

Organization/Company: Siemens Industry Software N.V.

Academic supervisor: KU Leuven, Prof. Wim Desmet

Location: Belgium, Leuven

Research field: Acoustics, Fluid Dynamics, Combustion

Research profile: First Stage Researcher (R1)

Type of contract: temporary

Job status: full-time

Hours per week: 39

Offer starting date: 1st March 2019

Application deadline: 30th September 2019

EU RESEARCH FRAMEWORK PROGRAMME: H2020 / Marie Skłodowska-Curie Actions

MARIE CURIE GRANT AGREEMENT NUMBER: 813367

Job title: Thermoacoustic instability control by acoustic damping devices

Background

Combustion of hydrogen from renewable energies is an emerging technology that can replace fossil fuels and so provide carbon-neutral energy. The objective of the Innovative Training Network POLKA is to solve serious technical problems, which are specific to hydrogen combustion: thermoacoustic instabilities and flashback. Thermoacoustic instabilities are large-amplitude pressure oscillations produced by interactions between the flame and acoustic waves. They tend to occur unexpectedly and can cause catastrophic damage to hardware combustor. Flashback is the dangerous phenomenon of the flame propagating backwards into components not designed for high temperatures.

POLKA - POLution Know-how and Abatement

The ultimate vision of the POLKA research and training initiative is to create new physical insight and advanced simulation tools, so as to underpin the development of hydrogen-fueled combustion systems (gas turbines, aero-engines, boilers, furnaces, ...). The methods to be used within this international network are a combination of experiments, numerical simulations and analytical techniques. Several positions are available for early-stage researchers (doctoral candidates) in the POLKA network, funded by the European Commission under Horizon 2020 / Marie Skłodowska Curie. POLKA is a multi-disciplinary project providing research training in computational fluid dynamics, combustion, acoustics, control and data science. The project will shape early career talents in a network of world leading scientists and industrial partners to work on one of the most severe design issues in aviation technology.

Academic project partners are TU Eindhoven, Univ. degli Studia di Genova, Univ. of Keele, TU München, Univ. Di Pisa, KTH Stockholm and KU Leuven. Partners from industry are Ansaldo, Bekaert, IFTA, SIEMENS and others. Two positions for a doctoral student ("early stage researcher") in the RTD acoustics team in Siemens Industry Software in Leuven will open in the first quarter of 2019. The

If you wish to apply, or to discuss any details of the project informally, please contact:
Michiel Ceunen, Siemens Industry Software NV., michiel.ceunen@siemens.com

objective of the research is to study sound mitigation devices for large-scale industry-relevant hydrogen-fueled combustors.

In this context, innovative numerical methods will be developed based on high-order finite elements in the frequency domain in order to predict the appearance of thermoacoustic instabilities and to allow the design of efficient damping devices to mitigate them, at a reasonable computational cost. These mitigation devices include perforated plates and more complex acoustic damping devices, like meta-materials. If successful, the proposed numerical strategies will be further developed into a research prototype within the commercial software Simcenter Acoustics (NX Nastran) in interaction with STAR-CCM+.

Major responsibilities

Your major responsibility as an early stage researcher is to carry out high-quality scientific research. This includes developing scientific concepts and communicating research results both verbally and in writing. As a research fellow you will be registered as a PhD candidate with the Graduate School of KU Leuven, under the supervision of Prof. Wim Desmet, head of the Noise and Vibration Engineering group.

Duration

The studentship will be for three years. There is some flexibility on the start date of each studentship, ranging from March to December 2019.

Remuneration

The researchers will receive a full salary in line with the rules for European Industrial Doctorates (see <http://cordis.europa.eu/fp7/people/>) including contributions to pension scheme and health care. A mobility allowance is also provided to support travelling.

Qualifications

A suitable background is a Master of Science degree in mechanical engineering, engineering physics, scientific computing or related fields. Experience in fluid dynamics, in particular combustion or acoustics is a requirement, and good programming skills are considered especially meriting. The position requires excellent oral and written communication skills in English.

Eligibility criteria

Applicants must satisfy the eligibility rules stipulated by the Horizon 2020 Guidelines of the European Commission. In particular, they must not have performed their main activity in Belgium for more than 12 months of the 36 months preceding the position. Early-Stage Researchers must be in the first four years (full-time equivalent) of their research careers, starting at the date of obtaining the degree which would formally entitle them to embark on a doctorate.

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Your application, with CV, names and contact information of at least two persons for reference, a list of publications (if applicable), and a summary of the M.Sc. thesis should be sent to michiel.ceunen@siemens.com, with subject "Application POLKA". The application should also include a complete academic record (credits and grades), including information on the grade point average, the maximum possible grade in the grading system that is in use at your university as well as the minimum passing grade. If possible, provide also a ranking within your class. Please make sure to combine all the documents in a single PDF file.

Selection process

The recruitment procedures will be transparent, efficient and internationally comparable; they will be based on competitive selection with equal opportunities for all applicants. Candidates from disadvantaged groups will be encouraged to apply, while discrimination based on gender, ethnic origin, disability, ... will not be tolerated. European and national legal obligations will be adhered to, in particular the European Charter for Researchers and the Code of Conduct for the Recruitment of Researchers.

The Organization

Siemens Industry Software N.V. (SISW, formerly known as LMS), located in Leuven, Belgium, is an engineering innovation company, with proven track record in the area of experimental, numerical and hybrid (mixed experimental-numerical) system modelling for noise, vibration, durability and dynamics, performing substantial in-house research on advanced methods and applications. The RTD Acoustics team is a research unit welcoming several international doctoral candidates.

Founded in 1425, [KU Leuven](#) has been a centre of learning for nearly six centuries. Today, it is Belgium's highest-ranked university, [48th position on the times higher education ranking](#) in 2019, as well as one of the oldest and most renowned research universities in Europe, hosting over 56.000 students of which more than 9.000 are international students in a wide variety of study programmes. The university is located in Leuven, a modern, bustling and safe student town, where centuries-rich history meets cutting-edge science. The mixture of cultures and research fields are some of the ingredients making the university of Leuven the [most innovative university](#) in Europe.

The [KU Leuven Noise and Vibration Research Group](#), which currently counts 90 researchers, is headed by [Prof. Wim Desmet](#) and is part of the Mechanical Engineering Department, a vibrant environment of more than 300 researchers. The research group has a long track record of combining excellent fundamental academic research with industrial relevant applications, leading to dissemination in both high ranked academic journals as well as on industrial forums.

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