2025

Erasmus+

CONVOCATORIA DE PRÁCTICAS INTERNACIONALES

Convenio UAM/CEBE (Bélgica)

Convenio UAM/CED (Dinamarca)

Convenio UAM/CERFA (Alemania)

Convenio UAM/CERU (Reino Unido)

Convenio UAM/SRSI (Irlanda)

Facultad de Ciencias
Universidad Autónoma de Madrid

CONVOCATORIA DE PRÁCTICAS INTERNACIONALES

Plazo de presentación de solicitudes: del <mark>11 de febrero al 26 de febrero de 2025.</mark>

Se ofertan un total de 57 estancias de prácticas en los siguientes destinos:

Convenio UAM/CERFA 2024: se ofertan 8 estancias de prácticas para movilidades con destino Alemania.

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

Convenio UAM/CEBE 2024: se ofertan 18 estancias de prácticas para movilidades con destino Bélgica.

Convenio UAM/CED 2024: se ofertan 15 estancias de prácticas para movilidades con destino Dinamarca.

Convenio UAM/CERU 2024: se oferta 14 estancias de prácticas para movilidades con destino Reino Unido.

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/CED, UAM/CEBE, UAM/SRSI 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.

Las fechas y duración propuestas de estancia son orientativas.

PRÁCTICAS EN ALEMANIA CONVENIO UAM-CERFA

Número de Proyecto	Supervisor	Área de Conocimiento	Lugar de realización	Número de plazas
AL-1	**Maite Ogueta Gutierrez**	Biology	**Münster**	1
AL-2	**Silvia Vega-Rubin-de-Celis**	Biochemistry, Biology	**Essen**	1
AL-3	**Maria Villoro Agud**	Biology, Biochemistry	**Berlin**	1
AL-4	**Maite Aguado Molina**	Biology	**Göttingen**	1
AL-5	**Juan J. Navarro**	Physics, Chemistry	**Berlin**	1
AL-6	**Borja Ferrero Bordera**	Biology, Biochemistry, Environmental Science	**Munich**	1
AL-7	**María H. Toyos Simón**	Environmental Science, Chemistry, Biology, Biochemistry.	**Bremen**	1
AL-8	**Carlos Guillén Posteguillo**	Chemistry (Electrochemistry)	**Berlin**	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: *GABAergic neurons and their role in the regulation of the circadian clock of the fruit fly*

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
Institute for Neuro and Behavioral Biology
University of Münster http://stanewsky.uni-muenster.de/team-members
http://stanewsky.uni-muenster.de

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

Perfil preferencial del estudiante
Biology student

Fechas orientativas/Available Dates
01.06.2025 - 30.09.2025

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)
None.

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

None.

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
Students will benefit from the *"Ayudas Traineeship CERFA"* consisting of 500 € and a career development course.

Proyecto AL-2: *The role of autophagy in cancer*

Nombre y apellidos del Supervisor / Name and surname of the Supervisor
Silvia Vega-Rubin-de-Celis

Afiliación del supervisor y Enlace a afiliación / Supervisor affiliation and Affiliation link
Institut für Zellbiologie (Tumorforschung)
University Hospital Essen
https://zellbiologie.uk-essen.de/autophagie-bei-krebs/

Título del Proyecto/ Project Title
The role of autophagy in cancer

Perfil preferencial del estudiante
Master of Biochemistry/Biology

Fechas orientativas/Available Dates
01.06.2025 - 30.09.2025

Programa/ Detailed program of the traineeship period
The "Autophagy in cancer" group focuses on studying the role of autophagy in different tumor types. We aim to understand the role of autophagy in cancer and exploring the use of autophagy-modulating drugs as potential therapeutic targets. We pursue a variety of approaches, from understanding basic molecular biological mechanisms in cell lines and patient samples to translating the results into the clinic.
Within the proposed project, a potential new therapeutic agent will be tested in several cancer cell lines and the effects will be characterized based on large-scale proteomics and phospho-proteomics data as well as RNASeq analysis. Identification of potential targets is expected, followed by in detail validation in vitro.

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)

Cell culture of mammalian cell lines, cell viability and proliferation assays, drug treatments, protein analysis (western blot, immunoprecipitation), microscopy studies, autophagy flux monitoring, experiment design and data interpretation.

Seguimiento/ Monitoring Plan
Daily direct supervision of the trainee until sufficient capacity and independence is achieved to operate with minimal supervision. Thereafter, regular meetings, at least once a week, and whenever necessary to discuss about data analysis, interpretation and problem solving.

Evaluación/ Evaluation plan
Trainee evaluation will be assessed weekly not only based on results but also in data interpretation, new skills acquired as well as data presentation.

Conocimientos técnicos o experiencia requerida (si procede) / Technical knowledge or experience required (if applicable)
Basic laboratory experience is required/desirable.

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

Enrolment as an intern at the University Hospital Essen is required, and as a lab member in the laboratory of Autophagy in Cancer.

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
Students will benefit from the *"Ayudas Traineeship CERFA"* consisting of 500 € and a career development course.

Proyecto AL-3: *Validation of Cancer Metabolic Genes as Modulators of Immune Evasion*

Nombre y apellidos del Supervisor / Name and surname of the Supervisor
Maria Villoro Agud

Afiliación del supervisor y Enlace a afiliación / Supervisor affiliation and Affiliation link
Department of Hematology, Oncology and Cancer Immunology at
Charité Universitätsmedizin Berlin, Berlin, Germany
https://dktk.dkfz.de/forschung/dktk-wissenschaftler/arbeitsgruppe-martinez-reyes

Título del Proyecto/ Project Title
Validation of Cancer Metabolic Genes as Modulators of Immune Evasion

Perfil preferencial del estudiante
Bachelor or master students with subjects related to cancer and immunology.

Fechas orientativas/Available Dates
01.06.2025 - 01.09.2025

Programa/ Detailed program of the traineeship period
The trainee's program will focus on validating candidate genes from a prior CRISPR-Cas9 screen, which uncovered several genes involved in immune evasion during T-cell-mediated selective pressure. Validation will begin with Clone 4 cells, a mouse gastric carcinoma-derived cell line expressing SV40 large T antigen (Tag) and firefly luciferase (Luc) as a fusion protein (TagLuc). TagLuc functions as a cancer driver, tumor-specific antigen, and reporter for bioluminescence imaging. The expression of the oncogene is inducible by doxycycline and serves as a model for tumor-specific antigen presentation. The trainee will also validate candidate genes in human melanoma cell lines expressing clinically relevant antigens, such as Melanoma-associated antigen gene-A1 (MAGE-A1) or mutant isoforms of the melanoma neoantigen cyclin-dependent kinase 4 (CDK4) (e.g., SKMEL-29.1, WM-902B).
The trainee's primary task will be to use CRISPR/Cas9 to knockout the identified gene of interest in both murine and human cancer cell lines. These modifications will be validated using sequencing and western blotting. To assess the impact on immune response, the modified cell lines will be co-cultured with antigen-specific T cells (e.g., TCR-I CD8 T cells for Clone 4 cells, or other TCR-specific T-cell for MAGE-A1 and CDK4 antigens). Key analyses will include flow cytometry (FACS) to evaluate T-cell activation, antigen presentation, cytokine production, and cell viability assays to measure T-cell-mediated cytotoxicity (killing efficiency).
This research will help elucidate how the identified gene regulates immune evasion in cancer cells and contribute to understanding its potential role as a target to improve the efficacy of cancer immunotherapies.

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 deepen their knowledge of cancer immunology, immunometabolism, and the role of metabolic genes in immune evasion. They will acquire hands-on experience with CRISPR-Cas9 gene editing techniques, cell culture, flow cytometry (FACS) for immune cell analysis, cytokine detection, and cell viability assays. The trainee will also

improve their scientific communication by presenting data at regular lab meetings and contributing to progress reports.

Seguimiento/ Monitoring Plan
The trainee will work closely with the supervisor during the first few weeks to learn the experimental procedures. From the fourth week onward, weekly meetings will be held to monitor progress and address challenges. Students are encouraged to approach the supervisor with questions on a daily basis as well. The trainee will present their findings at the midpoint and end of the traineeship. Additionally, weekly group meetings will allow for ongoing discussions, where the trainee will receive feedback on experimental design, troubleshooting, and data interpretation.

Evaluación/ Evaluation plan
The trainee will be evaluated on their ability to perform and troubleshoot experiments, analyze data, and interpret findings. Performance will also be assessed based on their initiative in solving problems, collaboration with the team, and adaptability to research challenges. Communication skills will be evaluated through progress reports and presentations during lab meetings. The trainee's motivation, interest in the project, and active participation in scientific discussions will also be key factors in the final evaluation.

Conocimientos técnicos o experiencia requerida (si procede) / Technical knowledge or experience required (if applicable)
Skills for basic cell culture, CRISPR and FACS analysis experience is preferred but not essential.

Especificaciones extra de la institución de acogida (si procede) / Additional specifications of the host institution (if applicable).
Enrolment document valid for the duration of the traineeship, copy of the student's ID, Erasmus contract for the student.

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
Students will benefit from the *"Ayudas Traineeship CERFA"* consisting of 500 € and a career development course.

Proyecto AL-4: *Unveiling Chromosomal Dynamics in Syllidae (Annelida): Adapting Cytogenetic Protocols to Explore Evolutionary Insights*

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
Animal Evolution and Biodiversity / Faculty of Biology and Psychology
Georg August University
https://www.uni-goettingen.de/de/dr.+maria+teresa+aguado+molina/623758.html
https://www.biodivmuseum.de

Título del Proyecto/ Project Title
Unveiling Chromosomal Dynamics in Syllidae (Annelida): Adapting Cytogenetic Protocols to Explore Evolutionary Insights

Perfil preferencial del estudiante
Bachelor or Master studens with knowledge in Zoology, cytology, genetics, developmental biology

Fechas orientativas/Available Dates
01.09.2025 - 01.11.2025

Programa/ Detailed program of the traineeship period
The traineeship will focus on implementing cytogenetic protocols to study chromosomal dynamics in Syllidae. The programme is structured over 8 weeks as follows:
- **Orientation and Training (Week 1):**
  The trainee will receive an introduction to the host institution, lab safety protocols, and key methodologies. They will undergo hands-on training in cytogenetic techniques, including specimen preparation, chromosome staining, and imaging, focusing on adapting methods previously successful in planarians.
- **Sample Collection and Preparation (Weeks 2–3):**
  The trainee will prepare Syllidae specimens from fresh samples. They will optimize fixation techniques, test various tissue preparation methods, and establish reliable chromosomal spreading protocols.
- **Chromosome Analysis (Weeks 4–6):**
  Using advanced microscopy, the trainee will stain chromosomes and acquire high-resolution images. Chromosome number, morphology, and potential duplication events will be analyzed. Comparative analyses will be conducted with existing cytogenetic data from other taxa to identify unique or shared evolutionary features.
- **Data Interpretation and Troubleshooting (Week 7):**
  The trainee will critically evaluate experimental outcomes, troubleshoot challenges, and refine techniques. They will discuss findings with the supervisor and lab team, interpreting results within an evolutionary framework.
- **Reporting and Dissemination (Week 8):**
  The trainee will compile results into a final report, prepare presentation materials, and deliver a seminar to the host team. They will also contribute to drafting a manuscript for potential publication if significant findings emerge.

Throughout the traineeship, regular meetings with the supervisor and team members will provide feedback and ensure alignment with the project's objectives while supporting the trainee's skill development and scientific understanding.

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 acquire expertise in cytogenetic techniques, including chromosome preparation and staining, and learn how to adapt protocols developed for planarians to Syllidae. He/she will develop skills in microscopy, image analysis, and data interpretation to identify and quantify chromosomal features. Additionally, she/he will gain insights into polyploidy and chromosomal duplication in annelids, enhancing their understanding of evolutionary biology. The project will also strengthen her/his ability to design and execute experiments, analyze results critically, and communicate findings effectively through scientific presentations and reports. These competencies will contribute to her/his academic and professional development in evolutionary and molecular biology.

Seguimiento/ Monitoring Plan
The trainee's progress will be closely monitored through regular meetings with the supervisor to discuss experimental results, troubleshoot challenges, and refine techniques. Milestones, such as successful chromosome preparations or imaging, will be set to track progress. The trainee will also participate in laboratory meetings to present their work and receive feedback from peers. A mid-term evaluation will ensure alignment with project goals, while the supervisor will provide hands-on guidance during key experimental steps to ensure proper protocol execution and learning.

Evaluación/ Evaluation plan
The trainee's performance will be evaluated based on her/his ability to achieve the project's scientific objectives, including successful application of cytogenetic protocols to Syllidae and the quality of chromosome preparations and analyses. Deliverables, such as a final report and oral presentation of results, will assess their understanding of the research topic and ability to communicate findings. Regular assessments during meetings and feedback on progress reports will provide ongoing evaluation. Key metrics include technical proficiency, problem-solving skills, and scientific rigor. A formal evaluation at the end of the traineeship will summarize achievements and provide constructive feedback for future development.

Conocimientos técnicos o experiencia requerida (si procede) / Technical knowledge or experience required (if applicable)
For this traineeship, the student should ideally have the following specific expertise and technical knowledge:
- ➢ Basic Cytogenetics Knowledge
    - Understanding of chromosomes, ploidy, and chromosomal duplication.
    - Familiarity with basic cytogenetic techniques, such as fixation, staining, and microscopy.
- ➢ Laboratory Skills
    - Experience in handling biological specimens and working under sterile conditions.
    - Knowledge of histological or cytological sample preparation is desirable.
- ➢ Microscopy Proficiency
    - Basic experience in using light microscopes.
- ➢ Molecular Biology Background
    - Basic understanding of molecular and evolutionary biology, especially related to genome duplication or polyploidy.

- Familiarity with evolutionary principles in invertebrates.
- Problem-Solving Skills
  - An analytical mindset to troubleshoot and adapt protocols for Syllidae.
- Communication and Collaboration Skills
  - Ability to work in an international, interdisciplinary lab setting and discuss findings with peers and supervisors effectively.

While prior hands-on experience with annelids is not required, curiosity and a willingness to adapt to new model organisms will be crucial for success in this project.

Especificaciones extra de la institución de acogida (si procede) / Additional specifications of the host institution (if applicable).
None.

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
Students will benefit from the *"Ayudas Traineeship CERFA"* consisting of 500 € and a career development course.

Nombre y apellidos del Supervisor / Name and surname of the Supervisor
Juan J. Navarro

Afiliación del supervisor y Enlace a afiliación / Supervisor affiliation and Affiliation link
Interface Science Department
Fritz Haber Institute of the Max Planck Society / Technische Universität Berlin
https://www.fhi.mpg.de/1345380/Group11_Navarro_Emmy-Noether

Título del Proyecto/ Project Title
Automation of Single Crystal Surface Preparation for Electrochemical Reduction of CO2

Perfil preferencial del estudiante
3rd year student in Bachelor of Physics, Chemistry or Engineering, or Master student in a related field.

Fechas orientativas/Available Dates
01.06.2025 - 30.09.2025

Programa/ Detailed program of the traineeship period
The electrochemical reduction of CO_2 (CO2RR) is one of the most promising approaches to convert CO_2 into valuable products such as hydrocarbons and alcohols, thus closing the anthropogenic carbon cycle. However, low selectivity, high overpotentials and catalyst deactivation are still major obstacles that need to be overcome by rational catalyst design. In this context, single crystal surfaces can be used as model catalysts to gain an atomistic understanding of the active sites and to develop novel strategies to tune the catalytic properties. This project aims to optimize the preparation of single crystal surfaces and to investigate their properties as catalysts for CO2RR.
The single crystal surfaces will be prepared in an ultra-high vacuum (UHV) system combining sputtering with Ar+ ions and annealing. Although our protocols lead to atomically flat surfaces, the resulting surface is very sensitive to a few critical parameters, such as crystal temperature and Ar partial pressures. In addition, this procedure is very time consuming for the investigator. Therefore, it is highly desirable to automate the preparation protocol. In particular, the student will use the Experimental Physics and Industrial Control System (EPICS), a software tool for experiment automation, to develop a program to control all the devices involved in the preparation. The UHV system is also equipped with Low Energy Electron Diffraction (LEED) and Auger Electron Spectroscopy (AES), characterization techniques that allow the study of the atomic structure and chemical composition of the surface, respectively.
Finally, the performance of the prepared single crystal surfaces as catalysts for CO2RR will be tested. This part of the project will be performed in an electrochemical workstation equipped with a single crystal adapted electrochemical cell, a potentiostat and a gas chromatograph.

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 become familiar with UHV techniques, learn how to characterize structural and chemical properties of single crystal surfaces, and acquire or extend knowledge in surface science and solid state physics. One of the main competencies to be acquired is the management of a complex experimental facility. In particular, the

student will develop different skills to automate processes, which implies the use of EPICS and general coding to control data acquisition, communication between instruments and to create a user-friendly interface. The student will be introduced to the field of electrocatalysis by testing the prepared samples for CO2RR.

Seguimiento/ Monitoring Plan
The scientific supervisor and a PhD student from his group will guide and help the trainee through the project. One of them will always be present during the trainee's work. In addition, the project will also be supported by the IT department of the Fritz Haber Institute and the technicians of the Interface Science Department.

Evaluación/ Evaluation plan
The success of the project will be evaluated according to the achieved objectives, which can be summarized in: 1) Preparation and characterization of single crystal surfaces with UHV techniques; 2) Automation of single crystal surface preparation; 3) Test of single crystal surface as a catalyst for CO2RR

Conocimientos técnicos o experiencia requerida (si procede) / Technical knowledge or experience required (if applicable)
Physics, Chemistry, Programming (Python, Matlab, C++, etc.)

Especificaciones extra de la institución de acogida (si procede) / Additional specifications of the host institution (if applicable).
None.

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
Students will benefit from the *"Ayudas Traineeship CERFA"* consisting of 500 € and a career development course.

Proyecto AL-6: *Investigating the Molecular Clock of Soil Bacteria*

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
Institute of Medical Psychology, Faculty of Medicine
LMU Munich
https://www.imp.med.uni-muenchen.de/members/mitarbeiter/ferrero-borja/index.html

Título del Proyecto/ Project Title
Investigating the Molecular Clock of Soil Bacteria

Perfil preferencial del estudiante
Master student or Bachelor student after 3rd year.

