

## 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.*

Name	Tom Lauriks				
Position	PhD student				
Contact (e-mail, phone)					
Department/Faculty. Institution	University of Antwerp, Faculty of Science, Department of Bioscience Engineering				
Organization Type (see annex I)	EPLUS-EDU-HEI (Higher education institution, tertiary level)				
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 checked="" type="checkbox"/> >250 employees
Address; website	University of Antwerp Campus Groenenborger Groenenborgerlaan 171 2020 Antwerpen Belgium <a href="https://www.uantwerpen.be/en/">https://www.uantwerpen.be/en/</a>				

#### II. PROJECT DESCRIPTION

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

<b>Wished period for mobility <sup>(1)</sup> : from 5 July 2021 to 31 January 2022</b> (duration of 4 months requested, preferably from 1 September 2021, but if necessary from 5 July 2021)
<b>1. Project title: Computational fluid dynamics modeling of the outdoor urban environment for the environmental impact assessment of a newly built underground parking garage in Antwerp (Belgium)</b>
<b>2. Number of working hours per week: 38 (standard full time hours in Belgium)</b>

### 3. Detailed programme of the traineeship <sup>(2)</sup> (max. 300 words):

A computational fluid dynamics (CFD) model was already made (in OpenFOAM), that simulates air pollutant dispersion in the outdoor environment in a part of Antwerp (a city in Belgium), as a result of the construction of an underground parking garage. The study was ordered by the municipality of Antwerp. Our task as university was assessing the environmental impact for the residents of the area and investigating efficient methods to purify the air exiting the ventilation shafts of the garage.

A first result was obtained, but a more extensive study is necessary, which will be the task of the trainee. The trainee will be using the CFD model that is already made, but he or she will be fine-tuning several model parameters, simulating multiple wind directions, and comparing the results to measurements. (The measurements were already made.)

The results of the project will be converted into an article, which will be submitted to a peer reviewed journal. Since the model was already mostly made, the trainee will have time left after finishing the modeling and data processing tasks. He or she will then start writing the part of the manuscript related to the modeling of the outdoor environment, that will later be submitted. The trainee will be recognized as co-author of the paper. (The supervisor of the trainee has already published on this topic, and will offer close guidance to the relevant literature and on efficient scientific writing.)

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

The trainee will be able to perform CFD simulations, in the open source software OpenFOAM, which is much used in academics and industry.

More specifically, the trainee will learn to perform simulations of wind flow in urban areas. Such models are in fact micro-scale weather models. This is a booming topic, which will probably become very important in the future in both science and consultancy.

Also, experience with data processing will be obtained.

Lastly, the trainee will receive close guidance on writing scientific publications. This will prepare the trainee for writing a master's thesis and a scientific career.

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

Targets will be set in cooperation with the trainee. Weekly reports and a final written text are expected. The weekly reports will allow monitoring the progress of the trainee and spotting difficulties needing a closer guidance. Obligatory sections in the final text are "Introduction", "Materials and methods", and "Results and discussion". Both expected written reports will be discussed weekly. Based on the meeting outcomes, guidance and targets will be adapted. Besides, the written texts will be corrected and returned to the trainee. Finally, the developed model and its outputs have to be presented to the supervisor and will be discussed.

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

**Permanent evaluation:** while performing the internship, it will be evaluated whether the trainee is trying to proceed with the agreed targets and obligations. If this appears to be difficult, reevaluation of the targets can occur if necessary without consequences for the grading. After learning the necessary skills, the ability of the trainee to work independently will be evaluated.

The written report will be evaluated. Elements that will certainly be taken into account are: scientific writing skills, correctness of the mathematical aspects, whether the trainee is sufficiently critical for the obtained modeling results, and validity of the scientific reasoning.

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

The research topic of the supervisor is the improvement of urban CFD models on a fundamental level. The presented topic to the trainee, is a more applied case. This project will show how we can intelligently incorporate parking garages in our cities, to promote the mobility of the future, by reducing traffic in the city center and removing pollution from the location where we park our cars at the city outskirts. The advantage for the supervisor is that both his fundamental and applied skills will be increasing during his research. He will also extend his leadership skills.

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

For the trainee, this is a unique chance to get close tutoring in a challenging but exciting and strongly upcoming field. The number of articles on urban CFD modeling is exploding in the scientific literature. Still, major issues in this field need to be resolved. However, since quick and exciting evolutions are going on, it is expected that urban CFD will evolve to a valuable research tool. Moreover, CFD is also quickly becoming important in other fields, such as reactor engineering. Hence, during the internship, the trainee will acquire solid practical experience in a valuable research tool for the future.

### 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.*

<p><b>8. Research Area (see annex II): Environmental Science, Physics</b></p>		
<p><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></p>	<p><input checked="" type="checkbox"/> YES    <input type="checkbox"/> NO</p>	
<p><b>10. Student required expertise and technical knowledge:</b></p> <ul style="list-style-type: none"> <li>- Large data sets will have to be processed (available measurement data and output data of other models, to be used as input for the trainee's model). The trainee should possess some skills in either a programming language, which will be used for the data processing. The supervisor is able to work with Python and Matlab. He can hence assist in the enhancement of the trainee's skills in these applications if necessary.</li> <li>-The trainee has preferably heard of, or has some experience, in numerically solving partial differential equations.</li> <li>-For this internship, intense use will be made of computers (the trainee's personal computer and the University of Antwerp's supercomputer). The trainee doesn't need to possess great computer skills. The supervisor will be able to assist with this. However, the trainee should realize that he or she will be intensively developing such skills during the internship.</li> <li>- Experience with Linux is a plus.</li> </ul>		
<p><b>11. Level of studies:</b></p> <ul style="list-style-type: none"> <li>- Bachelor in engineering, physics or mathematics</li> </ul>		
<p><b>12. Language:</b></p>		
<p>(4) The level of <b>language competence</b> in <b>English</b> (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 type="checkbox"/> B2 <input type="checkbox"/> C1 <input checked="" type="checkbox"/> C2 <input type="checkbox"/> Native speaker <input type="checkbox"/></p>		
<p><b>13. Does the host institution require any other language besides the language of work?</b></p>	<p><input type="checkbox"/> YES    <input checked="" type="checkbox"/> NO</p>	<p><b>Which one?:</b></p>
<p><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></p>	<p><input type="checkbox"/> YES    <input checked="" type="checkbox"/> NO</p>	<p><b>14. A</b> If YES, please detail:</p>

#### 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.

Tom Lauriks, 16 March 2021, Hoboken, Belgium



- (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

## 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