



**ANNOUNCEMENT OF COMPETITIVE EXAMINATIONS FOR ADMISSION TO THE  
MARIE SKŁODOWSKA-CURIE EUROPEAN JOINT DOCTORATE (EJD) IN  
ADVANCED BIOLOGICAL WASTE-TO-ENERGY TECHNOLOGIES (ABWET)  
AT THE UNIVERSITÀ DEGLI STUDI DI CASSINO E DEL LAZIO MERIDIONALE**

**Art. 1 - Institution**

The University of Cassino and Southern Lazio (coordinator institution) has launched the third call of the Marie Skłodowska-Curie European Joint Doctorate (EJD) in Advanced Biological Waste-To-Energy Technologies (ABWET) for the academic year 2015-2016. ABWET is a multidisciplinary and inter-sectorial consortium composed of 4 academic partners and 17 associated members (7 academic associated members, 1 international scientific association and 9 industrial partners, from 10 different countries, including 1 third-country). The research doctorate course is run in partnership with the UNESCO-IHE (The Netherlands), Tampere University of Technology (TUT) (Finland) and Université Paris-Est (UPE) (France). The ABWET Doctorate is funded by the Research Executive Agency of the European Commission that has signed a Grant Agreement with the University of Cassino and Southern Lazio and the above-mentioned Institutions. The partner institutions are in charge of the EJD Programme management and PhD support and supervision. Upon this agreement the University of Cassino and Southern Lazio and every above-mentioned partner participate, through their specific competences and educational structures, to set up the ABWET Marie Skłodowska-Curie EJD.

The PhD students enrolled in the ABWET Programme will be registered and will start the doctorate course at the partner institute where they will carry out most of their doctoral activities, i.e. at one of the four Partner Organisations with the distribution related to the selected research projects as reported in the following table:

**Table. Individual Research Projects**

1	Host institution TUT	PhD enrolment Y	Start date October 2015	Duration 36 months	
<b>Project Title:</b> H <sub>2</sub> S removal from biogas using novel bioreactor configurations					
<b>Description:</b> Biogas not only contains methane and carbon dioxide but also other gases such as hydrogen sulfide, siloxanes, halogenated hydrocarbons and ammonia that are produced during the anaerobic step. These impurities can cause health and environmental problems and can lead to corrosion and failure of process equipments, pipelines, nozzles as they tend to accumulate/buildup. H <sub>2</sub> S has plagued many industries for decades; the removal of H <sub>2</sub> S is conventionally done using adsorption and scrubbing based techniques and the sorbed H <sub>2</sub> S in solid/liquid phase requires further treatment. This PhD research project will focus on use of anoxic/anaerobic biological treatment options for H <sub>2</sub> S removal.					
<b>Planned secondment(s):</b> 1. Host: UPE; 2. Host: University of La Coruña; <b>SME involved:</b> Ekoinwentyka.					
2	Host institution UNICLAM	PhD enrolment Y	Start date October 2015	Duration 36 months	
<b>Project Title and Work Package(s) to which it is related:</b> Biosequestration of CO <sub>2</sub> in algal photo-bioreactors (WP2-Training through Research)					
<b>Description:</b> CO <sub>2</sub> capture/sequestration by biological means is a cost-competitive and attractive option to mitigate greenhouse effects in a sustainable way. Literature evidence suggests that, one kilogram of algal dry biomass weight utilizes around 1.83 kg of CO <sub>2</sub> ; and the CO <sub>2</sub> -sequestered biomass can be a source of (value-added) bioactive products such as vitamins, biopolymers, bioactive lipids, exopolysaccharides, etc, among others. Microorganisms such as Cyanobacteria, bacterium, Green-algae, Micro-algae and photo-bioreactor configurations such as tubular, flat plate, bubble column, external loop airlift, and cone shaped have been used for this purpose. In this research, the performance of tubular, bubble column and external/internal loop photo-bioreactor configurations will be ascertained to determine the effect of temperature fluxes, light intensity and residence time variations, mixing intensity, type of microorganism(s), and CO <sub>2</sub> uptake rates at different initial concentrations. Biochemical characterization and kinetic data of the microorganisms					



will provide useful information on the growth and specific substrate consumption rates for these microorganisms. The optimal conditions obtained from lab-scale studies will be identified, the best reactor configuration will be selected and scaled-up to be tested in pilot-scale that will simulate the conditions of a solar pond. The micro-kinetic and macro parameters estimated from different experiments will be used to develop adequate mathematical models that represent the behavior of the photo-bioreactor under steady-state conditions.
<b>Planned secondment(s):</b> 1. <b>Host:</b> UNESCO-IHE; 2. <b>Host:</b> University of South Florida; <b>SME involved:</b> AQUANOS.