Fechas orientativas/Available Dates
01.09.2025 – 31.01.2026

Programa/ Detailed program of the traineeship period
Until recently, non-photosynthetic bacteria were thought to lack an internal clock—our lab challenged this view by discovering that circadian gene expression in *Bacillus subtilis,* a model gram-positive bacterium broadly used for research and biotechnology. We are now uncovering the molecular mechanisms behind this novel bacterial clock. To support this research, we offer a five-month traineeship designed to provide hands-on experience in microbiology and molecular biology.
The program begins with a foundational month where trainees receive a comprehensive introduction to laboratory research, including microbiological techniques, molecular biology methods such as DNA extraction, PCR, and gene cloning, as well as lab safety and team dynamics. In the second month, these skills are applied to bridge microbiology methods with circadian approaches, alongside training in data analysis. The third month focuses on advanced techniques, including fluorescence microscopy and fermenter cultivations, enabling biofilm imaging and the continuous study of microbial physiology in long-term cultivations. A mid-term review provides feedback and an opportunity to refine research goals. As the internship progresses, trainees further develop their experimental skills while also improving their communication abilities through data presentation and scientific discussions. The program concludes with a final project presentation and an evaluation that includes performance feedback and potential research directions.
This traineeship offers a unique opportunity to explore the emerging field of bacterial chronobiology while gaining valuable laboratory experience in a dynamic and supportive environment. With a flexible structure that allows for individualized learning, participants can develop their skills while contributing to groundbreaking research.

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 a 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).
None.

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
Students will benefit from the *"Ayudas Traineeship CERFA"* consisting of 500 € and a career development course.

Proyecto AL-7: *Investigating Earth's Climate System Variables in a Warmer-Than-Present World Using Biogeochemical Indicators in Marine Sediments*

Nombre y apellidos del Supervisor / Name and surname of the Supervisor
María H. Toyos Simón

Afiliación del supervisor y Enlace a afiliación / Supervisor affiliation and Affiliation link
MARUM - Center for Marine Environmental Sciences, and Faculty of Geosciences
University of Bremen
https://www.marum.de

Título del Proyecto/ Project Title
Investigating Earth's Climate System Variables in a Warmer-Than-Present World Using Biogeochemical Indicators in Marine Sediments.

Perfil preferencial del estudiante
Bachelor's students who have ideally completed at least half of their respective degree programs in Environmental Science, Chemistry, Biology or Biochemistry.

Fechas orientativas/Available Dates
01.09.2025 – 01.12.2025

Programa/ Detailed program of the traineeship period
Climate and ocean change represent urgent societal challenges, particularly understanding how these systems respond to rising greenhouse gas levels. The geologic record provides critical insights into past climate transitions, including the Oligocene-Miocene transition (~23 million years ago), characterized by a significant temperature drop, Antarctic Ice Sheet expansion, and global shifts in ocean currents and atmospheric circulation. These changes had profound impacts on biodiversity and climate feedback mechanisms.

Marine sediment cores serve as invaluable archives of Earth's past climate. Layers of sediment deposited on the seafloor preserve microfossils, algae, and geochemical signals, offering a window into environmental conditions at the time of their formation. By analyzing proxies such as Mg/Ca ratios, stable isotopes, and Total Organic Carbon (TOC), scientists reconstruct ocean temperature, ice volume, CO_2 levels, and water circulation patterns.

The primary goal of this internship is to investigate Oligocene and Miocene climate conditions in the Tropical Atlantic using sediment samples from the MSM116 expedition. The work will focus on proxies to address unresolved questions about ocean temperature evolution, CO_2 concentrations, and circulation patterns.

Planned Activities

- **Weeks 1-2:** Orientation, lab tours with safety training, project planning, sample washing, and preparation.
- **Weeks 3-4:** Identification of foraminifera species; picking and preparing samples for Mg/Ca and stable isotope analyses.
- **Weeks 5-7:** Automated sample preparation for Mg/Ca measurements.
- **Week 8:** Preparation and measurement of Total Organic Carbon samples.
- **Week 9:** Machine lab tours (Stable Isotope Laboratory and sediment geochemistry lab).
- **Weeks 10-12:** Data analysis, interpretation, and preparation of the final presentation.

This traineeship provides practical laboratory experience, data interpretation skills, and collaboration within a multidisciplinary research environment.

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 receive practical laboratory training, including sample preparation, application of diverse protocols, and troubleshooting. He or she will develop skills in data interpretation and gain experience collaborating in a multidisciplinary, international team. The internship will enhance the student's ability to effectively present research findings and improve their English and German language skills. Additionally, the internship will enhance the student's understanding of Earth's past climate variables and their relevance to the current context of climate change.

Seguimiento/ Monitoring Plan
The monitoring plan will include weekly meetings to review the student's progress, provide feedback, and align the project with their interests. Additional sessions will be scheduled as needed to coordinate with other personnel or scientists for specialized training, such as safety protocols, laboratory techniques, or computer skills necessary for the work.

Evaluación/ Evaluation plan
The evaluation will consist of a brief presentation to the working group, during which the student will discuss the scientific results obtained during their research stay and their implications. The presentation will conclude with a summary of how the traineeship has impacted and benefited the student's professional and personal development.
Prior to the presentation, the student is encouraged to discuss its structure during the weekly monitoring meeting with the scientific supervisor or other working group members at any time.

Conocimientos técnicos o experiencia requerida (si procede) / Technical knowledge or experience required (if applicable)
No prior technical knowledge is required, as we will provide comprehensive training in all necessary techniques and protocols during the internship. However, we are looking for a student who is enthusiastic about laboratory work, possesses a strong interest in scientific inquiry, and approaches learning with curiosity and initiative. Such traits will help the student fully engage with the research and make meaningful contributions to the project.

Especificaciones extra de la institución de acogida (si procede) / Additional specifications of the host institution (if applicable).
The University of Bremen requires the signature of a Learning Agreement with the Spanish University under the Erasmus + Program.

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
Students will benefit from the *"Ayudas Traineeship CERFA"* consisting of 500 € and a career development course.

Proyecto AL-8: Determination of the Effect of Organic Additives in Industrial Cu Electrolytes Utilized for Plating in Electronic and Semiconductor Devices

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
Electrochemistry Group
MKS-Atotech
Atotech - Leading Plating Technologies   https://www.atotech.com/

Título del Proyecto/ Project Title
Determination of the Effect of Organic Additives in Industrial Cu Electrolytes Utilized for Plating in Electronic and Semiconductor Devices

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. We would prefer a master of bachelor student who wants to do their curricular practicum of 3 months in our company during the summer time, so the time employed in our company helps them to complete their academic degree.

Fechas orientativas/Available Dates
01.06.2025 – 31.08.2025

Programa/ Detailed program of the traineeship period
New technologies require of ever more complex and small electronic and semiconductor devices, e.g. chips and microchips. Many crucial steps for their production involve Cu electrodeposition. Cu is the preferred electronic conductor for printed circuit boards (PCBs), interconnects (IC), and chip metallization thanks to its high electronic and heat conductance.

To perform a successful Cu electrodeposition in very tiny and complex structures, like those found in electronics and semiconductors, are necessary, not only an acidic Cu electrolyte based on inorganic compounds such as the metal source (metal source $CuSO_4$), H_2SO_4 or chloride ions. But also organic additives (like inhibitors and accelerators) that are essential to obtain good results. To achieve those results in complex structures like vias, holes or liners, ranging sometimes from mm to nm of size, is essential to find the right ratio concentrations of organic molecules. The formulas must consider the different nature of the additives and their physico-chemical behaviour, e.g. adsorption and co-adsorption, diffusion in the electrolyte depending on convective conditions, etc. In fact, the performance of any Cu electrolyte and, thus, the final plating process, greatly depends on the interaction between the different additives used, rather than from the action mechanism of single additives alone.

In industry, before scaling up the use of additives in a plating process, it is essential their study at a smaller scale in the lab. It is fundamental an investigation to predict, and maybe even understand, how they behave in electroplating because many are unstable in the electrolytes or under the plating conditions. This proposed project aims at screening a new set of additives to determine their convenience to be used in different plating processes. Those showing more promising results could be then tested at a larger industrial scale.

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 to work in an international enterprise.
1. Participation in scientific discussions about experimental results and next steps.
2. Familiarisation with the software Origin for the presentation of scientific data.
3. Development of presentation skills, including the use of English.
4. Familiarisation with electrochemical software (Nova from Metrohm): learn how to write and run a Nova script.
5. High throughput screening with an automated measurement system.
6. Acquisition of the health and safety culture of a chemical company.

Seguimiento/ Monitoring Plan

The trainee will be under the supervision of the host, Carlos Guillén Posteguillo, who will introduce him/her into the workflow of the ED Group and his/her project. She/he will be sharing the same office with the rest of the team for constant communication and support.

The student will present a summary of his/her work during the group meetings every Thursday. He/she will also collaborate with members of other group in the company, to whom may present his/her results. Besides, it will get involved in other routine tasks with the rest of the team, e.g tiding up the laboratory.

Evaluación/ Evaluation plan

The evaluation of the student will be continuous, mainly throughout the presentation of his/her work in different meetings, as previously stated.

She/he will write a very brief closing report, as usually done in the electrochemistry group when a project is completed.

If required, he/she should write the practicum report to obtain the corresponding ECTS credits, getting 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.

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/No) / Availability to evaluate credit covalidation reports (Yes / No)

Yes.

Otra información relevante / Any additional important information

Students will benefit from the *"Ayudas Traineeship CERFA"* consisting of 500 € and a career development course.

PRÁCTICAS EN IRLANDA CONVENIO UAM-SRSI

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

A continuación, aparece toda la información de esta oferta

CONVENIO UAM/SRSI 2024 – DESTINO IRLANDA

Proyecto IR-1: Citometría de Flujo.

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
UCD Conway Flow Cytometry Core, University College Dublin
https://www.ucd.ie/conway/research/coretechnologies/flowcytometrycore/

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

Número de Proyecto	Supervisor	Área de Conocimiento	Lugar de realización	Número de plazas
BE1	Angel Miranda Vicario	Fisica, Ingeniería mecánica	Bruselas	1
BE2	Luis Diaz Allegue	Biology, Chemical engineering, Environmental engineering, Food science and technology	Amberes	1
BE3	Gerrit Beemster*	Biología	Amberes	1
BE4	Gerrit Beemster*	Biología	Amberes	1
BE5	Gerrit Beemster*	Biología	Amberes	1
BE6	Gerrit Beemster*	Biología	Amberes	1
BE7	Anchel de Jaime-Soguero	Bioquímica, Biología, Ingeniería biomédica	Bruselas	1
BE8	Ana María Barragán Montero	Ingeniería informática, Ingeniería informática y matemáticas, Física	Bruselas	1
BE9	Leticia Fernández Velasco	Química, Ingeniería Química	Bruselas	1
BE10	Leticia Fernández Velasco	Química, Ingeniería Química	Bruselas	1
BE11	Isidro Florenciano Cano	Ingeniería química, Química, Ingeniería mecánica, Física, Ingeniería eléctrica.	Lovaina	1
BE12	Ana Santos Coquillat	Bioquímica, Farmacia, Ingeniería Biomédica	Bruselas	1
BE13	Paloma Lozano Picazo	Bioquímica, Biología, Farmacia	Bruselas	1
BE14	Patricia Gutiérrez Lozano	Bioquímica, Ciencias Ambientales, Ingeniería Química	Amberes	1
BE15	Iris De Corte*	Biología, Bioquímica, Ciencias Ambientales, Ingeniería Química	Amberes	1
BE16	Iris De Corte*	Biología, Bioquímica, Ciencias Ambientales, Ingeniería Química	Amberes	1
BE17	Rubén del Olmo Martínez	Química, Ingeniería Aeroespacial e Ingeniería Mecánica	Bruselas	1
BE18	Elena Ramis Bravo	Biología, Bioquímica, Ingeniería Mecánica e Ingeniería Biomédica	Lovaina	1

*Gerrit Beemster e iris de Corte ofrecen varios proyectos diferentes

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

CONVENIO UAM/CEBE 2024 – DESTINO BÉLGICA

Proyecto BE-1: Sensored Armour for Vehicle Protection

Nombre y apellidos del Supervisor / Name and surname of the Supervisor:
Angel Miranda Vicario

Afiliación del supervisor y Enlace a afiliación / Supervisor affiliation and Affiliation link:
Dept Weapon Systems & Ballistics – Royal Military Academy

Título del Proyecto/ Project Title:
Sensored Armour for Vehicle Protection

Perfil preferencial del estudiante/Student Profile:
Student of Physics / Mechanical engineering. From a student about to elaborate his/her thesis (TFG) to a master student.

Fechas orientativas/Available Dates
01/09/2025 **to** 15/12/2025

Programa/ Detailed program of the traineeship period
Context: Sensored armour represents an innovative approach to vehicle protection that integrates sensor technologies with traditional and advanced armour systems. By embedding or pairing sensors within the armour layers, vehicles can actively monitor, detect, and respond to threats, enhancing survivability and operational effectiveness.
Role: Student will be part of the 3 years project, being an active part, helping to the development of the project at the stage of its arrival.
Approach: The student shall participate in the testing activities needed for developing the armour in collaboration with the laboratory technicians. Also the student shall participate in bibliographic research, analysis and interpretation of the results 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)

 It is expected that the trainee will benefit from professional development by:
-Testing standards and material behaviour, especially in the dynamic range,
- acquiring knowledge and expertise in the field of study,
- expanding his/her knowledge on hands-on-work in a lab,
- gaining expertise in the interpretation and discussion of results,
- learning how to work independently, in an international team and in the frame of a project,
- improving the knowledge of languages.

From a personal point of view, an additional goal of the traineeship would be to take advantage of the unique and enriching experience of living abroad.

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

First 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 propose the next activities. Student shall identify actions 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.
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
RMA might perform a security screening

Proyecto BE-2: PURPLEX: Microbial protein and pigment production for food applications using purple bacteria

Nombre y apellidos del Supervisor / Name and surname of the Supervisor:
Luis Diaz Allegue

Afiliación del supervisor y Enlace a afiliación / Supervisor affiliation and Affiliation link:
Department of Bioscience engineering. Faculty of Sciences. University of Antwerp
UAntwerpen – Campus Groenenborger
Groenenborgerlaan 171
2020 Antwerpen, Belgium
https://www.uantwerpen.be/en/research-groups/sustain/

Título del Proyecto/ Project Title:
PURPLEX: Microbial protein and pigment production for food applications using purple bacteria

Perfil preferencial del estudiante/Student Profile:
Biology, Chemical engineering, Environmental engineering, Food science and technology. Last year of Bachellor/Master's in Science

Fechas orientativas/Available Dates
TBD

Programa/ Detailed program of the traineeship period
The global demand for protein-rich products is projected to rise by 50% between 2000 and 2050. Conventional protein production methods are highly inefficient, resulting in significant nutrient losses throughout the fertilizer-to-food chain. An innovative alternative is microbial protein, which leverages microbial biomass—such as bacteria, yeast, and algae—as a sustainable protein source for food and animal feed. Among these, purple phototrophic bacteria (PPB) stand out as promising candidates. They can accumulate up to 60% of their biomass as protein and produce valuable carotenoid pigments, which offer antioxidant properties with potential health benefits.
PPB have the advantage of growing under versatile conditions, using organics or CO_2 as carbon sources, H_2 as electron source and light as energy source. They can contribute to a bio-circular economy in the future.
This project will align closely with ongoing research in the lab, focusing on bioreactor control, optimization of microbial growth, kinetics studies, and techno-economic analysis to assess the feasibility of large-scale PPB applications.

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 postdoc in the lab (Luis Diaz Allegue) and two PhD students (Naïm and Sara). 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.
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-3: *Growth-promoting endophytes in maize under drought stress conditions*

Nombre y apellidos del Supervisor / Name and surname of the Supervisor:
Gerrit Beemster

Afiliación del supervisor y Enlace a afiliación / Supervisor affiliation and Affiliation link:
Department of Biology / Faculty of Science / University of Antwerp
Laboratory for Integrated Molecular Plant Physiology Research (IMPRES)
Groenenborgerlaan 171
2020 Antwerp, Belgium
T +32 3 265 34 21 M +32 497 14 60 37 F +32 3 265 34 17
Website: https://www.uantwerpen.be/en/rg/impres/

Research Gate: https://www.researchgate.net/profile/Gerrit_Beemster

Título del Proyecto/ Project Title:
Growth-promoting endophytes in maize under drought stress conditions

Perfil preferencial del estudiante/Student Profile:
Biology, with level of MSc. Good level of English (at least B1)

Fechas orientativas/Available Dates
June 2025-December 2025

Programa/ Detailed program of the traineeship period
It Is Increasingly Clear That The Global Climate Shifts To More Extreme Precipitation Regimes (Prs) With Longer Alternating Wet And Dry Periods. In Recent Years, Such Conditions Had Great Impact On Crop Production And Ecosystem Performance. Despite Their Increasing Importance, The Effect Of More Extreme Prs On Plant Growth And Performance Is Rarely Investigated. Extreme Prs Are Novel Environmental Conditions To Which Plants Are Exposed And Yet We Do Not Understand How They Will Impact Growth And The Underlying Physiological And Molecular Processes.
We Will Perform A Systemic, Multi-Organisational Level Investigation On The Impact Of Extreme Prs On The Growth Of Maize Plants Exposed To A Range Of Realistic Extreme Prs. They Will Be Analysed At The Organism Level (Leaf Length, Biomass, Photosynthesis), At The Tissue/Cell Level (Cell Division And Expansion) And At The Molecular Level (Gene Expression, Metabolite Levels, Enzyme Activity). The Impres Laboratory Has All Expertise Available For Such Analyses. More Info At: Https://Www.Uantwerpen.Be/En/Research-Groups/Impres/Education/Master-Individual-Projects/

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 growth analysis (with leaf length tracker), plasmid cloning and transformation,
(fluorescence) microscopy and image analysis, laboratory skills including metabolite analyses
and biochemical analyses, NGS data analysis and qPCR.
Scientific presenting and writing. Training in plant growth analysis, metabolite, biochemical and transcriptome analysis. Training in scientific research. Functioning in international laboratory setting.

Seguimiento/ Monitoring Plan
- Daily supervision by PhD student.
- Weekly team meetings where progress is presented and discussed
- Weekly progress discussion with Professor and PhD student
- If needed for Spanish home institution, guidance in report writing.

Evaluación/ Evaluation plan
- Continuous evaluation
- Weekly progress
- If required, final report

Conocimientos técnicos o experiencia requerida (si procede) / Technical knowledge or experience required (if applicable)
Basic understanding of plant physiology; Basic laboratory skills; Basic mathematic and computer skills
Especificaciones extra de la institución de acogida (si procede) / Additional specifications of the host institution (if applicable)

Registration as a visitor for insurance purposes. Can be done upon arrival.

