

## CONVOCATORIA DE PRÁCTICAS INTERNACIONALES/ CALL FOR INTERNATIONAL INTERNSHIP

### CONVENIO CEBE 2021 / CEBE 2021 AGREEMENT

#### I. HOST APPLICANT INFORMATION

*This person is responsible for signing the Learning Agreement, amending it if needed, supervising the trainee during the traineeship and signing the Traineeship Certificate.*

Department/Faculty. Institution	Institute of Environment & Sustainable Development, Faculty of Science University of Antwerp					
Organization Type (see annex I)	EPLUS-EDU-HEI					
Public body	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	Non-Profit	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	Size	<input type="checkbox"/> < 250 employees <input type="checkbox"/> >250 employees	
Address; website	Campus Groenenborger – building V.612, Groenenborgerlaan 171 – 2020 Antwerpen, Belgium; <a href="https://www.uantwerpen.be/">https://www.uantwerpen.be/</a>					

#### II. PROJECT DESCRIPTION

*Description of the project that will be done by the student-trainee at the host institution.*

<p><b>Wished period for mobility</b> <sup>(1)</sup> : from (day/month/year) ..1/06/2022..... to (day/month/year) ..1/08/2022.....</p>
<p><b>1. Project title: Sustainable Hydrogen production from biogas</b></p>
<p><b>2. Number of working hours per week: 35</b></p>
<p><b>3. Detailed programme of the traineeship</b> <sup>(2)</sup> (max. 300 words):</p> <p>Innovation of the maritime sector is part of the DNA of the city of Antwerp. The Port of Antwerp is committed to act as a pioneer in the H2 economy. However, in addition to the economic production of H2 from renewable sources, its storage has been identified as the main challenge. Various H2 carriers has been identified. In the project, we will focus on formic acid. Formic acid can be synthesized via hydrogenation of CO2, and thus also represent a CO2 sink.</p> <p>In this project, the trainee will experimentally characterize the methane pyrolysis reaction from biogas, accompanied by coke gasification, in an innovative resistively heated tubular reactor. The student will be responsible for finalizing the assembly of the reactor setup, characterize its hydrodynamics via tracer studies, prepare a design of experiment and perform the experiments. To conclude, the student will perform kinetic characterization. If</p>

time allows, the student will prepare catalysts for combined methane pyrolysis and coke gasification.

**4. Knowledge, skills and competences to be acquired by the end of the traineeship (expected Learning Outcomes)(max 100 words):**

The trainee will gain invaluable knowledge of experimental tools used in reactor design and characterization (online quadrupole mass spectrometer). As important, the trainee must be able to communicate effectively his/her results. All in all, the main expected learning outcomes are:

- Perform characterization and basic modelling of chemical reactors by application of his/her knowledge on chemical engineering reaction.
- Communicate and discuss proposals and conclusions in multilingual forums, specialized and non-specialized, in a clear and unambiguous way in English.

**5. Monitoring plan (max 100 words):**

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

**6. Evaluation plan (max 100 words):**

The progress of the trainee will be evaluated on the basis of his/her capacity to:

- conduct a thorough literature review on the subject of gas-phase heterogeneous dehydrogenation, as well as the effect of resistive heating on chemical systems.
- integrate the findings of this review to propose original and innovative experiments.
- perform rigorous experimental characterization, including statistical analysis.
- address scientific problems and overcome challenges

**7.a. Impacts and benefits of the traineeship to the host applicant (max 100 words):**

The host applicant will benefit from the work of the trainee in various aspects: i) to deliver the work required as part of the funded project (characterization of state-of-the-art reactors), ii) to formalize the experimental techniques and data analysis for the hydrodynamic characterization of chemical reactors, including the associated documentation to ensure a long term research success and smooth transition of incoming students.

**7.b. Impacts and benefits of the traineeship to the trainee (max 100 words):**

The trainee will benefit from the acquired knowledge in the field of hydrodynamic characterization of reactor reactors, including innovative digital image processing tools. In

addition, the trainee will learn to devise diagnosis tool and criteria to characterize the operation of state-of-the-art reactors, including faulty operations. The knowledge acquired by the trainee is applicable to various types of chemical reactors, not limited to that of the current project.

### III. STUDENT PROFILE AND REQUIREMENTS

This section refers to specific knowledge or expertise that the student/trainee must have in order to proceed successfully with the proposed project.

