

ACOUCTECT

Open Position at Aalto University in the Field of Room Acoustics

Modelling of room acoustics and sound insulation (ESR2)

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.

Within this project we are seeking an early-stage researcher (ESR) for a duration of 36 months to join the Virtual Acoustics Team at the Department of Computer Science, Aalto University, in Finland.

The Virtual Acoustics Team at Aalto University

The main research area of the Virtual Acoustics Team at Aalto University is room acoustics and spatial sound. The team has worked over two decades on room acoustics modeling and auralization. Moreover, during last decade the team has concentrated on concert hall acoustics, and results in human perception, novel spatial sound measurement and auralization techniques have raised the team to be one of the best in the world in room acoustics.

Prof. Tapio Lokki and Prof. Lauri Savioja lead the team, which has state-of-the-art multichannel listening rooms, measurement equipment, and working conditions. The team has also very good connections in academia world-wide and with companies in Finland.

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.

With these objectives, Acoutect will equip early stage researchers (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

Computational modelling of room acoustics is an essential component in room acoustic design. The main approaches in room acoustic modelling are the wave-based techniques and techniques based on geometrical acoustics (GA). The wave-based techniques provide better accuracy, however, at higher computational cost. Therefore, typically modelling of higher frequencies needs to be done with less accurate GA techniques such as ray-tracing, whereas the low frequencies can be simulated with the wave-based methods.

In this project, the main emphasis is on efficient and perceptually accurate wave-based modelling. There are several such techniques, but the starting point for the development work is the finite-difference time-domain (FDTD) method that has been one of the main research topics in the Aalto Virtual Acoustics Team for two decades. A key research topic in this project is practical validation of the method. This means conducting measurements in real-life scenarios and comparing the simulation results to the measurement results. The aim is to find out the main reasons for the differences, and eventually investigating ways to overcome those challenges. The project is not limited to development of a single method, as another aim is to compare the performance of various techniques to reveal,

which modelling technique is computationally most efficient under given accuracy constraints.

To conclude, your research project will focus on the development and validation of high-performance wave-based room acoustic modelling techniques that enable simulation of room acoustics in complex multi-room environments.

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. acoustics, computer science, building physics, physics, mathematics).

- Knowledge of computational modeling, programming languages (matlab and C/C++) 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):

- 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 for the PhD program at Aalto University School of Science. The duration of the doctoral studies in Finland is 4 years. Therefore, this position includes an additional year contract at the end of Acoutect (the employment contract conditions for this last year are according to Aalto regulations).

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

Aalto University is a multidisciplinary community where science and art meet technology and business. Aalto University offers to the selected candidate an innovative and ambitious research environment with the best scientists in their fields. Aalto, having about 20 000 students and 4 500 employees, is located in Espoo, 11 minutes with metro from downtown of Helsinki. Finland is known for its excellent social security system and beautiful nature. For the selected candidate assistance for finding accommodation can be given.

How to Apply

Follow the instructions at www.acoutect.eu.

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.