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-4: *Impact Of Climate Change-Induced Extreme Precipitation On Plant Growth*

Nombre y apellidos del Supervisor / Name and surname of the Supervisor:
Gerrit Beemster

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

Department of Biology / Faculty of Science / University of Antwerp
Laboratory for Integrated Molecular Plant Physiology Research (IMPRES)
Groenenborgerlaan 171
2020 Antwerp, Belgium
T +32 3 265 34 21 M +32 497 14 60 37 F +32 3 265 34 17
Website: https://www.uantwerpen.be/en/rg/impres/

Research Gate: https://www.researchgate.net/profile/Gerrit_Beemster

Título del Proyecto/ Project Title:
Impact Of Climate Change-Induced Extreme Precipitation On Plant Growth

Perfil preferencial del estudiante/Student Profile:
Biology, with level of MSc. Good level of English (at least B1)

Fechas orientativas/Available Dates
June 2025-December 2025

Programa/ Detailed program of the traineeship period
One of the main challenges following climate change is long, unpredictable periods of drought. In our search towards increased plant resilience against drought stress, we identified two leaf endophytic bacterial strains conferring such drought tolerance in maize. We also study a commercially available fungal strain, that is currently used to improve maize growth under drought stress in Brazil. In this project we aim to identify their mode of action (MoA) and elucidate the downstream signalling in the maize leaf.
Concerning the bacterial strains, we plan to do experiments regarding the localisation of the endophytes in the maize leaf (by fluorescent labelling) and in-depth analyses such as a transcriptome analysis, metabolite and biochemical analyses, and enzyme activity measurements.
Concerning the fungal strain, a transcriptomics analysis of the maize leaf meristem has already been performed, so the aim is to compare transcriptomic changes in planta with the genomic capacity of the fungal strain and verify our then formed hypotheses through in-depth analyses such as mentioned above for the bacterial endophytes.

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 growth analysis (with leaf length tracker), plasmid cloning and transformation,
(fluorescence) microscopy and image analysis, laboratory skills including metabolite analyses
and biochemical analyses, NGS data analysis and qPCR.
Scientific presenting and writing. Training in plant growth analysis, metabolite, biochemical and transcriptome analysis. Training in scientific research. Functioning in international laboratory setting.

Seguimiento/ Monitoring Plan
- Daily supervision by PhD student.
- Weekly team meetings where progress is presented and discussed
- Weekly progress discussion with Professor and PhD student
- If needed for Spanish home institution, guidance in report writing.

Evaluación/ Evaluation plan
- Continuous evaluation
- Weekly progress
- If required, final report

Conocimientos técnicos o experiencia requerida (si procede) / Technical knowledge or experience required (if applicable)
Basic understanding of plant physiology; Basic laboratory skills; Basic mathematic and computer skills
Especificaciones extra de la institución de acogida (si procede) / Additional specifications of the host institution (if applicable)

Registration as a visitor for insurance purposes. Can be done upon arrival.

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-5: *The role of sugar supply and signalling to the growth zone in the regulation of maize leaf growth*

Nombre y apellidos del Supervisor / Name and surname of the Supervisor:
Gerrit Beemster

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

Department of Biology / Faculty of Science / University of Antwerp
Laboratory for Integrated Molecular Plant Physiology Research (IMPRES)
Groenenborgerlaan 171
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Website: https://www.uantwerpen.be/en/rg/impres/

Research Gate: https://www.researchgate.net/profile/Gerrit_Beemster

Título del Proyecto/ Project Title:
The role of sugar supply and signalling to the growth zone in the regulation of maize leaf growth

Perfil preferencial del estudiante/Student Profile:
Biology, with level of MSc. Good level of English (at least B1)

Fechas orientativas/Available Dates
June 2025-December 2025

Programa/ Detailed program of the traineeship period
- Determining the impact of altered sugar signals and supply on maize leaf growth at high temporal resolution using automatic imaging.
- Kinematic analysis of cell division and expansion, using fluorescence and DIC microscopy in combination with image analysis.
- Metabolite and biochemical analysis (e.g., sugars metabolism) at contrasting time points during the day/ night cycle.
- Transcriptome analysis, mRNA (next generation) sequencing and QRT-PCR at contrasting time points during the the day/ night cycle

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 growth analysis (with leaf length tracker), plasmid cloning and transformation, (fluorescence) microscopy and image analysis, laboratory skills including metabolite analyses
and biochemical analyses, NGS data analysis and QRT-PCR

Scientific presenting and writing. Training in plant growth analysis, metabolite, biochemical and transcriptome analysis. Training in scientific research. Functioning in international laboratory setting.

Seguimiento/ Monitoring Plan
- Daily supervision by PhD student.
- Weekly team meetings where progress is presented and discussed

- Weekly progress discussion with Professor and PhD student
- If needed for Spanish home institution, guidance in report writing.

Evaluación/ Evaluation plan
- Continuous evaluation
- Weekly progress
- If required, final report

Conocimientos técnicos o experiencia requerida (si procede) / Technical knowledge or experience required (if applicable)
Basic understanding of plant physiology; Basic laboratory skills; Basic mathematic and computer skills

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

Registration as a visitor for insurance purposes. Can be done upon arrival.

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: *Chilling Stress Responses In The Maize Leaf Growth Zone*

Nombre y apellidos del Supervisor / Name and surname of the Supervisor:
Gerrit Beemster

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

Department of Biology / Faculty of Science / University of Antwerp
Laboratory for Integrated Molecular Plant Physiology Research (IMPRES)
Groenenborgerlaan 171
2020 Antwerp, Belgium
T +32 3 265 34 21 M +32 497 14 60 37 F +32 3 265 34 17
Website: https://www.uantwerpen.be/en/rg/impres/

Research Gate: https://www.researchgate.net/profile/Gerrit_Beemster

Título del Proyecto/ Project Title:
Chilling Stress Responses In The Maize Leaf Growth Zone

Perfil preferencial del estudiante/Student Profile:
Biology, with level of BSc or MSc. Good level of English (at least B1)

Fechas orientativas/Available Dates
June 2025-December 2025

Programa/ Detailed program of the traineeship period
Background: Chilling stress, temperatures between 0 and 15°C, negatively affects maize (Zea mays) yield in North-Western Europe. In contrast to the direct response to cold, the recovery from chilling stress has hardly been studied. We addressed this lack of knowledge by performing an integrated study of chilling recovery in the maize leaf growth zone. By a kinematic and genome-wide transcriptome analysis, we identified the phytohormone jasmonic acid (JA) and the enzymatic antioxidant peroxidase (POD) as potential key regulators of recovery from cold.

Objectives: The objective of this project aims (1) Pioneer a novel, high-resolution leaf growth analysis using automatic leaf length tracking for studying stress recovery of mutants, (2) Characterize the role of jasmonic acid and peroxidase in cold recovery at the cellular level by kinematic analysis and at the metabolite level by series of biochemical experiments (3) Unravel the molecular mechanisms downstream of JA and POD guiding the recovery response by transcriptomic analysis.

Methods:
- Leaf growth analysis: using a ruler and/or the Leaf Length tracker
- Kinematics analysis: by measuring cell length and meristem length under microscopy, and leaf length
- Biochemical analysis: by measuring hormones, antioxidant metabolites and enzymes (e.g., POD), oxidative markers of oxidative stress (MDA, Electrolyte leakage) along the maize leaf (Division, Expansion and Maturation zone)
- Transcriptome analysis, mRNA (next generation) sequencing and qRT-PCR

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 growth analysis.
Microscopy and image analysis.
Laboratory skills including biochemical analysis, RNA extraction for NGS data analysis.
and qRT-PCR.
Statistical analysis and interpretation of the results.
Scientific presenting and/or writing.

Scientific presenting and writing. Training in plant growth analysis, metabolite, biochemical and transcriptome analysis. Training in scientific research. Functioning in international laboratory setting.

Seguimiento/ Monitoring Plan
- Daily supervision by PhD student.
- Weekly team meetings where progress is presented and discussed
- Weekly progress discussion with Professor and PhD student
- If needed for Spanish home institution, guidance in report writing.

Evaluación/ Evaluation plan
- Continuous evaluation
- Weekly progress
- If required, final report

Conocimientos técnicos o experiencia requerida (si procede) / Technical knowledge or experience required (if applicable)
Basic understanding of plant physiology; Basic laboratory skills; Basic mathematic and computer skills
Especificaciones extra de la institución de acogida (si procede) / Additional specifications of the host institution (if applicable)

Registration as a visitor for insurance purposes. Can be done upon arrival.

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: *Unraveling resilience to protein folding stress across early mammalian development and lineage specification*

Nombre y apellidos del Supervisor / Name and surname of the Supervisor:
Anchel de Jaime-Soguero

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

Faculty of Medicine, Institut de Recherche Interdisciplinaire en Biologie Humaine et Moléculaire (IRIBHM), Université Libre de Bruxelles (ULB)
https://iribhm.org ; https://www.ulb.be

Título del Proyecto/ Project Title:
Unraveling resilience to protein folding stress across early mammalian development and lineage specification

Perfil preferencial del estudiante/Student Profile:

Biochemistry, Biology, Biomedical engineering. Bachelor student or Master student. Preferentially, Master (English level, at least, B2).
Essentially, none expertise is required but high motivation and willing to learn molecular biology. However, previous experience in cell culture, stem cell biology, and/or embryo development would help.

Fechas orientativas/Available Dates
June 2025-December 2025

Programa/ Detailed program of the traineeship period
Embryonic development relies on genome and proteome stability in all species. Despite the robustness of the developmental programme, embryo fitness is continuously threatened by de novo acquisition of metabolic, proteostatic and genomic alterations in cells. While resilience to stress has been studied in several model organisms (including C. Elegans, D. Melanogaster or D. Renio), it remains unexplored in mammals, and particularly in humans, in which spontaneous miscarriage is frequent (>70%) during the first weeks of gestation. Physiological protein turnover is lineage-specific, as the response to genotoxic stress (recently discovered by our group; De Jaime-Soguero et al. NatComms 2024). Starting from this premise, the trainee will study how early mammalian lineages (corresponding to pre and early post-implantation stages) mitigate microenvironmental protein folding stress, including heat-shock and endoplasmic reticulum stress responses. With this purpose, the trainee will work with mouse embryonic stem cells (mESCs), which can differentiate in 2D into the three embryonic germ layers (ectoderm, mesoderm, endoderm). Furthermore, the candidate will be trained in generating 3D stem cell-based embryo models that recapitulate the embryonic architecture in a dish. This includes models for early post-implantation development (EiTiX embryoids) or gastrulation (gastruloids). Taking together these models, the trainee will quantify: i) the protein folding stress levels by classical biochemistry and microscopy techniques in different lineages after induction or absence of the ER stress response (e.g. by tunicamycin) or temperature stress (e.g. increase of temperature in culture); and ii) the survival and adaptation of the cells to those stresses (apoptosis, autophagy, etc). Overall, this work will shed light on unidentified developmental bottlenecks created in early embryo development by proteostasis alterations driven by the microenvironment, which could be associated with the high frequency of spontaneous human miscarriage.

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)

-Mouse embryonic stem cell culture

-Differentiation protocols to the three germ layers (ectoderm, mesoderm, endoderm)

-Characterization of potency stages (pluripotency, lineage specification, etc) by immunofluorescence or qPCR analysis

-Generation of 3D stem cell-based embryo models (gastruloids and EiTiX embryoids) from mouse embryonic stem cells

-Static microscopy analysis of 2D and 3D models

-Protein quantification by Western Blot and immunofluorescence

-In silico analysis of protein folding signature by analyzing previous OMIC repositories

-Critical thinking capacity to decipher biological mechanisms driving cellular stress

-Writing and presentation skills in English

-Basic concepts in developmental biology (early mouse embryo development) and the applicability of stem cell models

- The candidate will learn basic concepts of stem cell and developmental biology, and will be at the helm of a research line that has not been addressed yet.

- The candidate will gain independence at the time of planning, executing and analysing experiments with the support of the PI.

- The candidate will learn state-of-the-art technologies in the field of stem cell biology; particularly 3D-stem cell-based embryo models, which has been recognized as Nature Method of the Year 2023.

- The candidate will be involved in a international and healthy research environment at IRIBHM, with the possibility to follow research of other groups involved in cancer, development or bioinformatics

Seguimiento/ Monitoring Plan

The De Jaime-Soguero laboratory is a young and dynamic research group that kicked-off in

October 2024. The trainee will be directly supervised and trained by myself, and would represent a unique opportunity to learn directly from a young PI. At arrival, the student will

navigate the scientific literature of the topic, implement the in vitro techniques in cell culture

and follow specific trainning (e.g. microscopy) during the first 1-1.5 month. After robustly reproduce the cellular and model pipelines, the trainee will perturbate proteostasis (as described in the project section) and quantify stress response using different approaches.

Evaluación/ Evaluation plan

The candidate will be evaluated based on the practical and learning skills.

He/She will have to present the results to the laboratory at the end of the stay, and I will personally

evaluate her presentation. Furthermore, the trainee will be involved in the regular lab meetings and

journal club presentations of the lab.

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)

Yes

Proyecto BE-8: OpenTPS: an open-source treatment planning system for radiation therapy against cancer

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:
MIRO (Molecular Imaging Radiation Oncology) - UCLouvain
https://uclouvain.be/en/research-institutes/irec/miro

Título del Proyecto/ Project Title:
OpenTPS: an open-source treatment planning system for radiation therapy against cancer

Perfil preferencial del estudiante/Student Profile:
Biomedical engineering, Computer engineering, Computer engineering and mathematics, Physics. Master or Bachelor. Proficient level of python programming. Advance level of English and/or French (at least C1).

Fechas orientativas/Available Dates
June 2025-December 2025

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, without 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/. The integration of our tools in a functional and clinically oriented platform will enable faster research for our 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)
Being this project at the frontier of physics, computer science, engineering 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.
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 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)
Especificaciones extra de la institución de acogida (si procede) / Additional specifications of the host institution (if applicable)

Yes, to be discussed with the host.

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-1: *Turning humid air into renewable power.*

Nombre y apellidos del Supervisor / Name and surname of the Supervisor:
Leticia Fernández Velasco

Afiliación del supervisor y Enlace a afiliación / Supervisor affiliation and Affiliation link:
 Department of Chemistry / Royal Military Academy
Avenue Renaissance 30, 1000 Brussels, Belgium
http://www.rma.ac.be/en/

Título del Proyecto/ Project Title:
Turning humid air into renewable power.

Perfil preferencial del estudiante/Student Profile:
Chemistry / Chemical Engineering. At minimum, the trainee should be in the last year of a bachelor's degree and preferably be enrolled in a Master's program. English Level, at least, B2.

Fechas orientativas/Available Dates
September 2025-December 2025

Programa/ Detailed program of the traineeship period
Context: This project is aimed at the development of an innovative technology to exploit the atmospheric humidity for direct conversion to electricity, thus gaining a new sustainable source of renewable energy. The conversion principle is based on the fundamental characteristic of the surface of solids to maintain electroneutrality upon the adsorption of molecules from the gas phase. It combines at the micro level a sequence-chain of physicochemical, physical and electrophysical processes that take place on the interface of nanostructured oxide materials when interacting with water molecules from surrounding atmosphere, thus enabling direct humidity adsorption - electrical energy conversion. The proof of concept of this technology has been already delivered and the next step in this investigation is to increase its technology readiness level. More info: https://catcherproject.eu/

Approach: single and cycling water vapour adsorption-desorption experiments in static and dynamic conditions will be performed with different types of samples (mainly with metal oxides, but also metal organic frameworks, nanoporous carbon materials…). These materials will be thoroughly characterized by different techniques (adsorption isotherms, TG-MS, SEMEDX, XPS, XRD…) in order to link the water sorption behaviour with their surface, structural and textural properties. Based on the obtained results, an optimization of the material for this specific application will be performed.

Role of the trainee: the trainee will participate in the activities above described in the frame of an European project (CATCHER, 2022-2026). Besides the experimental work, the trainee will also participate in the bibliographic search, the interpretation and discussion of the results, and the drafting of reports and/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)
- Learning the principles of water vapour sorption: how to do the tests in static and dynamic
conditions, variables involved, calculations (capacity, kinetics)…
- Acquiring expertise in different characterization techniques of materials.

- Gaining knowledge on the interpretation and discussion of scientific results, as well as in the writing of scientific reports.
- Learning how to work in a research laboratory, in team and in the frame of an international on-going project. Interaction and exchange of results with other research groups.
- Improving the communication skills and knowledge of languages (the trainee will have the
opportunity to learn French/Flemish).

It is expected that the trainee will benefit from professional development by:
- acquiring knowledge and expertise in the field of study,
- expanding his/her knowledge on hands-on-work in a lab,
- gaining expertise in the interpretation and discussion of results,
- learning how to work independently, in an international team and in the frame of a project,
- improving the knowledge of languages.
From a personal point of view, an additional goal of the traineeship will be to take advantage of the
unique and enriching experience of living abroad.

Seguimiento/ Monitoring Plan

The trainee is expected to have permanent contact with the host scientist, especially at the beginning of the traineeship, and periodical meetings (once per week) will be scheduled in order to follow the progress of the work and the needs of the trainee. Moreover, the trainee will be working shoulder to shoulder with other members of the staff (technicians, PhD students…) who will help him/her in the daily work in the lab. Regarding the experimental part, and since the trainee will be integrated in the routine tasks of an on-going project, the risks of not accomplishing the goals is very limited. In the case of unexpected events influencing the good progress of this particular project, the trainee would then participate in other related projects in the field of water adsorption.

Evaluación/ Evaluation plan
1) Theoretical knowledge will be given by magistral lessons and supporting bibliographic material. A first evaluation will check if the basic concepts are fixed. Only once this goal is reached, we will proceed to the next step.
2) Experimental work: all the techniques and protocols will be explained in detail; then, the trainee will gradually increase his/her participation under supervision until he/she is able to work independently.
3) Discussion of results: the trainee will be asked to actively participate in the discussion of the results, this being a proper opportunity to identify additional actions needed to improve the formation.

Conocimientos técnicos o experiencia requerida (si procede) / Technical knowledge or experience required (if applicable)
The student may have some experience working in a chemical laboratory, and ideally in gas phase applications. Regarding the theoretical knowledge, formation in chemistry and/or chemical engineering is a must, and notions of fundamentals of adsorption in gas phase will be needed.

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

Yes, besides the Learning Agreement, and given the military character of the Academy, the trainee will be asked to pass a security screening.

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

Nombre y apellidos del Supervisor / Name and surname of the Supervisor:
Leticia Fernández Velasco

Afiliación del supervisor y Enlace a afiliación / Supervisor affiliation and Affiliation link:
 Department of Chemistry / Royal Military Academy
Avenue Renaissance 30, 1000 Brussels, Belgium
http://www.rma.ac.be/en/

Título del Proyecto/ Project Title:
Nanoporous materials for tailored hydrogen storage applications

Perfil preferencial del estudiante/Student Profile:
Chemistry / Chemical Engineering. At minimum, the trainee should be in the last year of a bachelor's degree and preferably be enrolled in a Master's program. English Level, at least, B2.

