



**CENTRE FOR RESEARCH &
TECHNOLOGY HELLAS**

Marie Curie, Early Stage Researcher Research Fellow

**Chemical Process & Energy
Resources Institute**

<http://www.certh.gr> , <http://www.lignite.gr>

January 2016

Role Profile

Post:	Marie Curie, Early Stage Researcher Research Fellow (2 positions)
Institution:	Centre for Research and Technology (CERTH)/ Chemical Process and Energy Resources Institute (CPERI)
Location:	CPERI branch in Athens (Egialeias 52, Maroussi, GR15125)
Tenure:	Fixed-term for 3 years Full-time
Scale of Pay:	In accordance with the MSCA-ITN rules: 41,790€ to 44,795€ gross per year, subject to health insurance/tax deductions (complied to Greek legislation)
Report to:	Dr Nikolaos Nikolopoulos, CERTH/CPERI

Background

CERTH is classified among the Research Centers of Excellence in Greece and employs a scientific staff of about 250 people, while its inflows is around to 21 million €/year.

The development strategy of CERTH has been based on establishing strategic collaborations with Industry and developing strong links with Research Centers and Universities within the European Research Area (ERA) and contributing to the training of young scientists and engineers in state-of-the-art technologies. CPERI carries out fundamental and applied research, emphasizing on development of novel products and services for alternative solid fuels and their residues, such as:

- “Cleaner” coal pyrolysis/gasification and combustion technologies
- Innovative environmental management methods, focused on CCS technologies, pollutants minimization and utilization of byproducts
- Energy exploitation of alternative fuel sources
- Development of novel CFD methodologies to keep up with the complexities of multiphase flow phenomena appearing in relevant technological areas.

HAoS Project:

Applications are invited for two (2) PhD positions (Early Stage Researcher Fellowship), funded by the Marie Curie-ITN 'HAoS' project. HAoS (Holistic Approach of Spray Injection through a Generalized Multi-phase Framework), is a unique international and interdisciplinary research consortium based on high profile universities, research organizations and large innovative industries.

Description of HAoS project:

Development of fuel injection equipment (FIE) able to reduce pollutant emissions from liquid-fueled transportation and power generation systems is a top industrial priority in order to meet the forthcoming EU 2020 emission legislations. However, design of new FIE is currently constrained by the incomplete physical understanding of complex micro-scale processes, such as in-nozzle cavitation, primary and secondary atomization. Unfortunately, today's computing power does not allow for an all-scale analysis of these processes.

The proposed programme aspires to create the new generation of numerical tools that will be available to both academic and non-academic sectors and will facilitate the cost effective design of novel FIE. The research programme will focus on developing, improving and validating new state-of-the-art models for multi-phase in-nozzle flow, primary and secondary atomisation against both existing and new experimental data.

The proposed studies provide a unique training opportunity to the ESRs in: (a) obtaining new experimental data by utilising the most advanced experimental techniques, (b) developing, improving and validating new state-of-the-art CFD methodologies and (c) training in industrial practice on site at the non-academic partner institutions which is expected to enhance their career perspectives.

PhD topics that are offered:

ESR1 Project Title: Droplet cluster break-up characterisation under non-evaporating conditions.

Objectives: (1) To characterise using DNS the dynamics of dense droplet clusters. (2) Derivation of relevant SGS (sub-grid-scale) models

Expected results: The dynamics of droplet clusters consisting of pre-defined arrangements of spherical as well as non-spherical droplets and ligaments will be simulated using DNS. Simulations will be performed for a range of clusters having as variables the number of droplets, their proximity and shape. Non-evaporating conditions will be considered. A SGS model that describes the change in liquid surface because of droplet dynamics in a droplet cloud will be proposed for Weber and Reynolds numbers referring to conditions representative of the industrial applications considered in this Project. The SGS model will be applied to the case of an oil burner.

ESR2 Project Title: Droplet cluster break-up characterisation under evaporating conditions.

Objectives: (1) Characterise the increased surface area and vaporisation rate for the same droplet clusters as ESR1 including vaporisation. (2) Derivation of relevant SGS models

Expected Results: Vaporisation rate models suitable for $P/P_{cr} < 0.5$ and $T < T_{cr}$ conditions will be implemented in the DNS solver of ESR1 and will simulate the break-up of droplet clusters under evaporating conditions. A SGS model describing the vaporisation rate and surface area increase during these processes, in a form suitable for implementation to the LES-PDF code will be suggested. Parametric studies will be performed for fuels and operating conditions relevant to Diesel sprays and oil burners.

Responsibilities:

Two (2) successful candidates will be employed for 3 years (36 months) and will receive a financial package including mobility and family allowance according to the rules for Early Stage Researchers (ESRs) in an EU Marie Skłodowska-Curie Actions Innovative Training Networks (ITN).