3	Host institution	PhD enrolment Y	Start date	Duration	
	UPE		October 2015	36 months	
<b>Project Title:</b> Fate of trace metals in soils after land application of digestate					
<b>Description:</b> Soil is a natural resource that is over exploited and fails more and more to its primary characteristic: fertility. This fact is explained by a lack in micronutrients that are found as trace elements in soils. In order to cope with the increase of soil fertility deficiency, it is important to bring organic resources that are biodegradable and could release micronutrients like trace elements in soils. Digestates, which are organic compounds, show most of the time significant amounts of trace elements. From a sustainable point of view, it appears interesting thus to recycle those digestates as “fertilizers” to balance the amount of essential nutrients. In this task, digestates will be characterized for their trace elements content in order to reach acceptable, ecotoxicological and legal thresholds authorized in soils. The fate of trace elements will be assessed through column experiments that could mimic the behavior of digestates in soils. Soil column will be instrumented to identify the digestate flux and trace elements fate throughout the column. The influence of the digestate composition on the dynamics and distribution of micronutrients in soil layers and particles and thus on their bioavailability will be assessed. In turn the influence of the distribution of micronutrients on phytotoxicity will be evaluated directly (growth of model plant) or indirectly (bioavailable metal by DGT). This dynamic and spatial analysis will help to optimize the land application of digestate in order to increase the fertility of soil.					
<b>Planned secondment(s):</b> 1. <b>Host:</b> UNICLAM; 2. <b>Host:</b> UNILIM; <b>SME involved:</b> Acqua & Sole s.r.l.					

At the time of recruitment by the host institution, the applicant must not have resided or carried out their main activity (work, studies, etc.) in the country of their host organisation for more than 12 months in the 3 years immediately prior to the reference date. Compulsory national service and/or short stays such as holidays are not taken into account.

The ABWET EJD programme aims to: train students at PhD level to be able to develop environmental technologies, with a strong focus on multidisciplinary and problem-based technology development; offer the PhD students a wide range of optional specialised and professional skills; promote networking and exchange of knowledge and experience in the field of environmental engineering between PhD students of all nationalities.

The PhD student mobility program will be developed within the Institutions which are part of the Consortium. However, for specific scientific needs, students may visit other Universities, Research Institutions, Companies or other Professional Organisations, which are not part of the Consortium.

The whole training and research programme will be recognised by all partners. This guarantees that a completely joint diploma can be issued. The delivery of a joint degree is highly favoured by the Consortium, which will award this kind of degree if consistent with the national laws and local academic regulations of the Consortium partners. In case the delivery of a joint degree is not yet possible when the first ABWET PhD students will defend their theses, a double degree will be delivered by the two Partner Organisations where the candidate will carry out his/her doctoral activities according to his/her mobility path.

The ABWET EJD is relative to the study area – Engineering, Technology. Thematic study fields: 06.9 (Others – Engineering, Technology); Environmental Technology, 07.4 (Soil and Water Sciences); 13.3 (Chemistry); 13.6 (Biochemistry); 06.4 (Civil Engineering).

Each edition of the ABWET Doctorate will last three years and is coordinated by Prof. Giovanni ESPOSITO (Department of INGEGNERIA CIVILE E MECCANICA, DICeM).

The University of Cassino and Southern Lazio has launched a competition, based on qualifications and examinations, for the three PhD positions corresponding to the three research projects reported in the above table. All three positions will be accompanied by a Marie Curie fellowship.

## Art. 2 - Conditions of admission

The competition for admission to the International Research Doctorate is open to European and non-European candidates who hold a Master of Science degree (MSc) in pure or applied sciences (e.g. chemistry, biology, geochemistry, geology, civil, environmental or



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agricultural engineering, environmental or agricultural sciences, etc.) or an equivalent level from a recognised University or Engineering College. Applicants whose MSc degree is awarded later than the deadline of the present call but earlier than 30 September 2015 are eligible. They will be **admitted sub condicione and will have to provide a certificate of their MSc delivering Institution reporting the date when they are expected to be delivered their diploma**. Sufficient knowledge at an academic level of mathematics, physics and chemistry is an absolute requirement.