Fechas orientativas/Available Dates
September 2025-December 2025

Programa/ Detailed program of the traineeship period
The aim of this project is to develop and optimize nanoporous materials for hydrogen storage, thus supporting the transition towards environmentally sustainable armed forces while maintaining their operational effectiveness. The department of chemistry of the Royal Military Academy will lead this research, assisted by partners from France and Spain, forming a strong consortium providing an integral approach. In this work, different materials ranging from carbons to Metal Organic Frameworks (MOFs), will be designed, synthesized and tested for hydrogen storage under different conditions of temperature and pressure, both individually and in a combined form to evaluate a probable synergy. Sustainable synthesis methods, including the valorisation of biomass waste, will be
particularly taken into account. And additional goal of the project, highlighting its innovative character, is to obtain a material with an enhanced hydrogen storage in a suitable form for real-use (contrarily to most of the materials reported in the literature, in powder form and with low densities).

The trainee will obtain knowledge about H_2 storage technologies, synthesis, characterization and performance of nanoporous materials on H_2 adsorption. Additionally, the trainee will investigate the fundamental adsorption mechanisms of hydrogen on nanoporous materials through experimental and theoretical studies to guide material design and optimization. A through characterization of the structural and surface properties of the materials will be the main tasks to be performed by the trainee, including techniques such as XRD, TGA, FTIR, SEM-EDX.

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)
- Understanding the main principles of H_2 adsorption and consequently the selection and
synthesis of promising nanomaterials.
- Acquiring expertise in different characterization techniques of materials (N_2 and H_2O Adsorption), TG-MS, PZC, XRD, SEM, among others.
- Gaining knowledge on the interpretation and discussion of scientific results, as well as in the writing of scientific reports.

- Learning how to work in a research laboratory in teams and in complete autonomy.
- Improving the communication skills and knowledge of languages.

The trainee gains practical, real-world experience in a professional chemistry laboratory, applying theoretical knowledge to experimental and research tasks. Plus, the exposure to
advanced laboratory techniques, instrumentation, and methodologies enhances the trainee's technical proficiency and problem-solving abilities. Additionally, this traineeship will provide the tools to work independently in an international team and in the frame of a
project. Finally, but not last, the trainee can improve the knowledge of languages (English,
French, Dutch, German, among others), giving to him/her an unique and enriching experience of living abroad in a multicultural country.

Seguimiento/ Monitoring Plan

The trainee is expected to maintain regular communication with the host scientist, particularly during the initial phase of the traineeship. Weekly meetings will be arranged to monitor the trainee's progress and address their requirements. Additionally, the trainee will collaborate closely with other team members, including technicians and PhD students, who will provide support with daily laboratory tasks.

Regarding the experimental part, and since the trainee will be integrated in the routine tasks of an on-going project, the risks of not accomplishing the goals is very limited. In the case of unexpected events influencing the good progress of this particular project, the trainee wouldthen participate in other related projects in the field of nanoporous materials or adsorption techniques.

Evaluación/ Evaluation plan

The evaluation plan will be focused on three categories:
1. State-of-art research: Supporting bibliographic material will be provided. A first evaluation will check if the basic concepts are fixed. Only once this goal is reached, we will proceed to the next step.
2. Experimental work: all the techniques and protocols will be explained in detail. Then, the trainee will gradually increase his/her participation under supervision until he/she is able to work independently.
3. Coordination and reporting: the trainee will be asked to actively participate in weekly meetings for the discussion of the results. The working group will also provide feedback on his/her performance at the laboratory. A final report will be requested.

Conocimientos técnicos o experiencia requerida (si procede) / Technical knowledge or experience required (if applicable)
The student may have some experience working in a chemical laboratory, for nanomaterial synthesis and ideally in gas phase characterization/applications. Regarding the theoretical knowledge, formation in chemistry and/or chemical engineering is a must, and notions of fundamentals of nanomaterials (carbon, MOF) synthesis and characterization will be needed.

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

Yes, besides the Learning Agreement, and given the military character of the Academy, the trainee will be asked to pass a security screening.

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

Nombre y apellidos del Supervisor / Name and surname of the Supervisor:
Francisco Molina-Lopez and Isidro Florenciano Cano

Afiliación del supervisor y Enlace a afiliación / Supervisor affiliation and Affiliation link:
 Kasteelpark Arenberg 44/bus 2450, 3001 Leuven
https://www.mtm.kuleuven.be/
https://www.molina-lopezresearchlab.com/

Título del Proyecto/ Project Title:
Emerging Green Thermoelectric Materials

Perfil preferencial del estudiante/Student Profile:
Chemical engineering, Chemistry, Mechanical engineering, Physics, Electrical Engineering.

Third year bachelor student/Master student. Level of English, at least, B2.

Fechas orientativas/Available Dates

May 2025-September 2025

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 Development: 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.

The trainee will benefit from experience in fabrication and characterization techniques for electronic materials, interdisciplinary knowledge (material science, physics, chemistry), and training in problem solving. Moreover, the trainee will gain exposure to cutting-edge research and state of the art facilities in a strongly international setting (there are more than 10 different nationalities in the FMolina-lopez group). Finally, depending on the outcome, she/he might obtain academic writing experience, publication opportunities on a collaborative project, and the possibility to continue the research in future stays.

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)
The project is flexible and can be tailored to align with the trainee's background and interests. Proficiency in material science and engineering, solid-state/seminconductor physics, transport phenomena, and electrical/thermal transport, as well as basic knowledge of chemistry, is essential.

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

Visiting scholar form, invitation letter from KU Leuven international office and from host Professor.

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

Yes

Nombre y apellidos del Supervisor / Name and surname of the Supervisor:
Ana Santos Coquillat

Afiliación del supervisor y Enlace a afiliación / Supervisor affiliation and Affiliation link:
Advanced Drug Delivery and Biomaterials Group, LDRI, UCLouvain
Avenue E. Mounier, 73 box B1.73.12 1200 Bruxelles
https://uclouvain.be/en/research-institutes/ldri/addb.html

Título del Proyecto/ Project Title:
Extracellular vesicles as nanomedicines in neuroinflammation

Perfil preferencial del estudiante/Student Profile:
Biochemistry, Pharmacy, Biomedical Engineering. Last year of bachelor or Master.
English level at least, B1.

Fechas orientativas/Available Dates
September 2025-December 2025

Programa/ Detailed program of the traineeship period
Neuroinflammation can be found in a variety of neurological diseases, including multiple sclerosis, Alzheimer's disease, Parkinson's disease, amyotrophic lateral sclerosis, traumatic brain injury, or traumatic spinal cord injury. Chronic immune system activation in the brain induces the release of inflammatory molecules that can damage neurons, glial cells, etc. Extracellular vesicles (EVs) are signaling particles without replicative capacity, released by cells to the biological fluids to control intercellular communication. Recently, milk extracellular vesicles have been studied as immunomodulatory nanomedicines with a natural origin and are being proposed as carriers or therapeutics in neuroinflammation. With this aim, the student will learn to isolate EVs from fluids, characterize them by common nanotechnology techniques, and evaluate them in cells with clinical interest (microglia, astrocytes…). Also, EVs will be evaluated as drug delivery systems with disease-relevant drugs. The student is not expected but has the possibility of participating in congress abstracts or scientific papers.

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)
Basic lab skills such as experiment planning, pipetting, and working in a biosecurity 2 lab. More specifically, cell culture of primary cells and cell lines, nanoparticle characterization by different physicochemical techniques (NTA, DLS, microscopy), drug encapsulation, molecular biology techniques (for example PCR), immunocytochemistry, ELISA, and confocal imaging. Related to transversal competencies, the student will acquire independent thinking, capacity for data curing, and scientific communication.
The student will develop the training in an international group with multiple nationalities and backgrounds (Pharmacists, Biotechnologists, Physicians, or Biomedical Engineers, among others) allowing her/him to engage with different people broadening their knowledge, language skills and expanding the professional/personal network. Moreover, from a scientific point of view, it will be a starting point to know how preclinical research is performed and what it takes to evaluate a candidate treatment for a disease.

Seguimiento/ Monitoring Plan

At the beginning of the stay, the student will learn the protocols and techniques by first seeing, then doing while being seen by the supervisor, and then doing alone always with the possibility of reaching out to the supervisor with periodic supervision. The work carried out by the student will be monitored in weekly meetings to discuss the student's progress on tasks, discuss the results obtained, resolve questions, and plan the following steps.

Evaluación/ Evaluation plan
Technical skills will be evaluated on a daily/weekly basis by the supervisor or the other lab
members to ensure the student is comfortable and can do the experimental work alone.
The student will be evaluated while acquiring data analysis and management competencies,
and the communication skills developed will be monitored.
Finally, the student´s contribution to the lab organization, cleaning, and integration will be
positively evaluated.

Conocimientos técnicos o experiencia requerida (si procede) / Technical knowledge or experience required (if applicable)
Previous cell culture knowledge is valued but not required, implementation of scientific method

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

Nombre y apellidos del Supervisor / Name and surname of the Supervisor:
Paloma Lozano Picazo

Afiliación del supervisor y Enlace a afiliación / Supervisor affiliation and Affiliation link:
Advanced Drug Delivery and Biomaterials (ADDB laboratory of the Louvain Drug Research Institute (LDRI).

https://www.uclouvain.be/en/research-institutes/ldri/addb-people-ti

Título del Proyecto/ Project Title:

Mechanotransduction-based therapy for spinal cord regeneration and its impact on glial cells

Perfil preferencial del estudiante/Student Profile:
Biochemistry, Biology, Pharmacy. Last year of bachelor or Master. English level at least, B2.

Fechas orientativas/Available Dates
June 2025-September 2025

Programa/ Detailed program of the traineeship period
This project is contemplated in the scope of the European project Piezo4Spine, focused on the pivotal role of mechanotransduction in the physiopathology of the spinal cord. This project is intended to develop a therapy that modulate the mechanotransduction of neurons. However, inside the complexity of the spinal cord, immune reaction carried out by glial cells have high importance contributing to the generation of a hostile environment for the regeneration, partly due to mechanical stimuli of the surrounding. According to this, it is important to evaluate the impact of this therapy on the actuation of glial cells, to discover if the mechanotransduction of glial cells can be also modulated in a beneficial way for spinal cord regeneration.

Based on this purpose, we will work according to the following program: Isolation of glial cells from pups of rat and generation of primary cell cultures. The maintenance of the culture requires a continuous check of the culture and changes of medium at determined time points. Study of the response of glial cells after the activation of a transmembrane mechanosensor. These experiments will simulate the mechanical stimuli that cells receive after a traumatic injury of the spinal cord. On one hand, this study will include the quantification of the expression of pro-inflammatory chemokines or markers by means of PCR, and on the other hand, the qualitative evaluation of the influx of calcium and the phenotype of cells by immunofluorescence.

After clarifying how glial cells behave under the damaging scenario, next experiments will test
the functionality of the developed therapy. This functionality will be evaluated not only under
conditions of the mechanical stimulation, but also under inflammatory conditions that
resemble the hostile context of the injured spinal cord. For this part, techniques such as western blot, immunofluorescence, PCR or calcium influx evaluation will be used.

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 competences on cell isolation and preparation of primary cultures, which implies to work under sterility conditions and know the habits when working in a laboratory of cell culture. The student will learn to extract RNA from cells by precipitation with alcohols, quantify the RNA, do the retrotranscription into cDNA, perform quantitative PCRs and analyze the results. Another competence to be acquired is the realization of immunofluorescence from cell cultures and its visualization by microscopy. Finally, the student will learn how to do protein electrophoresis and western blot for the analysis of the expression of specific proteins.

The benefits for the trainee include the opportunity to participate actively in a very interesting European project, and even attend the periodic meetings with the rest of the partners. The student will gain hands-on experience in evaluating key aspects in the scope of spinal cord regeneration. He/she will develop or improve skills in experimental design, data analysis and scientific communication while contributing to cutting-edge research. Moreover, this traineeship will contribute to the professional and personal growth of the student, interacting with people from different countries, broadening their cultural awareness and expanding his/her professional network.

Seguimiento/ Monitoring Plan (aprox. 50 palabras)

At the beginning of the stay and first times performing the different techniques, the student will observe the protocols and experiments carried out by the supervisor. After his/her familiarization, the student will begin performing experiments under supervision. Then, when he/she gains confidence and the competence necessary, he/she will work independently, but still with periodic supervision and help in case that it is needed. The work carried out by the student will be monitored in weekly meetings to discuss the student's progress on tasks, discuss the results obtained, solve questions and plan the following steps.

Evaluación/ Evaluation plan (aprox. 50 palabras)

Technical skills will be evaluated by regular observation to the student's performance, interactions in the laboratory and problem solving. The student will be evaluated in terms of communication skills according to the ability to summarize and discuss the research findings and present them during the weekly meetings with the supervisor, or with other members of the group. The supervisor will ask for feedback from other laboratory members regarding the student's contribution to the environment and organization of the laboratory. The student will be asked for feedback about his/her well-being in the laboratory or specific aspects he/she would like to learn.

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

Theoretical knowledge about PCR, electrophoresis and immunofluorescence. Previous work experience in a laboratory or hands-on experience in cell culture are going to be valued.

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

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

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

Department of Bioscience Engineering. Faculty of Science. University of Antwerp.
Groenenborgerlaan 171, 2020 Antwerpen, Belgium
 https://www.uantwerpen.be/en/research-groups/sustainable-energy/

Título del Proyecto/ Project Title:
BioCatcher: Sustainable and innovative nitrogen recovery from residual streams

Perfil preferencial del estudiante/Student Profile:
Biochemistry, Environmental Sciences, Chemical engineering. Bsc. & Master. English (B2) and/or Spanish.

Fechas orientativas/Available Dates
May 2025-October 2025

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 and domestic 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. Additional batch test experiments to find the best bacteria strains will be carried out.
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.

The trainee will have a unique experience completely immersed in the academic field, as well as a development of practical experience in a biochemical laboratory, he/she will gain significant knowledge and skills in a very relevant topic. All of this in conjunction, may open opportunities in the industry or the academy in the future for the trainee. Additionally, the trainee will benefit of the advantages of being part of a diverse and international team.

Seguimiento/ Monitoring Plan
Daily supervision by the tutor and lab technician. 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)
Theoretical knowledge about PCR, electrophoresis and immunofluorescence. Previous work experience in a laboratory or hands-on experience in cell culture are going to be valued.

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

Yes, Vaccination certificate of Hepatitis A & Tetanus. Signing labrules and risk analysis. Registry through MobilityOnline.

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

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:

Department of Bioscience Engineering. Faculty of Science. University of Antwerp. Groenenborgerlaan 171, 2020 Antwerpen, Belgium
https://www.uantwerpen.be/en/research-groups/sustain/

Título del Proyecto/ Project Title:
Dosing strategies for in-sewer denitrification with nitrified urine for odour and greenhouse gas emission control

Perfil preferencial del estudiante/Student Profile:
Biochemistry, Environmental Sciences, Chemical engineering. Bsc. & Master. English (B2) and/or Spanish.

Fechas orientativas/Available Dates:
July 2025-November 2025

Programa/ Detailed program of the traineeship period
Did you know that urine is liquid gold? With this thesis, you and your urine could contribute to making Flanders' urban wastewater treatment 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 while implementing extreme decentralization may be infeasible in a fast enough timeframe. Diverted urine could provide an overall bigger benefit when seen as a multi-resource product used within system boundaries of urban sanitation, rather than exported outside as a fertilizer or as N_2. Dosing nitrified urine in sewers gives several benefits: 1) it facilitates in-sewer denitrification, thus reducing the C and N load of the wastewater and saving money and energy; 2) valorizing the sewer as a pre-anoxic reactor virtually increases the treatment capacity of the urban sanitation cycle; 3) anoxic conditions in the sewer will reduce greenhouse gas emissions such as methane and odorous compounds such as hydrogen sulfide. However, the rates and the competition of autotrophic and heterotrophic denitrification need to be better understood to optimize the nitrate dosing strategies.
During this thesis, there is a strong focus on wet lab work. Batch tests will be done in flasks and a lab-scale sewer reactor will be operated and optimized. The main goal is to investigate the effect of nitrified urine dosage on the rates and competition of autotrophic and heterotrophic denitrification, as well as investigate the production of gaseous emissions (N_2O, H_2S, CH_4) under various relevant sewer conditions .
Microorganisms, often growing in biofilms on the sewers, are responsible for biological processes such as denitrification, sulphate reduction and methanogenesis. Hence, microbiome analyses will be done to gain insights into different dominating micro-organisms.

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 diverse and dynamic research team, enhancing skills such as collaborative work, communication and critical

thinking. The student will gain knowledge in state-of-the-art sewer dosing 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.

The student will have the experience of being part of an academic research team, where they will acquire a wide range of skills, enhance their knowledge and develop soft skills. The student will acquire expertise in analytical techniques, bioreactor operation, and microbiology. Furthermore, the student will enjoy the experience of an international placement in an applied sciences lab, which will increase both their knowledge and career possibilities in a national or international organization. Also, the student will enjoy the welcoming and lively city of Antwerp.

Seguimiento/ Monitoring Plan
- Laboratory rules test (2 weeks after initiating the practical activities)

- Permanent evaluation in the lab

- Final report and possible presentation at the end of the stay

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, Microsoft Office (Word, Excel, Powerpoint), basic laboratory experience.

Preferably knowledge on wastewater treatment.

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

Yes, Vaccination certificate of Hepatitis A & Tetanus. Signing labrules and risk analysis. Registry through MobilityOnline.

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

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:
Department of Bioscience Engineering. Faculty of Science. University of Antwerp.
Groenenborgerlaan 171, 2020 Antwerpen, Belgium
https://www.uantwerpen.be/en/research-groups/sustain/

Título del Proyecto/ Project Title:
Resource-efficient treatment of cow urine with partial nitritation/anammox in a rotating biological contactor

Perfil preferencial del estudiante/Student Profile:
Biochemistry, Environmental Sciences, Chemical engineering. Bsc. & Master. English (B2) and/or Spanish.

Fechas orientativas/Available Dates:
July 2025-November 2025

Programa/ Detailed program of the traineeship period
Agricultural practices and intensive livestock farming put immense pressure on the ecosystem by excessively leaching nutrients into it. Especially the excrements of livestock need to be managed well. While pigs can be kept inside a stable, (milk) cows generally roam free, which makes management of the nutrients they discharge challenging. Hanskamp, a Dutch agricultural technology company developed the 'cowtoilet' which stimulates the cow's bladder when it's being milked to release urine. This way, pure urine can be source-separated from the manure and appropriate treated or the nutrients recovered. However, research on cow urine treatment is limited. The goal of this project is to achieve high nitrogen removal from cow urine. A potential way of treating these streams is by converting the nitrogen to nitrogen gas with partial nitritation/anammox (PN/A). This thesis will investigate the use of a low-tech reactor with passive aeration, such as a rotating biological contactor (RBC), which enables robust and resource-efficient treatment. The aims are to target high removal efficiencies and removal rates, while maintaining a stable operation. 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 operation, and systemic analysis of N-related problematics. By working in the laboratory, 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.