The candidates will be enrolled to PhD programmes in City University London as external doctorate students, but they will both receive industrial/academic training through the scheduled secondments to world leading companies/partners of the project. The candidates will also take part in all other activities of the HAOs project (courses, summer schools, workshops).

Successful candidates are expected to contribute to the following main duties:

- To work closely with the principal investigator and co-ordinator to ensure project deliverables and milestones are met in a timely manner.
- To assist in the dissemination activity by providing suitable material to the project web site and ensuring the quality of material provided by other project partners.
- Being able to function both in a team and independently, with a good positive attitude to the wide variety of people encountered
- A critical and inquisitive attitude with regard to results, which can be translated into new research questions.

- To liaise closely with and travel to the premises of the industrial partners on the project, or to other sites, to meet any industrial requirements of the position, observing the specific rules of the Marie Curie actions.
- To play a leading role in raising the national and international profile of The Team by publishing articles in international journals, attendance at conferences, enhancing appropriate links with industry and Institutions and through other appropriate routes.
- To work as a member of the research centre within the discipline, playing a full part in the research life of the research team of the partner institutions.
- To play an appropriate role in planning and shaping future strategy and direction, working with other staff within The Team in a collegiate framework.
- To undertake other duties as required by the project coordinator.

Person Specifications:

We are looking for enthusiastic Early Stage Researchers, who want to apply know-how and experience in a challenging technical environment. Successful candidates:

- Should have less than 4 years of research experience. This is measured from the date when they obtained the degree which formally entitles them to embark on a doctorate, either in the country in which the degree was obtained or in the country in which the research training is provided.
- Must not have resided or carried out their main activity (work, studies etc.) in Greece for more than 12 months in the last 3 years.
- Should not possess a PhD.
- Should have basic knowledge on computational methods applicable in multiphase flows
- Should have experience in programming (e.g. Fortran, C, C++)
- Should have good communication skills.
- Should have proven knowledge of the English language, both oral and written.

Additional Information

- The post holders must at all times carry out their responsibilities with due regard to the partner's Equal Opportunities Statement.
- The post holders must accept responsibility for ensuring that the policies and procedures relating to Health and Safety in the workplace are adhered to at all times.
- The post holders must respect the confidentiality of data stored electronically and by other means in line with the Data Protection Act.
- The post holders must carry out their responsibilities with due regard to the non-smoking environment of the Universities and industries involved when working on collaborators premises or sites.

Sustainable Development

CERTH/CPERI are committed to a policy of best practice to assist in building a sustainable way of life by taking a positive, solutions-orientated approach. All post holders are encouraged to contribute through their roles to improving the environment, for CERTH/CPERI and the wider community. Details of policy, information and the staff development supporting the policy on the environment will be promoted through the website and various CERTH/CPERI communication channels.

The above list is not exclusive or exhaustive and the post holder will be required to undertake such duties as may reasonably be expected within the scope and grading of the post. All members of staff are required to be professional, co-operative and flexible in line with the needs of the post.

Job descriptions should be regularly reviewed and at least prior to the annual appraisal, if applicable or on a regular basis to ensure they are an accurate representation of the post.

Salary and Conditions of Service

The salient features of Conditions for Research and Analogous staff are as follows:

- The salary will be in the range of 41,790€ to 44,795€ gross per annum. This is in accordance with the MSCA-ITN rules for Marie Curie Fellows working in Greece and is subject to health insurance/tax deductions which comply with the Greek legislation.
- Annual Leave is 21 days.
- **These posts are fixed-term for 3 years.**
- All offers of appointment are subject to the CERTH/CPERI receiving satisfactory references and medical clearance.
- All appointments at CERTH/CPERI are subject to a probationary period.

Applications

When preparing your application, you should address carefully the post details enclosed and in particular the qualities outlined in the Person Specification. Please include examples where appropriate.

All applications must be received by 5pm on 15 March 2016.

Further Information

CERTH/CPERI offers a good working environment. CERTH/CPERI confirms its commitment to equal opportunities in all its activities. It is intended that no job applicant or employee will receive less favourable treatment on the grounds of political belief, sex, sexual orientation, disability, marital status, race, nationality, ethnic origin, religion or social class. Selection and promotion criteria will be kept under review to ensure that individuals are treated on the basis of the job requirements and on their relevant personal merits, and are not disadvantaged by conditions or requirements, which cannot be shown to be justifiable.

If you have a disability and are interested in this post, your application is welcomed.

For an informal discussion you may wish to contact Ilias Malgarinos and/or Nikolopoulos Nikos:

Telephone: +30 211 1069 506/509 (central: 500)

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