MIGRATE

MIniaturized Gas flow foR Applications with enhanced Thermal Effects

This project has received funding from the European Union's Horizon 2020 research and innovation programme under the Marie Sklodowska-Curie grant agreement No. 643095

MIGRATE (Research and training network on **MI**niaturized **G**as flow fo**R** **A**pplications with enhanced **T**hermal **E**ffects) is planned as a multi-partner Innovative Training Network (ETN – European Training Network), assessing research and applications for thermal aspects of gas microflows. The network consists of 10 beneficiaries and 7 associate partners, spread all over Europe. This unique combination of university research, SME and world leading industrial stakeholders will contribute in a synergetic way to the increase of knowledge about micro scale gas flow heat transfer problems as well as to industrial applications of highly efficient miniaturized devices. Within MIGRATE, a number of Early Stage Researcher (ESR) projects will cover different aspects of enhanced heat transfer and thermal effects in gases, spanning from modelling of heat transfer processes and devices, development and characterization of sensors and measurement systems for heat transfer in gas flows as well as thermally driven micro gas separators to micro-scale devices for enhanced and efficient heat recovery in automotive, aeronautics and energy generation.
The ESRs recruited for the network will undergo training in at least three different locations. Additionally, short stays can be arranged at beneficiaries and associate sites. Moreover, annual network wide workshops and summer schools will ensure that each researcher receives exposure to, and benefits from, the full expertise of the Network.

More information can be obtained from www.migrate2015.eu.

Within the MIGRATE network a

E S R Position (f / m)

is offered at University of Limerick with the topic

Micro Photo Ionization Detector for VOC Gases

Ref. N°: MIGRATE-ESR 3

The position includes secondments at

In Air Solutions

and

Karlsruhe Institute of Technology

Short stays at different other beneficiaries or associated may be possible by negotiation.

Main goal: development of miniaturized photoionization detectors for the measurement of volatile organic compounds (VOCs) at very low concentrations compatible with microfluidic flows

Duration: 3 years

Expected starting date: April 2016

Application deadline: **16th May 2016 or until filled**

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Support for housing, in terms of language courses etc. is provided by all participating organisations.

Application of women is highly appreciated!

Detailed description of the project:

The development of ultra-portable, accurate and powerful analytical tools capable of monitoring the air pollutants in near real time is a major technical challenge. Among pollutants, Volatile Organic Compounds (VOCs) such as Benzene are of major concern for indoor air quality due to its ubiquity and carcinogenic effect. ICPEES and INR have jointly developed a miniaturized GC/PID system dedicated to BTEX (Benzene, Toluene, Ethybenzene and Xylenes) monitoring in near-real time conditions at ppb level. This system has a temporal resolution of 10 min, a detection limit of 0.5 ppb.

The objective of this project is to improve this system by incorporating the Photo Ionization Detection into a microfluidic µ-PID device, focussing on the time to replenish the sample volume. The project involves the collaboration between four partners, hosted at the University of Limerick (ULim) in Ireland, In Air Solutions (INR) in France, Karlsruhe Institute of Technology (KIT) in Germany and the Institute for Chemistry and Processes for Energy, the Environment and Health (ICPEES) in Strasbourg, France. The development of the microfluidic device for µ-PID will be performed at ULim, while the test and validation will be conducted at INR. Supportive work will be performed at KIT and ICPEES, for example fabrication and analytical chemistry / BTEX detection methodologies. The candidate will primarily be located at the University of Limerick, Ireland.

Expected time schedule

ESR n°3	Year 1		Year 2	Year 3
	1st stay	2nd stay	3rd stay	4th stay
Location	**ULIM**	**KIT**	**ULIM**	**I**

1st stay: At ULim the ESR will initially define and quantify the existing design, and identify the current design bottlenecks. An iterative campaign of test / evaluation of preliminary design concepts will be conducted resulting in a redesigned microfluidic based PID inlet / outlet. The finalised design will be fabricated and tested, and ultimately integrated into the BTEX micro-analyser.

2nd stay: At KIT, the ESR will focus on the design for manufacture of the viable design concepts, and fabricate the device.

3rd stay: At INR, the instrument will be evaluated in terms of limits of detection, repeatability and reproducibility using controlled gaseous BTEX concentrations. Indoor field campaigns will be performed to assess the accuracy of the new micro-device and to compare its measurements with other reference methods*:*

In addition, a Short Visit (a few weeks) to ICPEES for analytical chemistry / diagnostic techniques in VOC detection training will be scheduled.

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Requirements

This is a challenging and highly rewarding course of study and therefore the successful candidate will need to have the following qualifications:

Essential Criteria

- Masters Qualification (NFQ Level 9, EQF Level 7) in Mechanical/Process/Chemical Engineering or related discipline.
- Satisfy the Eligibility Requirements under H2020 for Early Stage Researchers. (see *http://www.migrate2015.eu/24.php)*
- Experience in experimental techniques adapted to fluid flows.
- Strong background in fluid mechanics and heat transfer.

Desirable Criteria

- Excellent communication skills and written/verbal knowledge of the English language.
- High autonomy and adaptability skills.
- Experience in microfluidics would be beneficial.
- Knowledge of sensors, sensor systems, and related control hardware / software.
- Basic knowledge of German / French languages (English will be the working language).

Financial information / Salary

Annual gross salary: €37903 *subject to employer pension and PRSI deductions, in addition to personal income tax deductions, inclusive of mobility allowance (additional payment may be made due subject to status).*

Contacts:

For further information please contact:

Dr. David Newport, University of Limerick, david.newport@ul.ie

Application procedure:

Applications for this position **must** be made through the Vacancies Website of the University of Limerick, in accordance with the policies and procedures for the recruitment of staff.

https://cloud.corehr.com/pls/ulliverecruit/erq_search_package.search_form?p_company=1&p_internal_external=E

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Informal queries may be directed to Dr. David Newport (david.newport@ul.ie)

Deadline: 16th May 2016

Eligibility of your application can be checked here: www.migrate2015.eu