The trainee will have a unique experience completely immersed in the academic field, as well as a development of practical experience in a biochemical laboratory, he/she will gain significant knowledge and skills in a very relevant topic. All of this in conjunction, may open opportunities in the industry or the academy in the future for the trainee. Additionally, the trainee will benefit of the advantages of being part of a diverse and international team.

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 are 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 possible 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.

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

Yes, Vaccination certificate of Hepatitis A & Tetanus. Signing labrules and risk analysis. Registry through MobilityOnline.

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-18: *Corrosion protection strategies for 3D printed metallic materials*

Nombre y apellidos del Supervisor / Name and surname of the Supervisor:
Rubén Del Olmo Martinez

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

Department of Chemistry and Materials, Research Group of Electrochemical and Surface Engineering (SURF), Vrije Universiteit Brussel (VUB), 1050 Brussels, Belgium Bd de la Plaine 2, 1050 Ixelles. Building G.
https://surf.research.vub.be/

Título del Proyecto/ Project Title:
Corrosion protection strategies for 3D printed metallic materials

Perfil preferencial del estudiante/Student Profile:
Chemistry, Aerospace engineering, and Mechanical engineering. Last year of bachelor or Master. English level, at least, B1.

Fechas orientativas/Available Dates:
September 2025-December 2025

Programa/ Detailed program of the traineeship period
Over the last decade, the evolution of Metal Additive Manufacturing (MAM), or metallic 3D
printing, has become a reality. This technology enables the production of complex metallic
components with minimal material waste and greater energy efficiency compared to conventional processing methods. Among the materials processed via MAM, stainless steel
and aluminium alloys stand out due to their suitable mechanical properties for the transport
industry. However, the microstructural characteristics and corrosion behaviour of specific 3D-
printed alloys remain scarcely understood.
This project aims to:
1- Conduct a microstructural and electrochemical analysis of different Steel and Al alloys processed by additive manufacturing technologies.
2- Investigate electrochemical surface and/or thermal treatments to understand and/or mitigate corrosion phenomena in-service conditions.
By achieving these goals, the student will gain hands-on experience with conventional characterization techniques (SEM/EDS, XPS, SKPFM) and electrochemical methods (EIS, PDP).
Furthermore, based on the project findings, the student will contribute to optimizing surface
treatments for structural, aerospace, and automotive applications, drawing on literature and
experimental research.

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)
Basic lab skills such as experiment planning, conventional (including sample preparation),

understanding the different characterization procedures, electrochemical tests for corrosion
evaluation and surface treatments (anodizing, conversion coatings and/or plasma electrolytic
oxidation).
Related to transversal competencies, the student will acquire independent thinking, capacity
for data curing, and scientific communication.

The student will undergo training in an international research group composed of members
from diverse nationalities and backgrounds, including Material, mechanical, and chemical
engineers, and chemists, among others. This environment will provide valuable opportunities to engage with different perspectives, broaden their knowledge, enhance language skills, and expand their professional and personal network.

From a scientific perspective, this experience is an introduction to chemistry-materials science, offering insights into the processes involved in evaluating potential procedures for
testing and treatments for corrosion-sensitive applications in industry.

Seguimiento/ Monitoring Plan
The work will be monitored in weekly meetings to discuss the advances, conclusions, questions and future steps.
In detail, at the beginning, the student will learn the protocols and techniques under supervision. Then, once the supervisor confirms that the student is ready to work independently, the student will perform the experiments with the possibility of reaching out
to the supervisor.

Evaluación/ Evaluation plan
The student's technical skills will be assessed regularly—either daily or weekly—by the supervisor or other lab members to ensure they feel confident and can perform experimental
work independently.
Additionally, the student's progress in data analysis and management will be evaluated, along
with the development of their communication skills.
Finally, active participation in lab organization, cleanliness, and integration within the team
will be recognized as a positive contribution.

Conocimientos técnicos o experiencia requerida (si procede) / Technical knowledge or experience required (if applicable)
Previous knowledge in material science, electrochemistry and laboratory-related skills is valued but not 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)

Yes

Nombre y apellidos del Supervisor / Name and surname of the Supervisor:
Elena Ramis Bravo

Afiliación del supervisor y Enlace a afiliación / Supervisor affiliation and Affiliation link:
Department of Mechanical Engineering, Biomechanics Division KU Leuven.
 Celestijnenlaan 200F, 3001, Leuven, Belgium.
https://www.mech.kuleuven.be/en/bme/bme-people/00144453

Título del Proyecto/ Project Title:
Characterization in neural tube organoids development

Perfil preferencial del estudiante/Student Profile:
Biology, Biochemistry, Mechanical Engineering and Biomedical Engineering.
Undegraduate or master students are welcome. English level, at least, B2.

Fechas orientativas/Available Dates:
June 2025-October 2025

Programa/ Detailed program of the traineeship period
The laboratory of Bioengineering and Morphogenesis at KU Leuven, headed by Prof.Adrian Ranga, as recently implemented a novel approach to grow neural tube organoids in order to study neural tube morphogenesis. This approach is currently integrated in a project headed by a PhD in the lab, Elena Ramis Bravo. The trainee will be involved in the generation of these organoids, their characterization by immunohistochemistry (IHC) and confocal live-imaging. We expect that this project will help the trainee gain a better understanding of both the engineering and biological challenges involved in multi-disciplinary bioengineering research.

The students are expected to join the lab activities from Monday to Friday during official working hours. First,the intern will get familiar with the lab research line by reading literature. Second, the intern will be trained to learn cell culture (hiPSCs) and organoid assembly. Third, the intern will learn how to perform live-imaging in a confocal microscope. Fourth, the intern will learn how to analyze and quantificate the imaging data obtained from the experiments. Finally, the intern will present the outcomes of the internship to the laboratory members in a seminar.

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 the traineeship the students is expected to have acquire **technical skills** such a cell culture and maintenance of hiPSC cells and generation neural tube organoids.
Additionally, handling of light microscope, confocal microscope,perform
live-imaging experiments and 3D IHC staining.
Last but not least, the student will acquire skills for imaging analysis and quantification.

On the **general skills** side, the student is expected to learn good practices to work in a laboratory. Develop critical thinking and problem solving skills, as well as
work independently.

The Laboratory of Bioengineering and Morphogenesis is an international and multidisciplinary friendly environment with high research quality practices where the student

will be able to develop his research skills related to the field of Bioengineering, Organoids, Developmental Biology and Neuroscience. But also soft skills related to working with people from different nationalities (7) and backgrounds (engineering, biology, biochemistry, bioengineering). Furthermore, it is expected that the student will develop the passion for science and feels encouraged to continue the research path.

Seguimiento/ Monitoring Plan

The student will receive a training for each of the skills detailed before with direct supervision from PhD student. Additionally, the supervisor will be daily supervising the student at the beginning of the internship and the supervision will start to decrease in order to allow the student to gain independence inside of the laboratory. However, the PhD student will be having individual meetings every week or two weeks, depending on the progress of the internship. Furthermore, at least two meetings will be done with PI to also follow up on the progress of the intern. student will perform the experiments with the possibility of reaching out to the supervisor.

Evaluación/ Evaluation plan

The intern will have a follow-up meeting every week with the PhD student supervisor in order to update the progress of the internship and to solve any doubts that come up during the project. The intern will be asked to present a seminar at the end of the internship to the whole research group in order to share the outcomes of the research internship. The PhD supervisor will review the Erasmus+ internship report written by the intern
and provide feedback, if necessary.

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

Previous experience will cell culture will be taken into account, but all applications are welcome. **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

Oferta 2024 de Prácticas Internacionales

PRÁCTICAS EN DINAMARCA UAM-CED 2024

Número de Proyecto	Supervisor/a	Área de Conocimiento	Lugar de realización	Número de plazas
DI-1	Eleazar Rodriguez	Biología molecular, células madre (STEM cells)	Copenhagen University	1
DI-2	Eleazar Rodriguez	Biología molecular, inundaciones	Copenhagen University	1
DI-3	Eleazar Rodriguez and Cloe de Luxán Hernández	Biología molecular, plantas	Copenhagen University	1
DI-4	Carlos G. Acevedo-Rocha and Mehmet Mervan Çakar	Proteómica Computacional	Technical University of Denmark	1
DI-5	Carlos G. Acevedo-Rocha	Biologia Molecular, Biotecnologia, bioingenieria	Technical University of Denmark	1
DI-6	Vitor Cardoso and Jaime Redondo-Yuste	Física, Astrofísica, Teoría de la relatividad	Niels Bohr Institute	1
DI-7	Professor Bjørn Ebdrup and Dr María Hernández Lorca	Neurociencia, psiquiatria, biomedicina	Psychiatric Center Glostrup	1
DI-8	Fernando Salgado Polo	Farmacología traslacional	Copenhagen University	1
DI-9	Johan Andersen-Ranberg	Microalgae, producción de pigmentos	Copenhagen University	1
DI-10	Marek Mutwil	Biología molecular, expresión genética, Bioinformatica	Copenhagen University	1
DI-11	Michael Palmgren and Mai Duy Luu Trinh	Biología molecular, expresión genética	Copenhagen University	1
DI-12	Michael Palmgren and Mai Duy Luu Trinh	Biología molecular, expresión genética	Copenhagen University	1
DI-13	Michael Palmgren and Mai Duy Luu Trinh	Biología molecular, expresión genética	Copenhagen University	1
DI-14	Pablo D. Cárdenas	Ciencia de los alimentos, biotecnología, bioquímica, agronomía	Copenhagen University	1
DI-15	Pablo D. Cárdenas	Ciencia de los alimentos, biotecnología, bioquímica, agronomía	Copenhagen University	1

A continuación, aparece toda la información de esta oferta

Proyecto DI-1: *Defining the role of cellular recycling mechanisms during stem cell formation and differentiation.*

Nombre y apellidos del Supervisor /
Eleazar Rodriguez

Afiliación del supervisor y Enlace a afiliación /

Department of Biology at Copenhagen University
https://forskning.ku.dk/soeg/result/?pure=da%2Fpersons%2F439566

Título del Proyecto/ Defining the role of cellular recycling mechanisms during stem cell formation and differentiation.

Perfil preferencial del estudiante/ Graduate or undergraduate student in Biology, Biotechnology or a closely related discipline.

Fechas orientativas/ Start date flexible; duration at least 6 months

Programa/ Detailed program of the traineeship period

Plants have amazing regenerative capacity, fueled by the intrinsic plasticity of mature cells to undergo reprogramming: a process by which a mature cell's internal makeup is remodeled to form totipotent stem cells which can then differentiate to form new organs. Reprogramming holds massive importance for agriculture and biotechnology, and consequently, substantial research has been undertaken to understand and harness reprogramming to boost regeneration. Epigenetic and transcriptome changes have been studied in detail but in contrast less is known about how cellular degradation pathways help to remodel the cell's internal constituents to allow stem cell formation. During the traineeship, the student will **help to define how cellular recycling mechanisms are implicated in stem cell formation**. Specifically, the student will work to characterize the molecular mechanisms by which autophagy, an eukaryote conserved proteolysis process, promotes stem cell formation from mature cells.

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 be proficient in:
- Plant stem cell tissue culture
- standard molecular and cell biology techniques relevant to the project including: protein and nuclei acid extraction, western blotting and qPCR, life cell imaging, protein-protein interaction studies, molecular cloning.
- reading and understanding scientific papers relevant to the topic
- documentation, analysis and visualization of scientific data
- presenting experimental findings to an audience

Seguimiento/ Monitoring Plan

- Daily supervision and support in the laboratory while performing the experiments
- Bi-weekly sessions to discuss the experimental findings and troubleshoot potential problems with the supervisors
- Presentation of the project in a research seminar to receive critical input and feedback from the whole group

Evaluación/ Evaluation plan

A final written report

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

Basic understanding of plant molecular biology and previous laboratory experience would be desired but not necessary.
Oral and written English proficiency is needed.

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 /
Eleazar Rodriguez

Afiliación del supervisor y Enlace a afiliación /
Department of Biology at Copenhagen University
https://forskning.ku.dk/soeg/result/?pure=da%2Fpersons%2F439566

Título del Proyecto/ Defining the role of cellular recycling mechanisms during flooding.

Perfil preferencial del estudiante/ Graduate or undergraduate student in Biology, Biotechnology or a closely related discipline.

Fechas orientativas/ Start date flexible; duration at least 6 months

Programa/ Detailed program of the traineeship period
Flooding is a global issue, with an average of 149 occurrences per year worldwide, leading to significant agricultural losses. Flooding is a multiple step stress for plants. When covered by water, the plant suffers from reduced gas exchange capacity and light availiability, which restricts growth. As the water recedes, the plant enters faces dehydration combined with a sudden increase in light intensity and oxygen availability. These contrasting changes in conditions severely decrease plant growth and yield. Flooding survival strategies are controlled by the phytohormone ethylene (ET) and by the cells ability to rapidly adapt to the fast changing conditions during flooding. Suprisingly, there are many gaps in our knowledge about flooding responses. For instance, little is known about how the cells remodel their proteome during the different stages of flooding stress. During the traineeship, the student will **help to define how autophagy, a proteolysis pathway, impacts cellular adaptation during flooding tolerance. Moreover, b**ased on these findings, the student could assist in creating flooding tolerant plants.

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 be proficient in:
- Plant culture and flooding stress test
- standard molecular and cell biology techniques relevant to the project including: protein and nuclei acid extraction, western blotting and qPCR, life cell imaging, protein-protein interaction studies, molecular cloning.
- reading and understanding scientific papers relevant to the topic
- documentation, analysis and visualization of scientific data
- presenting experimental findings to an audience

Seguimiento/ Monitoring Plan
  - Daily supervision and support in the laboratory while performing the experiments
  - Bi-weekly sessions to discuss the experimental findings and troubleshoot potential problems with the supervisor.
  - Presentation of the project in a research seminar to receive critical input and feedback from the whole group

Evaluación/ Evaluation plan: A final written report

Conocimientos técnicos o experiencia requerida (si procede) / Technical knowledge or experience required (if applicable)
Basic understanding of plant molecular biology and previous laboratory experience would be desired but not necessary.
Oral and written English proficiency is needed.

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
Eleazar Rodriguez and Cloe de Luxán Hernández

Afiliación del supervisor y Enlace a afiliación / Supervisor affiliation and Affiliation link
Department of Biology at Copenhagen University
https://forskning.ku.dk/soeg/result/?pure=da%2Fpersons%2F439566

Título del Proyecto/ Uncovering the functional specialization of two homologous MAPKs in defense and regeneration responses in *Physcomitrium patens*

Perfil preferencial del estudiante/ Graduate or undergraduate student in Biology, Biotechnology or a closely related discipline.

Fechas orientativas/ Start date flexible; duration at least 6 months

Programa/ Detailed program of the traineeship period
Plants activate both their defenses against pathogens and initiate regeneration upon recognition of specific molecular patterns associated with microbes (MAMPs) and damage (DAMPs). Our previous discoveries found out how MAP kinase MPK4a mediates the activation of immune responses triggered by MAMPs in the moss *Physcomitrium patens*. Continuing from this, our recent investigations revealed that the upstream MAP kinase kinase, MKK1c and MPK4a´s homolog MPK4b are also integral to these processes, and together with MPK4a, form a dynamic protein complex responsive to both MAMPs and DAMPs.
While MKK1c seems to activate both MPK4a and MPK4b, our latest discoveries point to a nuanced functional specialization. Specifically, only MKK1c and MPK4b are indispensable for the reprogramming of stem cells essential for regeneration, setting them apart from MPK4a's primarily defensive role. Additionally, RNA sequencing analyses confirmed that the absence of MKK1c leads to changes in the transcriptional reprogramming following both immunity and wounding stress. This underlines the importance of MKK1c in coordinating both responses. By delineating the roles of MKK1c, MPK4a, and MPK4b in this cooperative response mechanism, our research will provide a valuable model for studying the divergence between defense and regeneration, offering new avenues for enhancing plant health and resilience.
During the traineeship, the student will **help to identify the regulation of potential targets of MPK4a and MPK4b** at the transcriptional and protein level.

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 be proficient in:
- culturing, maintaining and collecting tissue from *Physcomitrium patens*
- standard molecular biology techniques relevant to the project including RNA isolation, cDNA synthesis, RT-qPCR, Molecular cloning and Co-IP
- reading and understanding scientific papers relevant to the topic
- documentation, analysis and visualization of scientific data
- presenting experimental findings to an audience

Seguimiento/ Monitoring Plan
- Daily supervision and support in the laboratory while performing the experiments

- Bi-weekly sessions to discuss the experimental findings and troubleshoot potential problems with the supervisors
- Presentation of the project in a research seminar to receive critical input and feedback from the whole group

Evaluación/ Evaluation plan
A final written report.

Conocimientos técnicos o experiencia requerida (si procede) / Technical knowledge or experience required (if applicable)
Basic understanding of plant molecular biology and previous laboratory experience would be desired but not necessary.
Oral and written English proficiency is needed.

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
Carlos G. Acevedo-Rocha, PI
Mehmet Mervan Çakar, Postdoc

Afiliación del supervisor y Enlace a afiliación / Supervisor affiliation and Affiliation link
Technical University of Denmark
The Novo Nordisk Center for Biosustainability (DTU Biosustain)
Computational Protein Engineering Group
https://www.biosustain.dtu.dk/research/research-areas/natural-products/computational-proteinengineering

Título del Proyecto/ Project Title
Accelerated Enzymatic CO$_2$ Reduction via Machine Learning-Guided Directed Evolution

Perfil preferencial del estudiante

Fechas orientativas/Available Dates
We can only host a candidate for 6 months on either May to October 2025 or June to November 2025

Programa/ Detailed program of the traineeship period
The traineeship program will cover both in silico and in vitro experimental parts of machine learning (ML)-guided engineering of formate dehydrogenase (FDH) enzymes to enhance their biocatalytic properties for carbon dioxide (CO2) reduction to formate.
Leveraging the software ProteusAI (see below), protein large language models (pLLMs) such as ESM-2 will be utilized to determine zero-shot scores to identify potentially beneficial mutations that enhance substrate affinity, turnover number, thermostability, operational stability, solubility, and overall fitness of the FDH enzyme. The effect of these identified mutations will then be experimentally tested using established methods including saturation and site-directed mutagenesis.
The experimental data will be used to train a ML model and generate data for further optimization. The top mutants will be biochemically characterized, process metrics will be determined and optimized, and the scalability of the biocatalytic processes will be tested on lab-scale reactors to test usability for industrial uses.

