffield, Civil and Structural Engineering
/https://www.sheffield.ac.uk/civil/people/academic/isabel-douterelo-soler

Título del Proyecto/ Project Title

Investigating microbial pollution in freshwater ecosystems

Perfil preferencial del estudiante

1. Qualifications: BSc/Msc in Biological or Environmental Sciences.

2. Have knowledge of molecular biology, including basic laboratory skills

3. Knowledge and/or be willing to analyse data using bioinformatics tool is necessary.

Fechas orientativas/

June-September 2024

Programa/ Detailed program of the traineeship period

The objective of the research is to advance understanding on the impact of faecal pollution in freshwater ecosystems (environmental and public health). The student will learn how to monitor microorganisms in freshwater ecosystems using a range of molecular methods including DNA sequencing, Quantitative Polymerase Chain Reaction (q-PCR) and metagenomics. Samples obtained from freshwater ecosystems will be analysed using molecular methods to understand the impact of faecal pollution in these ecosystems. The influence of different environmental factors on the microbial ecology and subsequently on water quality and safety will be assessed by monitoring physicochemical parameters (e.g. chlorine, pH, temperature, conductivity, etc). After collection of samples, DNA will be extracted, and different molecular methods used to characterise the samples including DNA sequencing and qPCR. After sequencing, samples will be analysed using a range of bioinformatics tools including the study of microbial diversity (alpha and beta diversity) and patterns of species co-occurrence.

Competencias a adquirir por parte del estudiante/ Knowledge, skills and competences to be acquired by the trainee at the end of the traineeship (expected Learning Outcomes)

The student will learn about microbial risks and management of freshwater ecosystem in response to pollution. The student will gain fieldwork skills and learn how to monitor physico-chemical parameters in freshwater ecosystems. It will also learn laboratory skills, particularly in microbiology and genetics (DNA extractions from environmental samples, sequencing) and

bioinformatics. The student will also gain skills on how to analyse biological and physico-chemical data, statistics and scientific report writing.

Seguimiento/ Monitoring Plan

Regular Meetings: 1-hour weekly meetings with UK supervisor and project collaborators.
Scientific Report: At the end of the studentship, the student will write a report formatted as a scientific paper.

Evaluación/ Evaluation plan

The student will present her/his research at the Sheffield Water Centre at the University of Sheffield and the group will give feedback on the presentation. The supervisor in the UK will evaluate the scientific report written by the student and this will be subject to corrections.

Conocimientos técnicos o experiencia requerida (si procede) / Technical knowledge or experience required (if applicable)

Experience in molecular methods (e.g. DNA extractions, PCR).

Especificaciones extra de la institución de acogida (si procede) / Additional specifications of **the host institution (if applicable)**

No

Disponibilidad para evaluar informes de covalidación de créditos (Si/No) / Availability to evaluate credit covalidation reports (Yes / No)

Yes

Otra información relevante / Any additional important information

Proyecto RU-10

Nombre y apellidos del Supervisor / Name and surname of the Supervisor

Dr. Magda Pascual-Borràs

Afiliación del supervisor y Enlace a afiliación / Supervisor affiliation and Affiliation link

Senior Research Associate

Título del Proyecto/ Project Title

Mechanochemical Approach to Electron-rich Polyoxometalates

Perfil preferencial del estudiante

Chemistry

Fechas orientativas/Available Dates

June-July or September-December

Programa/ Detailed program of the traineeship period

Polyoxometalates (POMs) often called 'electron/ion sponges' represent ideal candidates for molecular electron reservoirs due to their ability to **reversibility accept** multiple **electrons**, making them excellent models to study mechanisms of electrochemical nature. However, their multielectron reduction gives rise to intricate physical-chemical phenomena that must be fully understood for their future use in energy-storage devices.

Using **mechanochemistry**, which refers unusual chemical reactions induced by mechanical energy at room temperature, we have been able to **inject electrons** into POMs and synthesise these **electron-rich molecular oxides**. The student will explore the step-wise mechanochemical reduction of the different polyoxotungstates and polyoxomolybdates in order to provide better fundamental understanding of the reactivity and the **electronic properties** of the resulting electron-rich nanoscale metal oxides.

The resulting products of the reductions will be analysed by **state of art characterisation** techniques available at Newcastle University, which will include Nuclear Magnetic Resonance (NMR), Infrared Spectroscopy (FTIR), Xray Photoelectron Spectroscopy (XPS), electrochemical and computational methods in order to investigate the formation of 'super-reduced' POMs. These fundamental results benefit the way for **applications** using the massive **electron-storage** properties of POMs.

Competencias a adquirir por parte del estudiante/ Knowledge, skills and competences to be acquired by the trainee at the end of the traineeship (expected Learning Outcomes)

The student will be able to work in a **synthetic laboratory** and experience a day-to-day research laboratory. The student will acquire experience in working with **air-sensitive techniques** (Schleck-type and globe boxes) and learn how to interpret results that will be obtaining from the **characterisation techniques** used for analysing the different compounds (which were mentioned above). The student will also learn how to **organise** a day in a research laboratory. Moreover, the student will improve **English communication** skills as well as **teamwork**.

Seguimiento/ Monitoring Plan

The student will be **introduced** to the different **techniques** that we use day to day in the laboratory during the first days of the project where we will explain everything what he/she will need in order to develop the project. After that, she/he will be able to **work independently** having 1 or 2 **meeting**s a week in order to organise the next experiments. I will be working at the same laboratory so I will be **available for questions** or supervision that he/she will need during the studenship.

Evaluación/ Evaluation plan

I will take into account how the student **works independently** in the laboratory, **interpretation** of the **results** and her/his **interest** in the project. Also, if the student is able to propose **new ideas** for developing the project and the **final report**.

Conocimientos técnicos o experiencia requerida (si procede) / Technical knowledge or experience required (if applicable)

No experience is needed. However, interest in inorganic chemistry is required.

Especificaciones extra de la institución de acogida (si procede) / Additional specifications of the host institution (if applicable)

Disponibilidad para evaluar informes de covalidación de créditos (Si/No) / Availability to evaluate credit covalidation reports (Yes / No)

Si

Otra información relevante / Any additional important information

N