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

is offered at Karlsruhe Institute of Technology (KIT) with the topic

Micro Pirani Pressure Sensor

Ref. N°: MIGRATE-ESR 01

The position includes secondments at

University of Bologna, Italy

and

INFICON, Liechtenstein

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

Main goal: Development, modelling, generation and characterization of a micro sensor for pressure measurements based on the Pirani principle. The sensor shall be applicable for various microstructure equipments.

Duration: 3 years

Expected starting date: 01.02.2016

Application deadline: **15.01.2016**

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Detailed description of the project:

The Pirani sensor uses this principle to measure the temperature of a hot wire and, with that, the heat transfer to the surrounding gas. Heat transfer in gases is depending on the total pressure of the gas inside a volume. The higher the pressure is, the better heat is transferred. Moreover, the heat transfer is depending on the molecule size of the respective gas. Therefore, standard Pirani sensors have to be calibrated for each gas separately, or will deliver different pressure measurements for different gases or gas mixtures.

The project is dedicated to model and simulate, develop and characterize experimentally a micro Pirani sensor or sensor array in micro scale. The sensor should be developed in a way to act independently from the gas and for a wide range of total pressure. Its precision and sensitivity should be as high as possible. It should be possible to implement the sensor system in all kind of technological fields, micro and macro scale, being as cost-effective as possible. The numerical model should enable a prototype design to be evaluated by comparison of the model calculations and experimental results. Final objective of the project is to have both, a detailed model description as well as a working prototype sensor, which can be further developed.

Expected time schedule

ESR n°01	Year 1		Year 2	Year 3	
	1st stay	2nd stay	3rd stay	4th stay	5th stay
Location	**KIT**	**UNIBO**	**KIT**	**INFICON**	**KIT**

1st stay:
Literature review and basic principles development. The ESR should review the actual status of pressure sensor technology, evaluate for possibilities to miniaturization and compare to the status of the Pirani technology. Moreover, the ESR should get familiar with vacuum technology and Pirani measurement principle. Possibilities as well as threads for miniaturization should be identified.

2nd stay: Overview on the technological possibilities of vacuum measurement. Practical and theoretical training on vacuum technology and measurement technologies.

3rd stay: Development of a simulation model, realization in CFD (or other) simulation code. Experimental approach to a working sensor system.

4th stay: Industrial ambient training, application of vacuum sensors and vacuum technology in industry. IP training.

5th stay: Finalizing the model and simulative work, experimental proof of the simulation. Characterization of prototype devices.

In addition, a Short Visit (a few weeks) to University of Thessaly, Volos, Greece for additional competence in modelling and simulation techniques has to 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:

Diploma/Master in Physics, Electrical Engineering, Mechanical Engineering, Process Engineering or similar. Good skills in sensor, sensor systems, measurement and control hard- and software. Basic knowledge in vacuum technology, microstructure technology and mechanical engineering. Skills in CFD will be helpful. Excellent English skills, basics in German will be helpful. Good presentation skills needed.

Financial information / Salary

Monthly gross salary: approx. 3050,- €

Monthly mobility allowance: 600 € (researcher without family obligation) – 1 100 € (researcher with family obligation)

Contacts:

For further information please contact: juergen.brandner@kit.edu, info@migrate2015.eu

Application procedure:

Applications for this position, including a CV with the contact details of three referees, a covering letter, attestation of the diploma / master degree and last transcript of records, should be sent, using the reference number in the subject line and preferably via e-mail, to:

Karlsruhe Institute of Technology (KIT)
PD Dr.-Ing. habil. Juergen J. Brandner
Institute for Micro Process Engineering (IMVT)
PTE-HEX
CN, Hermann-von-Helmholtz-Platz 1
D-76344 Eggenstein-Leopoldshafen
Germany
e-mail: juergen.brandner@kit.edu

Deadline: 18.12.2015

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