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 gain interdisciplinary expertise in ML-guided enzyme engineering and biocatalysis. Knowledge of enzyme structure-function relationships, focusing on enhancing multiple properties and scalability for industrial CO2 reduction processes will be gained.
The trainee will develop skills in computational modeling, molecular biology (e.g., mutagenesis and protein expression), and biochemical characterization of enzymes (kinetics). Additionally, experience will be gained in data analysis to optimize enzyme performance and scale up biocatalytic processes using lab-scale bioreactors. The traineeship will strengthen the ability to integrate computational and experimental approaches, solve research challenges in enzyme and process engineering, and apply their skills to sustainable biotechnological innovations in industrial enzyme applications.

Seguimiento/ Monitoring Plan
The monitoring plan will include regular progress reviews through weekly meetings to evaluate experimental data analysis. Experimental results will be systematically recorded and assessed for reproducibility using the LIMS Benchling. Supervisors will provide guidance, ensuring alignment with project objectives and milestones, timely troubleshooting, and successful completion of enzyme optimization and scalability goals.

Evaluación/ Evaluation plan
The evaluation plan will involve assessing the trainee's progress through milestone achievements, quality of experimental and computational data, and ability to analyze and interpret results. Final evaluation will include a comprehensive review of enzyme optimization outcomes, a detailed report, and a presentation demonstrating the trainee's knowledge, skills, and project contributions.

Conocimientos técnicos o experiencia requerida (si procede) / Technical knowledge or experience required (if applicable)
Basic molecular biology and biochemical laboratory skills. Experience in protein engineering, biocatalysis and process engineering is an advantage.

Especificaciones extra de la institución de acogida (si procede) / Additional specifications of the host institution (if applicable)
We work closely with the Biofoundry from DTU Biosustain in the áreas of automation and DNA sequencing services. https://www.biosustain.dtu.dk/technologies/biofoundry

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
We will use our ProteusAI software:
https://www.biorxiv.org/content/10.1101/2024.10.01.616114v1

Nombre y apellidos del Supervisor / Name and surname of the Supervisor
Carlos G. Acevedo-Rocha, PI
Max Finger-Bou, Postdoctoral researcher

Afiliación del supervisor y Enlace a afiliación / Supervisor affiliation and Affiliation link
Technical University of Denmark

The Novo Nordisk Center for Biosustainability (DTU Biosustain)
Computational Protein Engineering Group
https://www.biosustain.dtu.dk/research/research-areas/natural-products/computational-proteinengineering

Título del Proyecto/ Project Title
Development and Optimization of an Automated Workflow for Colony PCR in *Komagataella phaffii*

Perfil preferencial del estudiante
Preference will be given to students with background in molecular biology, biotechnology, or bioengineering. Experience with PCR and microbial culturing will be important, as well as interest in laboratory automation and high-throughput screening.

Fechas orientativas/Available Dates
We can accept a candidate for a minimum of 5-6 months after April 2025.

Programa/ Detailed program of the traineeship period
The project focuses on developing an automated workflow for performing high-throughput colony PCR reactions in Komagataella phaffii and optimizing it to suit the needs of genetic engineering projects that require time-intensive screening methods. This will streamline the process of screening recombinant K. phaffii strains and accelerate research projects in the field. The main objectives include:
- Comparing reproducibility and efficiency of existing DNA extraction protocols.
- Evaluating different polymerases and PCR conditions for optimal performance.
- Consider doing polymerase engineering using machine learning methods.
- Designing and optimizing a high-throughput colony PCR workflow.
- Integrating liquid-handling robots for sample preparation and PCR setup.
- Implementing data management strategies for tracking results efficiently.
- Validating the developed workflows in the context of Cas9-mediated genetic engineering experiments.

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 gain proficiency in designing and troubleshooting PCR based experiments, especially for colony PCR genotyping. The trainee will further get acquainted with the basic laboratory principles related to working with Komagataella phaffii, including growing the species in different conditions, designing genome editing experiments and verifying DNA sequencing results. Additionally, the trainee will gain familiarity colony-picking, liquid-handling robots and general automation tools, as well as proficiency in troubleshooting and optimizing high-throughput protocols.

Upon completing their traineeship, the trainee will be expected to be able to design and implement this type of workflow independently for different yeast or even bacterial species*.*

Seguimiento/ Monitoring Plan
Regular progress meetings will be held weekly to discuss experimental results and challenges. In addition, the trainee will be expected to present their plans, results and progress to the research group at least twice during their traineeship. Results will be systematically recorded using electronic lab notebooks (Benchling). Supervisors will provide guidance on experiment design, protocol optimization and troubleshooting.

Evaluación/ Evaluation plan
The trainee's performance will be evaluated based on milestone achievements, quality of systematic data management and recording, reproducibility of results, and ability to work independently, including designing, troubleshooting and optimizing protocols. The final assessment will include a presentation and a written report detailing project outcomes.

Conocimientos técnicos o experiencia requerida (si procede) / Technical knowledge or experience required (if applicable)
Previous hands-on experience with basic microbiology and molecular biology techniques, such as primer design, PCR and DNA extraction methods, will be important. The trainee is not expected to have previous experience with automation tools (although it is a plus), but it is expected to have interest in learning them.

Especificaciones extra de la institución de acogida (si procede) / Additional specifications of the host institution (if applicable)
The project will be conducted in collaboration with the Biofoundry at DTU Biosustain, which specializes in laboratory automation and synthetic biology.
https://www.biosustain.dtu.dk/technologies/biofoundry
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 DI-6: *Radial stability of neutron stars*

Nombre y apellidos del Supervisor / Name and surname of the Supervisor
Vitor Cardoso
Jaime Redondo-Yuste

Afiliación del supervisor y Enlace a afiliación / Supervisor affiliation and Affiliation link
Niels Bohr Institute, Strong group
https://strong-gr.com/ / https://vitorcardoso.strong-gr.com/ /
https://jredondoyuste.github.io/

Título del Proyecto/ Project Title
Radial stability of neutron stars

Perfil preferencial del estudiante
Bachelor's or Master's student with a background in Physics or closely related disciplines. Enthusiasm for theoretical research, numerical techniques, and problem-solving in General Relativity is highly valued.

Fechas orientativas/Available Dates
June-October 2025

Programa/ Detailed program of the traineeship period
The project begins with a review of Chandrasekhar's groundbreaking work on the stability of relativistic stars during gravitational collapse. The initial task will involve replicating and thoroughly understanding this work using a combination of analytical and numerical techniques.
The student will then extend the analysis to include the effects of viscosity, investigating whether this alters the onset of Chandrasekhar's instability. The approach will depend on the student's interests, ranging from an analytical exploration to a computational investigation of the relevant equations.
As a final step, the findings will be connected to current astrophysical constraints on the neutron star equation of state. The student will document their work in a written report and present their results to the research group, gaining experience in communicating scientific results to a specialised audience.

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 advanced knowledge of neutron star physics, particularly stability analysis and its connection to astrophysical observations. They will develop practical skills in General Relativity, perturbation theory, and numerical methods for solving differential equations.
Through hands-on research, the student will enhance their problem-solving skills and learn to independently tackle complex scientific questions. Communication skills will be strengthened through writing a report and presenting findings to an international audience. These experiences will prepare the student for further research or a career in physics and astrophysics.

Seguimiento/ Monitoring Plan
The student will meet with the supervisors weekly to discuss progress and address challenges. Supervisors will remain available outside of scheduled meetings for

guidance. Additional support will come from group members. The student will participate in regular group seminars and meetings to integrate into the research environment.

Evaluación/ Evaluation plan
The student's performance will be evaluated based on weekly meetings, the quality of their final report, and an oral presentation at the end of the internship. Feedback will be given regularly throughout the project and formally after the report and presentation, ensuring constructive input to aid the student's growth.

Conocimientos técnicos o experiencia requerida (si procede) / Technical knowledge or experience required (if applicable)
Familiarity with General Relativity, theoretical astrophysics, computational methods, or fluid dynamics is advantageous but not strictly required. A willingness to learn and adapt to new concepts is essential.

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

Name and surname of the Supervisor: Professor Bjørn Ebdrup and Dr María Hernández Lorca

Supervisor affiliation and Affiliation link:

Bjørn Ebdrup is a clinical professor at the University of Copenhagen, senior physician, and the research leader of the group Center for Neuropsychiatric Schizophrenia Research (CNSR) at Psychiatric Center Glostrup.

María Hernández Lorca is Post Doc at CNSR and COPSAC (Gentofte Hospital)
https://www.psykiatri-regionh.dk/CNSR/Sider/default.aspx
https://ikm.ku.dk/ansatte/?pure=da/persons/38122
https://copsac.com/

Project Title: Pediatric Neuropsychiatry

Student's profile: The student should have an interest in neuroscience, psychiatry and/or biomedicine. The student should have an interest in research, and a high level of written and spoken English is required.

Available Dates: Flexible. To be agreed with the student. The stay should cover a minimum period of 4 months.

Detailed program of the traineeship period
The trainee will work on longitudinal data from the birth cohort COPSAC2010 (https://copsac.com/home/copsac-cohorts/copsac2010-cohort/) and will investigate predictors of pediatric brain health. The program consists of three work packages, described below:
1. Work package 1: Orientation and Foundation
   o Introduction to the project's goals and scope.
   o Learning about the cohort and data/measurements.
2. Work package 2: Training
   o Understanding the design, aim, and methods.
   o Participate in the weekly meetings and workshops on the group's projects.
   o Get familiar with the data and R programming.
3. Work package 3: Results and interpretation
   o Learn to interpret the results of the project
   o Write a report following the scientific paper structure on the results.
Throughout the program, the trainee will have access to the mentor for guidance and regular progress assessments to ensure they are on track with their learning objectives and project goals.

Knowledge, skills and competences to be acquired by the trainee at the end of the traineeship (expected Learning Outcomes) (aprox. 100 palabras)
The student will acquire knowledge of longitudinal studies, including their scope, aims, methods, associations, effects, and the applicability of results in public health and/or clinical settings. The student will be able to define an objective,

apply the required methodology, and subsequently interpret the results. Finally, the student will be able to communicate the findings both orally and in a written report to academic peers.

Monitoring Plan

Professor Ebdrup will be the responsible P.I. and Dr Hernández-Lorca will provide guidance and monitoring. The trainee will join weekly group meetings and should present her progress at the end of the stay.

Evaluation plan

We expect the trainee to gain independence in the scientific process. Therefore, by the end of the stay, the trainee is expected to critically evaluate scientific designs and methods and to be able to write a scientific report. Based on these criteria, along with their daily work, the trainee will receive a brief written evaluation of their achievements during the stay. This document will be provided by Professor Ebdrup.

Technical knowledge or experience required (if applicable)

Being familiar with R code is a plus.

Additional specifications of the host institution (if applicable)

N/A

Availability to evaluate credit covalidation reports (Yes / No)

Yes

Any additional important information

Please contact María Hernández Lorca (maria.lorca@dbac.dk) or Prof. Bjørn Ebdrup
(bjoern.ebdrup@regionh.dk) if you need additional information

Nombre y apellidos del Supervisor / Name and surname of the Supervisor
>   Dr. Fernando Salgado Polo

Afiliación del supervisor y Enlace a afiliación / Supervisor affiliation and Affiliation link
>   University of Copenhagen
>   Faculty of Health and Medical Sciences
>   Department of Biomedical Sciences
>   Section of Molecular and Translational Pharmacology
>   Blegdamsvej 3
>
>   Grupo de Martin Gustavsson:
>   https://bmi.ku.dk/english/research/molecular-and-translational-pharmacology/gustavsson-group/

Título del Proyecto/ Project Title
Estudio del efecto del colesterol sobre la señalización celular de los receptores de quimioquinas

Perfil preferencial del estudiante
>   Conocimientos de Biología celular, Bioquímica y/o Inmunología. Interés por la señalización celular y por comprender la regulación de la respuesta inmune.
>   Se prefiere un/a estudiante que realice una estancia de más de cuatro meses.

Fechas orientativas/Available Dates
>   Disponibilidad amplia a partir de agosto de 2025.
>   De forma orientativa, se propone el periodo de agosto de 2025 a marzo de 2026.

Programa/ Detailed program of the traineeship period
>   **Objetivo del proyecto**: Comprender el mecanismo por el que el colesterol regula la actividad de los receptores de quimioquinas
>
>   **Subobjetivo 1**: Determinar qué receptores necesitan colesterol para tener actividad.
>   - El/la estudiante aprenderá técnicas de cultivo celular, la transfección de células de mamífero y la realización de ensayos celulares en placas multipocillo para detectar señales de transferencia de energía por resonancia de bioluminiscencia (BRET).
>   - Se estudiarán los receptores de tipo CXC (CXCR1-CXCR4) y de tipo CC (CCR1-CCR10) para detectar el acoplamiento a proteínas G. Se dispone de los plásmidos para realizar estos experimentos y se conocen dos receptores que servirán de controles positivo y negativo.
>   - En los experimentos, se tratará a las células con ciclodextrinas, que son capaces de extraer colesterol de las membranas celulares. De este modo, se analizará la actividad de los receptores en presencia y en ausencia de colesterol.
>   **Subobjetivo 2**: Analizar el efecto del colesterol en otras rutas de señalización.
>   - El/la estudiante aprenderá los métodos para detectar otras vías de señalización: acoplamiento a beta-arrestinas e internalización de receptores.
>   - Aplicación de estos métodos con los receptores para los que se haya detectado un cambio de actividad en presencia o ausencia de colesterol.

Subobjetivo 3: Integrar los datos obtenidos y plantear hipótesis sobre el mecanismo de modulación.
- Analizar parámetros de farmacología, como la ponencia y la eficacia, a partir de los resultados obtenidos.
- Contrastar el efecto celular del colesterol con la información estructural disponible en bases de datos acerca de la interacción del colesterol con los receptores estudiados.

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)

- Técnicas de cultivo celular de células adherentes.
- Planificación, ejecución y análisis de los experimentos de señalización celular ya establecidos en el grupo de investigación.
- Comprensión teórica y práctica de las técnicas basadas en la transferencia de energía por resonancia de bioluminiscencia (BRET) y su aplicación en el estudio de receptores acoplados a proteína G (GPCRs).
- Capacidad de preparar presentaciones científicas en las que exponer y discutir acerca de los resultados obtenidos.
- Debido al enfoque multidisciplinar del departamento, el/la estudiante conocerá otros temas de investigación sobre los receptores de quimioquinas; por ejemplo, estructura de proteínas, ensayos clínicos y migración celular.

Seguimiento/ Monitoring Plan

El supervisor formará al estudiante en las tareas de laboratorio.

El seguimiento del progreso del proyecto se realizará a través de reuniones semanales con el supervisor directo, reuniones mensuales con el grupo de investigación y una presentación científica que llevará a cabo el/la estudiante para la sección del departamento al final de la estancia.

Evaluación/ Evaluation plan

Se evaluarán las habilidades técnicas que haya desarrollado el/la estudiante en su trabajo de laboratorio, así como su destreza en el análisis de datos. Al final del proyecto, el/la estudiante presentará sus resultados para la sección de *Molecular and Translational Pharmacology*, lo que permitirá evaluar la comprensión del proyecto y la capacidad de pensar en los siguientes pasos.

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 convalidación de créditos (Sí/No) / Availability to evaluate credit covalidation reports (Yes / No)

Otra información relevante / Any additional important information

Si fuera necesario, se puede ofrecer ayuda para encontrar alojamiento en Copenhague.

Nombre y apellidos del Supervisor / Name and surname of the Supervisor
Johan Andersen-Ranberg

Afiliación del supervisor y Enlace a afiliación / Supervisor affiliation and Affiliation link
University of Copenhagen, Department of Plant and Environmental Sciences. Section of Plant Biochemistry

https://researchprofiles.ku.dk/da/persons/johan-andersen-ranberg
https://plen.ku.dk/english/research/plant_biochemistry/algae-biochemistry/

Título del Proyecto/ Project Title
Ocean Colors: Characterization of genes involved in marine microalgae carotenoid biosynthesis

Perfil preferencial del estudiante

Fechas orientativas/Available Dates
July, August and September 2025. September would be optional.

Programa/ Detailed program of the traineeship period

The oceans are responsible for half of global CO_2 fixation where microalgae are the main contributors to photosynthesis that takes place under the sea surface. Microalgae have adapted their pigment composition to ensure efficient photosynthesis in different marine environments. To do this they use pigments different from the ones found in terrestrial photosynthetic organisms. Marine carotenoids are of increasing interest due to their industrial and ecological relevance. Fucoxanthin, astaxanthin and peridinin are good examples. Peridinin in particular is present in microalgae living in symbiosis within corals. This carotenoid allows them to absorb light efficiently even if the light goes through the animal tissue. However, many steps in the biogenesis of these carotenoids remain a mystery to be solved. Understanding the biosynthetic pathways behind marine carotenoids is key for the sustainable production of these compounds and opens the possibility of expanding and improving photosynthesis in plants.

Literature of interest:
Dautermann, O et al. "An algal enzyme required for biosynthesis of the most abundant marine carotenoids." Science advances vol. 6,10 eaaw9183. 4 Mar. 2020.
Jinkerson, Robert E et al. "Biosynthesis of chlorophyll c in a dinoflagellate and heterologous production in planta." Current biology : CB vol. 34,3 (2024): 594-605.e4.

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) (aprox. 100 palabras)

During the project, the trainee will learn methods for the characterization of microalgae genes involved in carotenoid biogenesis. Molecular biology tools for genotyping and vector cloning will be employed during the Erasmus internship. In addition, the student will be introduced to microalgae cultivation and characterization of their pigments profile, using analytical chemistry techniques such as HPLC-MS, using *Nannochloropsis oceanica* as model organism. Molecular biology and fluorescence microscopy methods will be used for confirmation of protein expression and localization. Genes of interest will

be in addition characterized via transient expression in tobacco, followed by analytical chemistry techniques as described previously.

Seguimiento/ Monitoring Plan
The trainee will have weekly meetings with the mentor to plan experimental work and discuss the progress. The trainee will also join the bi-weekly group meetings where they will present their progress on the project and get feedback.

Evaluación/ Evaluation plan
The trainee's progress in the experimental work, will be presented and assessed during a group meeting at the end of the internship. Additionally, the trainee will present a scientific publication of their choice at a group meeting once a month, demonstrating their communication skills and ability to critically engage with scientific literature.

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

It is recommended that the candidate has experience in Molecular biology, analytical chemistry, and biochemistry

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

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

Afiliación del supervisor y Enlace a afiliación / Supervisor affiliation and Affiliation link
PLEN, University of Copenhagen

Título del Proyecto/ Project Title
Elucidating genes important for organ development and function

Perfil preferencial del estudiante

Fechas orientativas/Available Dates
2nd half of 2025 - 2026

Programa/ Detailed program of the traineeship period
The student will collect a large compendium of gene expression data (months 1-2) and perform gene expression analysis (months 3-) to identify organ specific genes. Other analyses that study gene functions will follow.