At the time of recruitment by the Host Institution, i.e. October 1<sup>st</sup> 2015, the candidates must be in the first four years of their research careers (measured from the date when the candidate obtained the degree which would formally entitle him/her to embark on a doctorate) and not yet have been awarded a doctoral degree.

### Art. 3 - Application

The access to the ABWET EJD will be regulated by a competitive application and carried out through a central selection procedure. The application form is enclosed to the present announcement and it is available online at <http://www.internationaldoctorate.unicas.it/ABWET>.

Applications should be sent to the e-mail address [abwet@unicas.it](mailto:abwet@unicas.it) within the following deadline:

Application period	July 15 – September 15, 2015
Deadline for applications	September 15, 2015
Interview week	September 28 – October 2, 2015
Communication of the selection results	October 9, 2015

Late or incomplete applications will not be accepted.

The application file should contain all elements needed for the selection, such as academic background with a list of followed courses, obtained grades, language skills, and motivation to participate in the programme. Furthermore, the MSc thesis, two recommendation letters, a review of research activities carried out and a short research plan are requested. The Administrative Board collects all applications and checks whether students fulfil the basic diploma requirements. All applications received within the application period prior the publicized deadline will be subjected to a multi-step selection procedure detailed below.

In the application form, under the candidate's own responsibility, must be clearly specified, by typing in block capitals:

- personal particulars, tax code (if held), date and place of birth, place of residence, postal address, e-mail address where communications about the selection procedure should be sent (specifying the postcode and, if possible, a telephone number and a Skype contact);
- citizenship;
- degree held with a list of followed courses (specifying the University that issued it and the date of issue - specifying the number and date of the Rector's decree declaring the value);

Candidates must enclose the following documents with their application forms:

- European Format Curriculum Vitae
- Copy of a valid passport
- Certified (translated) copy of University diplomas or degree certificate indicating the final grade (applicants whose MSc degree is awarded later than the deadline of the present call **will enclose a certificate reporting the date when they are expected to be delivered their diploma**)
- Certified (translated) transcript of study results (all courses attended with grades for each examination)
- Copy of the last university degree thesis
- Letter of motivation to participate in the ABWET Doctorate
- 2 Letters of recommendation from lecturers/researchers at the university that issued the candidate's degree or at other academic institutions (to be sent separately by the persons recommending the candidate)
- Review of research activities carried out with the list of publications (if any)
- Research plan and PhD thesis outline (maximum 5 pages)



- A video interview to be recorded at [recruitby.net](https://recruitby.net) with the applicant's answers to the questions indicated at the following link: <https://recruitby.net/interview/public/f57e90368a3f1f5b33c2516a626f16623b83>
- A document giving evidence that the applicant's level of proficiency of the English language meets the ABWET requirements.

#### **Art. 4 - Additional specifications for disabled candidates**

In compliance with Article 20 Italian Law N° 104 dated 5 February 1992, disabled candidates may apply, if they wish, for special aids and/or additional time to take the entry examination. Candidates who wish to make use of this facility must enclose a medical certificate substantiating the validity of their request with their application form.

#### **Art. 5 - Qualifications**

The Consortium will strive towards a balanced gender participation. Selection is based on academic scores, reputation of the school or institute where the student has previously studied, language skills, country of origin (to promote geographical balance), recommendation letters, interest, motivation and background, and the interviews. When these measures would not yet result in balanced gender participation, preference will be given to the underrepresented gender during selection of candidates when candidates of different genders would submit application files of similar quality. English language competence is a basic requirement, applicants should reach at least the level B2 of the *Common European Framework of Reference for Languages*. To certify their competence, applicants should submit:

- a TOEFL certificate, max. 2 years old with minimum total score of 580 on the paper based test, or
- a IELTS certificate, max. 2 years old with minimum overall band score of 6.5, or
- a TOEIC certificate, max. 2 years old with minimum total score of 750, or
- the Cambridge ESOL First Certificate in English (FCE).