<b>8. Research Area (see annex II): Chemical Engineering</b>		
<b>9. Is the host applicant / scientific supervisor willing to evaluate the project performance so that the student could validate the traineeship as ECTS credits (3):</b>	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	
<b>10. Student required expertise and technical knowledge: Basic knowledge of Matlab, and chemical reaction engineering concepts (residence time distribution, space and residence time, kinetic modelling, etc.).</b>		
<b>11. Level of studies: Currently at the master level</b>		
<b>12. Language: English and Spanish (the host professor speaks fluently Spanish)</b>		
(4) The level of <b>language competence</b> in _____ (indicate here the main language of work that the trainee already has or agrees to acquire by the start of the mobility period is: A1 <input type="checkbox"/> A2 <input type="checkbox"/> B1 <input checked="" type="checkbox"/> B2 <input type="checkbox"/> C1 <input type="checkbox"/> C2 <input type="checkbox"/> Native speaker <input type="checkbox"/>		
<b>13. Does the host institution require any other language besides the language of work?</b>	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	<b>Which one?:</b>
<b>14. Does the host institution require any further paperwork done or any other relevant information to host a student/trainee (under the condition of this programme)</b>	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	<b>14. A</b>  If YES, please detail:

### IV. Consent to publish Traineeship Data.

I agree that my name, title of the project, its duration and the name of the Receiving Institution / Enterprise can be published on the CEBE website as awarded supervisor of the Traineeship Programme 2020.



(1) a) Related to UAM: A minimum of 2 months and up to 4 months (only the first 3 are funded). The planned period in this call should be between 1st of June 2020 and 30th of December of 2021. After the matching of host

candidates with students and by mutual agreement between the two parties, the exact dates can be changed and the total stay could be prolonged up to 6 months; b) Related to UCLM: A minimum of 2 months and up to 4 months (all 4 months are funded). The estimated start date of the internship is 1st July and can be extended up to a total of 12 months.

(2) Consider that this must be read by the selection committee but also by the students, who will apply to the project.

(3) If NO, only students who will not validate the project as ECTS credits will be assigned for matching with this applicant. The application to validate the project as ECTS credits will come exclusively from the student.

(4) Level of language competence: a description of the European Language Levels (CEFR) is available at: <https://europass.cedefop.europa.eu/en/resources/european-language-levels-cefr>

#### Annex I: List of Organisation Types

CODE	Organisation type
EPLUS-EDU-HEI	Higher education institution (tertiary level)
EPLUS-EDU-GEN-PRE	School/Institute/Educational centre – General education (pre-primary level)
EPLUS-EDU-GEN-PRI	School/Institute/Educational centre – General education (primary level)
EPLUS-EDU-GEN-SEC	School/Institute/Educational centre – General education (secondary level)
EPLUS-EDU-VOC-SEC	School/Institute/Educational centre – Vocational Training (secondary level)
EPLUS-EDU-VOC-TER	School/Institute/Educational centre – Vocational Training (tertiary level)
EPLUS-EDU-ADULT	School/Institute/Educational centre – Adult education
EPLUS-BODY-PUB-NAT	National Public body
EPLUS-BODY-PUB-REG	Regional Public body
EPLUS-BODY-PUB-LOC	Local Public body
EPLUS-ENT-SME	Small and medium sized enterprise
EPLUS-ENT-LARGE	Large enterprise
EPLUS-NGO	Non-governmental organisation
EPLUS-FOUND	Foundation
EPLUS-SOCIAL	Social partner or other representative of working life
EPLUS-RES	Research Institute/Centre
EPLUS-YOUTH-COUNCIL	National Youth Council
EPLUS-ENGO	European NGO
EPLUS-NET-EU	EU-wide network
EPLUS-YOUTH-GROUP	Group of young people active in youth work
EPLUS-EURO-GROUP-COOP	European grouping of territorial cooperation
EPLUS-BODY-ACCRED	Accreditation, certification or qualification body
EPLUS-BODY-CONS	Counselling body
EPLUS-INTER	International organisation under public law
EPLUS-SPORT-PARTIAL	Organisation representing the sport sector
EPLUS-SPORT-FED	Sport federation
EPLUS-SPORT-LEAGUE	Sport league

EPLUS-SPORT-CLUB	Sport club
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## Annex II: Research Areas

Area of knowledge	University
Agricultural and agri-food engineering	Universidad Castilla La Mancha
Aerospace engineering	Universidad Castilla La mancha
Biochemistry	Universidad Autónoma de Madrid, Universidad Castilla La mancha
Biology	Universidad Autónoma de Madrid
Biomedical engineering	Universidad Castilla La Mancha
Chemical Engineering	Universidad Autónoma de Madrid, Universidad Castilla La mancha
Chemistry	Universidad Autónoma de Madrid, Universidad Castilla La mancha
Computer Engineering	Universidad Autónoma de Madrid, Universidad Castilla La mancha
Computer Engineering and Mathematics	Universidad Autónoma de Madrid
Electrical Engineering	Universidad Castilla La mancha
Environmental Sciences	Universidad Autónoma de Madrid, Universidad Castilla La mancha
Food Science and Technology	Universidad Autónoma de Madrid, Universidad Castilla La mancha
Forestry and environmental engineering	Universidad Castilla La mancha
Human nutrition and dietetics	Universidad Autónoma de Madrid
Industrial and automatic electronics engineering	Universidad Castilla La mancha
Mathematics	Universidad Autónoma de Madrid
Mechanical engineering	Universidad Castilla La mancha
Medicine	Universidad Castilla La mancha
Nursing	Universidad Castilla La mancha
Pharmacy	Universidad Castilla La mancha
Physics	Universidad Autónoma de Madrid
Physiotherapy	Universidad Castilla La mancha