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) (aprox. 100 palabras)
This is a purely computational Project, and no lab work is required. Various genomic and transcriptomic analyses, including gene expression estimation, sample quality control, clustering, gene family identification, gene set enrichment analysis, Python programming

Seguimiento/ Monitoring Plan
The student will meet with the supervisor on weekly basis, and the done and future work will be evaluated through continuous feedback

Evaluación/ Evaluation plan
As above, the student will be provided with verbal and written feedback.

Conocimientos técnicos o experiencia requerida (si procede) / Technical knowledge or experience required (if applicable)
Basic knowledge of bioinformatics. Python programming desirable but not essential.

Especificaciones extra de la institución de acogida (si procede) / Additional specifications of the host institution (if applicable)
None

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

Nombre y apellidos del Supervisor / Name and surname of the Supervisor
Michael Palmgren and Mai Duy Luu Trinh

Afiliación del supervisor y Enlace a afiliación / Supervisor affiliation and Affiliation link
Department of Plant and Environmental Sciences, University of Copenhagen
https://plen.ku.dk/english/

Título del Proyecto/ Project Title
Identification of *cis*-elements for the TSARL1 transcription factor, a key regulator of saponin biosynthesis in *Chenopodium quinoa* Willd.

Perfil preferencial del estudiante

Fechas orientativas/Available Dates
This traineeship lasts for three months. A specific time schedule can be discussed beforehand.

Programa/ Detailed program of the traineeship period (aprox. 100-200 palabras)
Chenopodium quinoa Willd. (quinoa) is a promising crop for climate change resilience due to its abiotic stress tolerance and high nutritional value. However, quinoa seeds accumulate antinutritional saponins, requiring removal during processing. The bHLH transcription factor TSARL1 regulates saponin biosynthesis and is a target for breeding strategies. While we've identified genes indirectly controlled by TSARL1, the specific cis-elements for its activity are still largely unknown. Identifying these cis-elements will help us understand the direct regulation of saponin biosynthesis. This project aims to identify TSARL1 cis-elements through biolayer interferometry to study DNA-protein interactions.

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) (aprox. 100 palabras)
After completing the traineeship, the trainee will be able to:
- Understand and obey laboratory safety requirements.
- Produce recombinant proteins in E. coli, which serves as a heterologous expression system.
- Purify HIS-tagged proteins using an open resin column or a mechanical protein purification system.
- Design labeled DNA fragments.
- Perform PCR synthesis of biotinylated DNA probes.
- Identify DNA-protein interactions using the biolayer interferometry method.

Seguimiento/ Monitoring Plan
The trainee will work in the lab under the supervision of the supervisor.
Guidance and discussion will be arranged weekly to keep up with the experimental process.

Evaluación/ Evaluation plan
The trainee will be evaluated by the supervisor based on:
- His/her performance and behavior in the lab.
- His/her final experimental report at the end of the traineeship.

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

The trainee needs sound knowledge of microbiology, molecular biology, and biochemistry.

The trainee needs to have experience working in the lab, including preparing solutions and using essential lab tools and devices.

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 DI-12: *Identification of tissue specific expression and subcellular localization of novel transporters in quinoa*

Nombre y apellidos del Supervisor / Name and surname of the Supervisor
Michael Palmgren and Mai Duy Luu Trinh

Afiliación del supervisor y Enlace a afiliación / Supervisor affiliation and Affiliation link
Department of Plant and Environmental Sciences, University of Copenhagen
https://plen.ku.dk/english/

Título del Proyecto/ Project Title
Identification of tissue specific expression and subcellular localization of novel transporters in quinoa

Perfil preferencial del estudiante

Fechas orientativas/Available Dates
This traineeship lasts for three months. A specific time schedule can be discussed beforehand.

Programa/ Detailed program of the traineeship period
Chenopodium quinoa Willd. (quinoa) is a promising crop for climate change resilience due to its abiotic stress tolerance and high nutritional value. However, quinoa seeds accumulate antinutritional saponins, requiring removal during processing. Transportation of saponin across quinoa tissues and within quinoa organs are largely unknown. Using omics and bioinformatics analysis, we have identified six potential genes encoding putative ATP-binding cassette type C (ABCC) and multidrug and toxic compound extrusion (MATE) transporters. This offered project aims to study on tissue specific expression and subcellular localization of those identified novel transporters by using reverse transcription (RT)- PCR and heterologous expression in tobacco.

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) (aprox. 100 palabras)
After completing the traineeship, the trainee will be able to:
- Understand and obey laboratory safety requirements.
- Design primers specific for PCR amplification of target genes
- Clone target genes into destination vector for heterologous expression system
- Perform RT-PCR
- Trasfect constructed vectors to Agrobacterium
- Infiltrate transfected Agrobacterium into tobacco leaves
- Use confocal microscopy to study on subcellular localization of fluorophore-tagged transporters

Seguimiento/ Monitoring Plan
The trainee will work in the lab under the supervision of the supervisor.
Guidance and discussion will be arranged weekly to keep up with the experimental process.

Evaluación/ Evaluation plan
The trainee will be evaluated by the supervisor based on:
- His/her performance and behavior in the lab.
- His/her final experimental report at the end of the traineeship.

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

The trainee needs sound knowledge of microbiology, molecular biology, and biochemistry.

The trainee needs to have experience working in the lab, including preparing solutions and using essential lab tools and devices.

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

Nombre y apellidos del Supervisor / Name and surname of the Supervisor
Michael Palmgren and Mai Duy Luu Trinh

Afiliación del supervisor y Enlace a afiliación / Supervisor affiliation and Affiliation link
Department of Plant and Environmental Sciences, University of Copenhagen
https://plen.ku.dk/english/

Título del Proyecto/ Project Title
Study on biological function of quinoa saponins against fungal infection

Perfil preferencial del estudiante

Fechas orientativas/Available Dates
This traineeship lasts for three months. A specific time schedule can be discussed beforehand.

Programa/ Detailed program of the traineeship period (aprox. 100-200 palabras)
Chenopodium quinoa Willd. (quinoa) is a remarkable crop known for its resilience to climate change and high nutritional value. However, its seeds contain saponins, antinutritional compounds that must be removed during processing. We have successfully inhibited saponin accumulation in quinoa seeds using an advanced mutagenesis approach. To understand the implications of this change, we will investigate the effects of saponins on fungal pathogens and pests. This offered project will assess the toxicity of quinoa saponins on isolated fungal strains and examine how fungal infections affect seed germination and seedling development by comparing wild-type quinoa seeds, which contain saponins, with mutated, saponin-free seeds.

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)

After completing the traineeship, the trainee will be able to:
- Understand and obey laboratory safety requirements.
- Isolate infected fungi from quinoa sedes and cultivate them under laboratory conditions.
- Purify single fungal spore for pure strain isolation.
- Purify DNA genome from fungi species.
- Identify fungi species by using molecular methods and morphology-based methods.
- Extract saponins from quinoa seeds.
- Study on toxicity of extracted saponins against fungi in vitro.
- Study on protective ability of quinoa saponins against fungal infections in vivo.

Seguimiento/ Monitoring Plan
The trainee will work in the lab under the supervision of the supervisor.
Guidance and discussion will be arranged weekly to keep up with the experimental process.

Evaluación/ Evaluation plan
The trainee will be evaluated by the supervisor based on:
- His/her performance and behavior in the lab.
- His/her final experimental report at the end of the traineeship.

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

The trainee needs sound knowledge of microbiology, molecular biology, and biochemistry.

The trainee needs to have experience working in the lab, including preparing solutions and using essential lab tools and devices.

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

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
A wild transformation: Cracking the molecular code for transformability in Chenopodium album

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

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

Programa/ Detailed program of the traineeship period (aprox. 100-200 palabras)
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. We are working to develop the local 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 antinutritional chemical compounds called saponins. We are editing saponin biosynthetic genes in C. album to make it fit for human consumption. However, plant transformation and regeneration are the basic requirements and major bottlenecks to fully deploy the potential of its genome editing.
In this project, you will be conducting experiments to establish a working Agrobacteriummediated transformation and gene editing protocol for C. album. We already have a basic regeneration protocol, and we are working now on using floral explants for transformation and grafting, which will be included in the current project. Designing CRISPR/Cas based genome editing constructs which will be used for transformation will also be part of your 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)
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 of working with plants.

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
Co-supervisor: Sanskriti Vats

Proyecto DI-15: *Nutritional characterization of the local wild plant C. album as a potential novel crop*

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
Nutritional characterization of the local wild plant C. album as a potential novel crop

Perfil preferencial del estudiante
Food science, biotechnology, biochemistry, agronomy

Fechas orientativas/Available Dates
Dates to be agreed, ideally at least 3 months

Programa/ Detailed program of the traineeship period
We have a significant challenge to produce enough food, with the constraints of a rapidly increasing population, climate change and most agricultural land surfaces being already exploited. The lack of diversity in our food system makes it especially vulnerable to pests and diseases, while thousands of edible and widely distributed wild plants have the potential to be developed as new crops. Our mission in the Plant Bioengineering group is to bridge molecular, agricultural and food sciences to create the crops of the future, starting from local wild plants such as Chenopodium album. In this project, you will focus on the nutritional characterization of C. album seeds. This involves determining the protein, carbohydrate, and fat content of our seed collection, but also more in-depth analysis of their composition, including amino acids, fatty acids, fiber content, and in vitro digestibility. These comprehensive analyses will help us better understand the potential of C. album seeds as a nutritious food source.

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) (aprox. 100 palabras)
Laboratory experience in nutrient profiling, seed functional properties, protein quality assessment

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 of working with plants.

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
Co-supervisor: Alexandra Sanfeliu Meliá

Número de Proyecto	Supervisor	Área de Conocimiento	Lugar de realización	Número de plazas
RU-1	Maria Dimitriadi	Biology, Biochemistry, Neurobiology	University of Hertfordshire	1
RU-2	Clara Albiñana	Data Analysis, Health data science, psychiatry, bioinformatics	Big Data Institute, University of Oxford	1
RU-3	Isabel Douterelo Soler	Biological or Environmental Sciences.	University of Sheffield	1
RU-4	Isabel Douterelo Soler	Biological or Environmental Sciences.	University of Sheffield	1
RU-5	Marta Vallejo	Biology, Bichemistry, Bioinformatics, Machine learning	Heriot-Watt University Edimburg	1
RU-6	Amalia Ruiz Estrada	Biology, Biomedicine, Pharmacy, Chemistry, Chemical Engineering or any related area.	University of Bradford	1
RU-7	Rubén de Dios/Ronan McCarthy	Microbiology	Brunel University of London	1
RU-8	Alfred Fernandez Castane and Marta Maso-Martinez	Microbial Biotechnology, Biotechnology, Biochemistry, Biology, Bioengineering, Microbiology or similar fields.	Aston University (Birmingham)	1
RU-9	Larissa Zárate García	Biology / Biotechnology / Medicine / Biochemistry / Biophysics	Imperial College London	1
RU-10	Ana Sara Cordeiro	Biochemistry, Sciences, Chemical Engineering, Chemistry	University of Strathclyde	1
RU-12	Magda Pascual-Borràs	Chemistry	Newcastle University	1
RU-13	Shoib Siddiqui	Biology, Biochemistry, cancer research	University of Hertfordshire	1
RU-14	Adrian Bradu/ Alejandro Martínez Jiménez	Physical Sciences, Computing and Software engineering	University of Kent, Applied Optics Group	2

A continuación, aparece toda la información de esta oferta

Proyecto RU-1: *Elucidating the cellular and molecular mechanisms underlying motor neuron diseases: insights from the nematode Caenorhabditis elegans*

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 motor neuron diseases: insights from the nematode *Caenorhabditis elegans*

Perfil preferencial del estudiante
Excellent technical skills, hard working, passion for research, be able to stay for 4-6 months in total.

Fechas orientativas/Available Dates
1st of June 2025 to 31st of December 2025 (6 months is required for project completion).
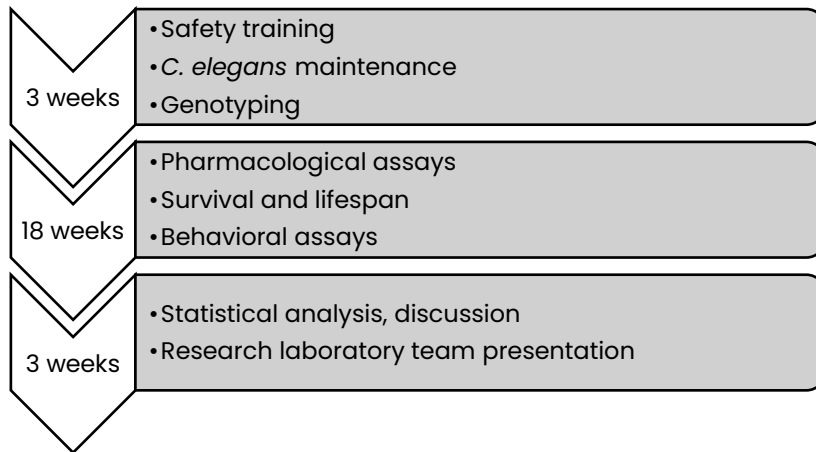
Programa/ Detailed program of the traineeship period
We are interested in the cellular and molecular pathways that underlie motor neuron disorders. In the Dimitriadi lab we use the nematode *Caenorhabditis elegans* and a range of pharmacological, genetic and behavioural assays to elucidate disease pathogenesis. The student will be able to choose among different projects, including spinal muscular atrophy and charcot-marie-tooth disease with the ultimate goal to identify the key pathways that are needed to spearhead further therapeutic avenues for 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)

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

n/a

Nombre y apellidos del Supervisor / Name and surname of the Supervisor
Clara Albiñana Climent

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

University of Oxford - https://www.psych.ox.ac.uk/team/clara-albinana

Título del Proyecto/ Project Title

Linking clinical and molecular phenotypes of depression

Perfil preferencial del estudiante

You should have, or be studying, a degree in computer science, biology, biomedical sciences, medicine, statistics, public health or other related study area.

You should have experience in R or python.

This project will use quantitative data analysis, so experience of and/or an interest in statistics would be beneficial. If you have had no prior training in statistics, you will have the opportunity to learn these skills during the internship.

Fechas orientativas/Available Dates

Any 2-4 months period between 1st of June 2025 to 31st of December 2025

Programa/ Detailed program of the traineeship period

Depression is a common mental disorder, but it presents high levels of heterogeneity, both in terms of its symptoms and molecular phenotypes. For symptoms, some individuals may struggle primarily with overwhelming sadness and low energy, while others might experience irritability, insomnia, or even physical symptoms like chronic pain. At the molecular level, depression shows a complex genetic architecture, with thousands of genetic associations of small effect together with neurotransmitter and hormonal imbalances, differential inflammation and immune responses etc. However, it is unknown how the clinical and molecular phenotypes of depression intersect.

The project aims to investigate the overlap between clinically and biologically defined subtypes of depression in the UK Biobank. In practise, to goal is to combine mental-health questionnaire data together with blood multi-omic data (genomics, metabolomics, proteomics, blood biomarkers) and apply unsupervised clustering algorithms to identify subgroups of depression cases. Identifying these subgroups might lead to better diagnosis and treatment options for these patients.

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)

You will have the opportunity to work alongside a postdoctoral researcher and participate in a very engaging research environment under the group of Prof. Naomi Wray at the Big Data Institute of the University of Oxford. You will gain experience in analysing large biological datasets and train a range of machine learning techniques in a very active research field. At the end of the project you will present your findings back to the group in an internal meeting. If any aspect of your analysis is included in a future publication, you may be included as a named co-author on that paper.

Seguimiento/ Monitoring Plan

There will be weekly supervisory meetings to discuss analyses plans and progress and the student will get a desk in an open desk area where the whole of the group sits, with the added benefit of being involved in daily matters and the possibility to resolve smaller issues.

Evaluación/ Evaluation plan

The student will have the opportunity to get feedback on a written report about the project and the stay will conclude with an oral presentation to the group.

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

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

https://www.sheffield.ac.uk/mac/people/civil-academic-staff/isabel-douterelo-soler

Título del Proyecto/ Project Title

Microbial Source Tracking in freshwater ecosystem: development of a DNA based method to quantifying sources of pollution

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/Available Dates

June-September 2025

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)

· Basic laboratory skills
· 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)

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

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

https://www.sheffield.ac.uk/mac/people/civil-academic-staff/isabel-douterelo-soler

Título del Proyecto/ Project Title

Investigating bio-remediation capabilities of constructed wetlands to treat pollution

Perfil preferencial del estudiante

1. Qualifications: BSc/Msc in Biological or Environmental Sciences, Biotechnology, Molecular Biology,

2. Knowledge of molecular biology, including basic laboratory skills (e,g, DNA extractions, PCR)

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

Fechas orientativas/Available Dates

June-September 2025

Programa/ Detailed program of the traineeship period

This project explores the use of biofilms in constructed wetlands to remove pollutants from surface water run-off. Biofilms are communities of microorganisms that attach to surfaces and can aid in biodegradation of pollutants. Constructed wetlands mimic natural wetland functions and can be enhanced with biofilms for better pollutant breakdown. The project involves field work, and studies in small-scale wetlands with local biofilms and porous substrates, encouraging biofilm growth and monitoring pollutant concentrations, biofilm development, and water quality. The goal is to analyse biofilm effectiveness in pollutant removal using molecular methods (i.e. DNA/RNA extraction and metagenomics) to identify bacteria and genetic degradation pathways and enzyme activity using traditional fluorometric methods in laboratory incubation experiments.

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 water quality analysis in freshwater ecosystem, by learning fieldwork skills and l how to monitor physico-chemical parameters in wetlands. 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)

- · Basic laboratory skills

- · Experience in molecular methods (e.g. DNA extractions and PCR).

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

Nombre y apellidos del Supervisor / Name and surname of the Supervisor
Dr Marta Vallejo

Afiliación del supervisor y Enlace a afiliación / Supervisor affiliation and Affiliation link
Heriot-Watt University
https://researchportal.hw.ac.uk/en/persons/marta-vallejo

Título del Proyecto/ Project Title
Deep Learning-based Characterisation of Protein Aggregation in amyotrophic lateral sclerosis (ALS)

Perfil preferencial del estudiante
Interest in interdisciplinary areas such as biotechnology and biomedicine in combination with machine learning, bioinformatics or statistics. For people with an interest in machine learning, programming is desirable. However, willingness to learn is also acceptable.

Fechas orientativas/Available Dates
Flexible

Programa/ Detailed program of the traineeship period
The proposed work seeks to develop innovative computational techniques to address pressing challenges in neurodegenerative diseases, specifically amyotrophic lateral sclerosis (ALS). ALS is a devastating and progressive condition that is classified as a rare disease, with limited research efforts and scarce data due to its low prevalence. This research represents a critical contribution at the intersection of machine learning, computational science, and clinical neuroscience, aligning with key trends in personalised medicine to overcome these challenges.