Candidates who expect to be awarded the necessary qualification later than the deadline of the present call for applications but earlier than the date of the selection examination may apply for admission; in this case, the candidate will be admitted to the course *sub condizione* and will have to provide a certificate of possession of the qualification within thirty days from the date when it is awarded.

#### **Art. 6 - Selection**

The selection of the applicants is a competitive process based on the academic performance and credentials of the applicants as to guarantee selection of high-quality students. The first evaluation takes into account the applicants' education and background, and applications of candidates which meet the requirements of the ABWET EJD will be invited for a Skype interview with web cam (interview week). Each candidate in this shortlist will conduct an interview with the selection committee, which will evaluate the overall qualification of the candidate, and recommend to the Management Assembly of the international PhD Programme who to admit to the program. Information about the date and time of the interview for each candidate admitted will be given by email or on the ABWET website. This publication will have the value of notification with full effect. Candidates must produce one of the following identity documents when attending the interview: a) identity document; b) passport.

#### **Art. 7 - Selection Committee**

The selection committee in charge of this competitive examination will include at least four members of the ABWET Supervisory Board nominated from the four partner organisations.

#### **Art. 8 - Admission to the programme**

Admission will be granted by the consortium following the recommendation of the selection committee. Offers of admission to the ABWET EJD will be made to the selected candidates. The offers will include the affiliation to a research group of a Partner Institution. In order to be admitted to the Doctoral Programme the selected candidates will sign an employment contract, containing their rights and obligations.

Candidates will be admitted to the doctorate programme on the basis of the selection ranking, until the number of places available for the competition has been filled. Candidates from position 1 to 3 will be awarded a Marie Curie fellowship. Further excellent candidates ranked below position 3 will be included in a reserve list.

Applicants admitted to the courses will lose their entitlement if they fail to make express acceptance within eight (8) working days of the date when they are informed by email. In such a case, the positions will be taken by the candidates selected for the reserve list.

#### **Art. 9 - Fellowships**



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Employment contracts will be used to appoint the three doctoral candidates ranked from position 1 to 3 who will be awarded a Marie Curie fellowship. This fellowship will be taxed according to the taxation policies of the Country of the Institution giving the employment contract. While signing these employment contracts, the candidates will earn all employers' rights and obligations, including health care, social security and pension.

#### **Art. 10 - Tuition fees**

Tuition fees should be paid according to the internal rules of the Institutions where the PhD students are registered. However such tuition fees will be covered by the Marie Curie fellowship according to the Grant Agreement stipulated with the REA.

#### **Art. 11 - PhD students' rights and obligations**

A comprehensive Doctoral Candidate Agreement will be made defining the joint course and research implementation rules and mechanisms as well as the mutual rights, obligations and responsibilities of the two parties for what concerns the academic, administrative and financial aspects of the PhD student's participation in the ABWET programme. It aims to ensure active participation of all students in the programme activities and to guarantee transparency of participation rules. The Doctoral Candidate Agreement is signed by both parties (students and ABWET consortium members) upon enrolment of the PhD student.

The degree contains at least 40 ECTS of theoretical courses or other eligible studies. An individual study plan will be drawn up by the PhD student in close consultation with his or her supervisors after acceptance to the programme. The ABWET EJD provides common courses for all students.

ABWET will follow the recommendations contained in the European Charter for Researchers and on the Code of Conduct for the Recruitment of Researchers, giving individual researchers the same rights and obligations wherever they may work throughout the EU.

#### **Art. 12 - Award of the qualification**

The PhD qualification is awarded at the conclusion of the PhD edition, by passing the final examination, which is subordinate to the presentation of a written thesis (PhD thesis) in English and it is mandatory that it includes or is based on at least 4 peer-reviewed scientific articles (at least 3 published/accepted and 1 submitted).

#### **Art. 13 - Treatment and processing of personal information**

In accordance with the Regulations issued in application of Italian Legislative Decree N° 196, dated 30 June 2003, the University hereby undertakes to respect the reserved nature of the information provided by applicants: all the information provided will be processed solely for purposes connected with and instrumental to the competition and the management of the applicant's relationship with the University, in compliance with the laws currently in force.

#### **Art. 14 - Benchmark legal framework**

Any items for which no specific provision has been made in this announcement shall be regulated in accordance with the Italian legislation.