

Open Position at KU Leuven in the Field of Vibro-Acoustics

Development of acoustic resonant metamaterials for building applications (ESR7)

Acoutect is a European project running from January 2017 until December 2020. This project has received funding from the European Union's Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement number 721536.

Acoutect marries "Acoustics" and "Architect" and responds to the important role that Acousticians have in the design of modern buildings. The overarching aim of Acoutect is to set up a PhD training network on building acoustics and react to the acoustic challenges stemming from modern building concepts to deliver sustainable indoor environments with respect to health and well-being. The coordinator of the project is Eindhoven University of Technology (TU/e).

Within this project we are seeking an early-stage researcher (ESR) for a duration of 36 months to join the Noise and Vibration Research Group at the KU Leuven Mechanical Engineering Department in Belgium.

The KU Leuven Noise and Vibration Research Group

The KU Leuven Noise and Vibration Research Group (www.mech.kuleuven.be/mod), which currently counts 90 researchers and is headed by Prof. Wim Desmet¹, is part of the Mechanical Engineering Department, a vibrant environment of more than 300 researchers. The group initiated research in noise and vibration in the late sixties, with initial efforts focussed on the development of experimental methods, with the birth of modal analysis and applications in the automotive and aeronautics sectors. The eighties are marked with the introduction of numerical techniques (finite and boundary elements) and in the nineties, the scope further widened with the development of active control strategies. During the last decade, the group's expertise in dynamic analysis was further exploited in the context of model based system engineering of smart products and their manufacturing. Today, noise and vibration issues remain a major challenge, not only in the development of high-tech products, processes and systems, but also for the health of people and the well-being of society, for sustainable environment and energy supply, and for safe and comfortable mobility. As such, the KU Leuven research group is continuously challenged to excel and innovate helping to build tomorrow's society.

¹ www.kuleuven.be/wieiswie/en/person/00011973

Industrial relevance and advanced applications have always been major drivers in our strategy. LMS International, now Siemens Industry Software NV (SISW), was established in 1979 as one of the first spin-off companies of KU Leuven and is now a global leader in dynamic testing and mechatronic simulation. Testimony to this industrial relevance also is the long list research projects, ranging from fundamental research over applied research to prototyping and demonstration projects².

Another important element in the group's strategy is dissemination. Apart from publishing in relevant international peer reviewed journals and at scientific and industrial conferences³, since 1975 the research group organises the yearly ISMA and ISAAC courses and the biennial ISMA conference on Noise & Vibration engineering, attracting more than 600 participants from industry and academia, and with full conference proceedings listed on the ISI Thompson list (www.isma-isaac.be).

Project Background

To ensure a healthy environment for people living and working in buildings, research and engineering in the area of building acoustics is essential. Developments in modern building concepts, such as sustainable low-energy consuming buildings, buildings with lightweight materials and open plan working environments, as well as the need to build in extremely noisy areas, require involvement of acoustic experts in order to successfully (re)design buildings without negatively impacting upon people's health and well-being. Taking up current and future acoustic challenges requires innovative solutions based on a thorough understanding and mastering of modern methods and tools, as well as a holistic acoustic approach involving acoustic design, products and subjective evaluation. However, in the complex field of building acoustics, research activities typically are not holistic and have become slightly marginalised. As a consequence, there is a lack of building acoustics experts. To meet the future acoustic needs of the built environment, Acoutect is constructed around two objectives:

1. Establish a long-lasting European-wide training programme on building acoustics.
2. Launch an innovative research programme.

² www.mech.kuleuven.be/en/pma/research/mod/projects/projects

³ <https://lirias.kuleuven.be/cv?u=U0011973>

With these objectives, Acoutect will equip ESRs with skills to ensure acoustic quality of modern and future building concepts, and with excellent perspectives for a career in industry or academia within the area of building acoustics. The training and supervision to reach these objectives is offered by the Acoutect consortium.

Vacancy description

The proposed ESR PhD track targets the development of an innovative noise control concept for building applications, which complies with the challenging and apparently conflicting requirements of good noise and vibration behaviour, and low mass and compact volume.

The concept is based on the patented concept of KU Leuven acoustic resonant metamaterials^{4,5}. These are innovative material systems that can be manufactured from conventional materials but exhibit some targeted performance that exceeds that of conventional materials. Vibro-acoustic metamaterials come to the fore as possible candidates for lightweight material systems with superior noise and vibration insulation, be it at least in some targeted and tuneable frequency ranges, referred to as stop bands.

The proposed PhD track will develop metamaterial structures specifically for building acoustics applications such as roof and wall panels with low mass and high sound insulation. The proposed PhD track will also be involved in the Open Plan Spaced demonstrator and investigate the potential in such setting of open space offices to improve acoustic comfort.

Candidate Profile

All candidates must be fluent in spoken and written English. The R&D is highly multidisciplinary. An ideal candidate has an M.Sc. in engineering (e.g. (vibro-)acoustics, solid-mechanics, building physics, physics).

- Knowledge of numerical modelling. programming languages and signal processing is a strong advantage.
- Candidates get the opportunity to perform this work as part of a PhD study.
- All members of the network are equal opportunity employers, both female and male candidates are invited to apply.

Job conditions

The host organisation will appoint the successful applicant under an employment contract with a very competitive salary according to EU regulation, including social security. The duration of the contract is, at least, 36 months. The fellow is expected to join their host organizations starting from July 2017 (estimated time). The salary is composed from the following allowances depending on the personal status of each fellow (see more details at www.acoutect.eu):

⁴ www.mech.kuleuven.be/en/research/mod/research/metamaterials

⁵ www.youtube.com/watch?v=JUi3qK32mf0

- Living allowance: Monthly rate of €3,110. This amount will be multiplied by the Country Correction Coefficient of the recruiting institution. This amount includes the monthly salary for the fellow before any deductions (contributions of both employers and employees to social security, pension, taxation, voluntary deductions, etc).
- Mobility Allowance: Monthly rate of €600. Contributes to the expenses of the researcher caused by the mobility.
- Family Allowance: Monthly rate of €500. For all the recruited fellows who have family at the time of the recruitment.

Additional funding for participation to courses, workshops, international conferences, etc. is ensured.

This position includes doctoral studies. The successful applicant must register at the KU Leuven Arenberg Doctoral School (<https://set.kuleuven.be/phd>).

EU Eligibility criteria for candidates (in short)

The applicant may be of any nationality.

The applicant shall at the time of recruitment be in the first four years of his/her research career and have not been awarded a doctoral degree. This is measured from the date when the applicant obtained the degree, which would formally entitle him/her to register as PhD candidate.

The applicant must not have resided or carried out his/her main activity in the country of the host institute for more than 12 months in the 3 years immediately prior to the recruitment.

Benefits

KU Leuven offers to the selected candidate a stimulating and ambitious research environment⁶ which is embedded in the DNA of the region of Leuven, a premier destination for Health, High-Tech and Creativity⁷ and considered an extremely nice place to live and work.

To assist Fellows in matters of work permits, visas, living, mobility, housing,... , KU Leuven has the International Admissions Office (an Official Marie Curie mobility centre recognized by the Flemish government) with dedicated Officers which offers new colleagues HR, Recruitment and Career Management support⁸.

How to Apply

Follow the instructions at www.acoutect.eu.

⁶ <http://www.kuleuven.be/english/living>

⁷ <http://www.leuvenmindgate.be/en>

⁸ www.kuleuven.be/welcome

APPLY NOW! Application open from February 1st 2017. The evaluation process of the applications will start from April 1st 2017.

Questions regarding this position: info@acoutect.eu.