In our last paper (https://doi.org/10.1101/2024.09.22.24313406), we developed advanced deep learning models with attention mechanisms and transfer learning to train immunohistochemistry (IHC) brain tissue images to understand the dysfunction of TDP-43 proteins in relation to cognitive impairment in ALS. We significantly extended the dataset using conventional image processing techniques. This is the first step in a series of machine learning developments aimed at addressing multiple critical research questions in the ALS field, including biomarker discovery, disease progression modelling, ALS subtypes, and personalised therapeutic approaches.

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 enhance their understanding of immunohistochemistry images and protein aggregation in ALS, focusing on data preparation, visualisation, and the use of applied machine learning or advanced statistical techniques to characterise proteinopathy. They will gain hands-on experience with cutting-edge methods, contributing to meaningful insights in the field. The trainee will be encouraged to generate publishable results, with mentorship extending beyond the traineeship to support this goal. Previous students in similar roles have successfully produced high-quality results and are currently preparing publications from related datasets, demonstrating the potential for impactful contributions.

Seguimiento/ Monitoring Plan
The trainee will take part in weekly group meetings to share updates on their activities and receive feedback and guidance. Opportunities for peer interaction will be encouraged.

Evaluación/ Evaluation plan
The applicant is expected to contribute towards research and generate material to be published in a suitable journal/conference. Finally, the applicant will conclude their visit at Heriot-Watt University by giving a talk to the department. The applicant will be able to present their work during events at the school.

Conocimientos técnicos o experiencia requerida (si procede) / Technical knowledge or experience required (if applicable)
Programming skills are recommended, particularly for tasks involving data analysis, visualisation, and the application of machine learning techniques.

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

Proyecto RU-6: *Development of advanced nanocarriers for drug delivery*

Nombre y apellidos del Supervisor / Amalia Ruiz Estrada

Afiliación del supervisor y Enlace a afiliación / Institute of Cancer Therapeutics (https://www.bradford.ac.uk/staff/gruizestrada/#biography)

Título del Proyecto/ Development of advanced nanocarriers for drug delivery

Perfil preferencial del estudiante/ Biology, Biomedicine, Pharmacy, Chemistry, Chemical Engineering or any related area.

Fechas orientativas/ There's flexibility for joining the group between the 1st of June 2025 to 31st of December 2025.

Programa/ The projects are focused on the design and development of smart (stimuli-responsive) nanocarriers to improve anticancer treatments, besides introducing new targeting approaches to enhance efficacy and to reduce the side effects of existing chemotherapeutics. The research involves the application of novel formulations of liposomes or polymeric nanoparticles to fabricate and scale-up multifunctional nanoparticles for combinatory therapy with photothermal or photodynamic therapy.

Workplan:
1.   Synthesis of nanoparticles co-loaded with a photothermal agent and a chemotherapeutic drug.
2.   Characterisation of the colloidal properties and Encapsulation Efficiency.
3.   Cell uptake evaluation using live fluorescence microscopy and flow cytometry.
4.   Assessment of cell viability after irradiation with a NIR laser via resazurin assay.

Competencias a adquirir por parte del estudiante/ The host research group sits in the Institute of Cancer Therapeutics. Our expertise combines cell biology, formulation, and pharmacology to take medicines and diagnostics from concept to clinic. The applicant will have access to top-notch training in diverse techniques such as synthesis and functionalisation of nanomaterials with different bioactive compounds, life-cell imaging, cytotoxicity assays, and the biological evaluation in 2D and 3D spheroids models of cancer. The applicant will have access to the facilities of the Analytical Centre for research support with several techniques available for nanomaterial characterisation (DLS, Raman spectroscopy, UV-vis and fluorescence spectroscopy, among others).

Seguimiento/ The applicant's research progress will be monitored by weekly lab meetings supervised by Dr Amalia Ruiz. The dynamic of the group also involves journal clubs and scientific seminars, and the applicant will benefit from a medium size research group formed by technical staff, PhD students and PGRA.

Evaluación/ The applicant will submit a report at the end of the internship with a summary of the research outcomes in the format of a research article.

Conocimientos técnicos o experiencia requerida (si procede) / Ideally students with a background in Biology, Biomedicine, Pharmacy, Chemistry, Chemical Engineering or any related area.

Especificaciones extra de la institución de acogida (si procede) / not applicable

Disponibilidad para evaluar informes de covalidación de créditos (Si/No) / Yes

Otra información relevante / No

Nombre y apellidos del Supervisor / Name and surname of the Supervisor
Dr Rubén de Dios Barranco and Prof 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 June 1st to December 31st 2025 (depending on 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 Prof. 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 of 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 of London as a visiting student, avoiding the requisite of a visa application.

Nombre y apellidos del Supervisor / Name and surname of the Supervisor
Dr Alfred Fernandez Castane and Dr Marta Maso-Martinez

Afiliación del supervisor y Enlace a afiliación / Supervisor affiliation and Affiliation link
Energy and Bioproducts Research Institute, Aston University
Energy and Bioproducts Research Institute | Aston University

Título del Proyecto/ Project Title
Exploring magnetotactic bacteria growth and physiology

Perfil preferencial del estudiante
Preferred candidates are students pursuing a BSc or MSc in Biotechnology, Biochemistry, Biology, Bioengineering, Microbiology or similar fields.

Fechas orientativas/Available Dates

Programa/ Detailed program of the traineeship period

Magnetotactic bacteria (MTB) are unique microorganisms capable of naturally synthesizing a type of magnetic nanoparticles called magnetosomes. Magnetosomes hold significant potential for applications in fields such as bionanotechnology, biomedicine (e.g., targeted drug delivery, MRI contrast agents) and environmental remediation. Understanding and optimizing the growth conditions and physiological properties of MTB is key for unlocking the future of these applications.
The traineeship will focus on developing expertise in the cultivation and study of MTB. These include screening of different parameters that affect bacterial physiology, growth and magnetosome production. The student will develop practical bioprocessing and microbiology skills and gain hands-on experience with advanced analytical techniques. Comprehensive training will be provided on all techniques, and the student will actively participate in experimental planning, data collection, and analysis. As part of a collaborative research group, the trainee will gain insight into the daily life of a researcher and experience working in a dynamic professional environment within the Energy and Bioproducts Research Institute (EBRI) in Aston University, acquiring valuable skills for a future career in science.

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 acquire a strong foundation in microbiology culturing techniques, gain expertise in bioproducts production, such as magnetosomes or biopolymers, physiological monitoring, and optimizing growth conditions.
The student will develop advanced skills in aseptic techniques, optical and fluorescence microscopy, and analytical methodologies, including inductively coupled plasma optical emission spectrometry, gas chromatography-mass spectrometry, and flow cytometry. Beyond technical expertise, the trainee will enhance their ability to design and execute experiments independently, critically analyse data, and effectively communicate scientific findings. Working in a collaborative research environment, they will also develop teamwork and problem-solving skills, preparing them for future roles in academic or industrial research.

Seguimiento/ Monitoring Plan

The trainee will receive regular guidance through weekly meetings with their supervisor to review progress, address challenges, and discuss experimental approaches. During laboratory work, the trainee will benefit from daily support and mentorship provided by experienced members of the research team, including PhD students and postdoctoral researchers.

Evaluación/ Evaluation plan

Conocimientos técnicos o experiencia requerida (si procede) / Technical knowledge or experience required (if applicable)
Preferred candidates are students pursuing a BSc or MSc in Biotechnology, Biochemistry, Biology, Bioengineering, Microbiology, or related fields. Basic knowledge of microbiology techniques, aseptic handling, and bacterial culturing is preferred. A strong interest in laboratory research and eagerness to learn new techniques are highly valued.

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 **–** **Larissa Zárate García**

Afiliación del supervisor y Enlace a afiliación / Supervisor affiliation and Affiliation link – Department of Life Sciences, Imperial College London
https://profiles.imperial.ac.uk/l.zarate-garcia

Título del Proyecto/ Project Title **– Traineeship in Flow Cytometry**

Perfil preferencial del estudiante –
Biology / Biotechnology / Medicine / Biochemistry / Biophysics

Fechas orientativas/Available Dates – September-November 2025 (2-2 months and three weeks)

Programa/ Detailed program of the traineeship period

Flow cytometry is a powerful analytic technique that is in constant evolution. Cytometers are delicate and expensive pieces of equipment, difficult to be purchased and maintained by research groups. Research centres have acknowledged the need to create university-based facilities that supply this service to staff, and for highly specialized technicians to run these facilities. However, the availability of flow cytometry specialists remains low, and more efforts are put within the community to educate the next generation of cytometrists.
In this traineeship, the student will be trained in the operation and management of flow cytometry: analysis and cell sorting, identifying different biological and synthetic samples, troubleshooting. Analysis of data will be also covered, as well as complimentary aspects of working with a flow cytometer: panel design, biosafety, and communicating with users.
The student will be in continuous contact with users and will benefit from informal conversations with them around their research. There will be opportunities to attend cross-departmental events and conferences on flow cytometry, such as the London Cytometry Club 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)

At the end of the traineeship, the student is expected to have acquired a deep knowledge on the different types of flow cytometry. They will be able to analyse small-panel experiments, and to perform simple cell sorting with the assistance of a senior staff. The student will solve minor troubleshooting and will develop a critical thinking to evaluate the suitability of designed panels, protocols and data analysis. The student is expected to have acquired some managerial, communication and leadership skills.

Seguimiento/ Monitoring Plan
Monitoring of the student will be performed through a progress chart. At the beginning of each week, the student will have mini-assignments that will allow them to achieve the required milestones at the end of the week. These will be in the form of online learning, hands-on practice, and attendance to events.
The student will work Monday to Friday, 10am-4pm. They won't be expected to work during weekends and after 5pm. All learning will take place during working hours.

Evaluación/ Evaluation plan

Evaluation will take place informally at the end of every week. It will allow for the planning of the next week if any of the expected milestones has not been satisfactorily achieved. The student is expected to have a great involvement in the planning of their work, and in the evaluation of their acquired skills.

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

Knowledge of cellular biology is required.

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

High self-motivation, initiative, collaborative working style, problem-solving. Good written and oral communication abilities in English. Programming skills in R are desirable, but not essential.

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

The student is expected to adhere to Imperial College London Values and Behaviours: Respect, Collaboration, Excellence, Integrity and Innovation.

Nombre y apellidos del Supervisor / Name and surname of the Supervisor
Ana Sara Caetano Cordeiro

Afiliación del supervisor y Enlace a afiliación / Supervisor affiliation and Affiliation link
Strathclyde Institute of Pharmacy and Biomedical Sciences, University of Strathclyde
(link not available yet, supervisor to start at the Institution on 1st May 2025)

Título del Proyecto/ Project Title
Development of vitamin-loaded nanocarriers for non-invasive supplementation in paediatric populations

Perfil preferencial del estudiante
Biochemistry, Sciences, Chemical Engineering, Chemistry

Fechas orientativas/Available Dates
September-December 2025 (4 months)

Programa/ Detailed program of the traineeship period
The project aims to develop lipid-based nanocarriers such as nanoemulsions for the delivery of lipophilic vitamins (retinol – vitamin A – and α-tocopherol – vitamin E) through non-invasive administration routes targeting supplementation in children. These nanocarriers will be able to control vitamin release, reducing the administered dose and dosing frequency and therefore potentially increasing patient compliance. The trainee will be responsible for screening different compositions of the nanoemulsion formulation, particularly in terms of the oils and surfactants used, in a systematic approach using Design of Experiments. Then, they will prepare the nanoemulsions with and without the abovementioned vitamins, and assess their main physicochemical characteristics (particle size, polydispersity index, surface charge), stability in storage, encapsulation efficiency and vitamin release profile in relevant media. The outcome of this study will allow the selection of optimal formulations for further studies in terms of delivery efficacy, safety and incorporation in different dosage forms for non-invasive delivery, including mucoadhesive films and hydrogels and microneedle arrays.

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 is expected to have gathered knowledge and experience in the formulation and physicochemical characterisation of nanoemulsions and in the development and validation of analytical methods such as UV-Vis spectrophotometry. Additionally, they will develop transferrable skills such as critical thinking, research integrity, data collection and analysis including graphical presentation and statistical analysis, keeping data records, presentation of results in small meetings, academic reading and writing, time management and autonomy in performing laboratory tasks.

Seguimiento/ Monitoring Plan
The student will be directly trained by the supervisor in the lab in all the necessary techniques and accompanied closely particularly at the beginning of the traineeship period. Then, the supervisor will hold weekly meetings with the student to ensure

progress towards the project objectives, promoting their autonomy in the lab while keeping a focus on maximising the training opportunities for the student.

Evaluación/ Evaluation plan
The student will be asked to present their progress in a short presentation during the weekly meetings with the supervisor, so that constructive feedback can be provided in an immediate manner, contributing to future steps of the work. Additionally, the student will be asked to prepare a brief report at the end of the traineeship, allowing them to practice their writing and data analysis skills.

Conocimientos técnicos o experiencia requerida (si procede) / Technical knowledge or experience required (if applicable)
Basic laboratory skills, basic understanding of nanomedicine and drug delivery (not mandatory)

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

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

https://www.ncl.ac.uk/nes/people/profile/magdapascual-borras.html

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 interpretate 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 **team work**.

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

Proyecto RU-13: *Screening of new kinder and effective drugs against cancer with minimal side effects*

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

Afiliación del supervisor y Enlace a afiliación / Supervisor affiliation and Affiliation link **University of Hertfordshire, UK**
https://researchprofiles.herts.ac.uk/en/persons/shoib-siddiqui

Título del Proyecto/ Project Title
Screening of new kinder and effective drugs against cancer with minimal side effects

Perfil preferencial del estudiante

Fechas orientativas/Available Dates 1st June to 31st Dec (flexible)

Programa/ Detailed program of the traineeship period

 Cancer is a highly lethal disease which is associated with immunosuppression and rapid metastasis. Even with the best possible therapy, the 5-year survival time for most of the solid cancers is less than 50%. The approved therapies are highly aggressive and lead to severe side effects. Therefore, there is a need to develop kinder therapies with a more targeted approach resulting in fewer side effects. In this project, we aim to target the cancer cells by targeting an antigen which is expressed by the cancer cells with minimal expression in normal cells. Therefore, it is an ideal target for cancer. Moreover, there have been no approved small-molecule inhibitors that can target this antigen.

In this project, we will perform assays such as MTT-based cell viability assay, cell migration assay and colonization assay to understand the impact of new drugs on the proliferation, migration and colonization of colorectal cancer cells. Also, we will check the effect of these drugs on normal colon epithelial cells. Further we will decipher if the cell killing is early apoptosis, late apoptosis or necrosis. This will pave the way development of new drugs with minimal side effects.

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 use state-of-the-art facilities at the University of Hertfordshire and develop cell culture, molecular biology and cancer biology skills. Besides this, the trainee will develop several transferable skills such as communication skills (presentations), problem-solving and time management. Finding a new drug with minimal side effects for cancer is needed at this time. Therefore, the trainee will

develop a strong research profile which will be beneficial for the career and development. The student hosted before in the lab have participated in conferences and received best poster awards.

Seguimiento/ Monitoring Plan

The trainee will be part of the Cancer Biomarker and (Immuno)therapy group. We organize a journal club/lab meeting every 2 weeks. Beside there will be regular meetings with the supervisor to see how the project is going and what support the trainee need.

Evaluación/ Evaluation plan

The trainee will present their work in the lab meeting to the group in about 3 months after joining. Beside this, there will be regular meetings with the supervisor to go through the results obtained. The trainee will also present their findings in the conferences and meetings.

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

The candidate should have basic knowledge of cell biology, molecular biology and cancer biology. An experience in cell culture would be good but not mandatory.

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

The UH will follow the standard visitor VISA regulations provided by the home office. The lab induction and supervision will be provided.

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

Proyecto RU-14: *Novel procedures to generate enhanced optical coherence tomography angiography images of the human retina*

Nombre y apellidos del Supervisor / Name and surname of the Supervisor
Adrian Bradu and Alejandro Martínez Jiménez

Afiliación del supervisor y Enlace a afiliación / Supervisor affiliation and Affiliation link
University of Kent https://www.kent.ac.uk/

Título del Proyecto/ Project Title
Novel procedures to generate enhanced optical coherence tomography angiography images of the human retina

Perfil preferencial del estudiante
Physical Sciences, Computing and Software engineering, Biomedical Sciences, Computing Engineering

Fechas orientativas/Available Dates
1st July to 1st December

Programa/ Detailed program of the traineeship period
This summer internship project focuses on enhancing the quality of Optical Coherence Tomography Angiography (OCTA) images, a cutting-edge imaging technique utilised to visualise blood flow in the human retina. OCTA is essential for diagnosing and monitoring retinal diseases such as diabetic retinopathy and age-related macular degeneration. However, image quality can be compromised by noise, motion artefacts, and low signal-to-noise ratios, which limit its diagnostic capabilities.

Interns will develop and implement advanced image processing algorithms to improve OCTA image quality. Tasks may include segmentation, denoising techniques, motion correction, contrast enhancement, and methods to automate and optimise these processes. The project will analyse clinical OCTA datasets and validate improvements through quantitative metrics.

By the end of the internship, participants will acquire hands-on experience in medical image processing, algorithm development, and interdisciplinary collaboration. This project offers a unique opportunity to contribute to advancements in retinal imaging, potentially enhancing early diagnosis and treatment of eye diseases while building valuable skills in biomedical engineering and data analysis.

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)

An understanding of laser sources and an introduction to imaging techniques, specifically optical coherence tomography, are expected technical learning outcomes. The trainee will enhance and develop their communication skills,

collaboration, teamwork (including interpersonal skills and conflict resolution), as well as critical thinking and problem-solving abilities. Presentation and public speaking skills will be cultivated through the journal clubs held in the lab group. The trainee will learn to receive and incorporate feedback, accepting constructive criticism to improve their work. Time management and organisation skills will be honed, enabling the trainee to balance multiple tasks and prioritise effectively throughout the project. Finally, the trainee will acquire cultural competence, enhancing their ability to appreciate and navigate cultural differences.

Seguimiento/ Monitoring Plan

The trainee will be immersed in a research environment where the supervisor and co-supervisor can be contacted daily. Training on laser sources and laser safety will familiarise the trainee with the research laboratory. A weekly meeting will be conducted to provide updates on the overall progress of the project.

Evaluación/ Evaluation plan

A progress report will be completed weekly. At the end of the stay, an oral presentation will showcase the work realised during the period of stay.

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

Experience in programming would be beneficial for a faster introduction to the research environment.

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