

# ACOUCTECT

## Open Position at Eindhoven University of Technology in the Field of Building Acoustics

### Room acoustic modelling of open plan spaces (ESR1)

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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 Building Acoustics Chair in the unit of Building Physics and Services at the Department of the Built Environment, Eindhoven University of Technology, in the Netherlands.

The Department offers a BSc in Architecture, Urbanism and Building Science (Bouwkunde) and MSc programs in Architecture, Building and Planning and Construction Management and Engineering. Education and research in the Department focus on the development and use of technology for the design and construction of a comfortable, healthy and sustainable built environment. The Department's philosophy is "Beyond Building", which reflects our multidisciplinary, integral and innovative approach in the construction, evaluation and improvement of buildings and urban areas. Our research is based on fundamental scientific insights and methods and their application for the built environment.

### The Building Acoustics Chair at TUe

The chair Building Acoustics is the acoustics research group of the unit Building Physics and Services (BPS) being the leading academic group on acoustics of the built environment in the Netherlands.

The chair focuses on research in the field of Acoustics of the Built Environment. Research as conducted by the Chair Building Acoustics revolves around the continuous development of computational and experimental acoustic methods. These methods quantify the influence of the built environment on the propagation of sound from the sources to our ears.

The aim of these developments is twofold:

- supports fundamental research on the understanding of the mechanisms underlying the production, propagation and perception of sound in the built environment.
- offers researchers and designers tools to integrate and optimize acoustics for a sustainable (re)design of the built environment and technical innovations therein.

Herewith, we strive to contribute to the reduction of adverse health effects caused by human induced noise, and to promote positively perceived sound environments. Our strong ties with the academic and business community results in high-grade research opportunities. The research connects to the TU/e strategic areas health and smart mobility (visit [www.tue.nl/buildingacoustics](http://www.tue.nl/buildingacoustics) for current research projects).

### 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

The acoustics in modern open plan spaces plays an important role with regards to the work or study performance of the occupants and their health. Often, the sound environment in these spaces does not fully support the user's needs. Acoustic modelling plays an important role in the design of these spaces, as well as in improving existing spaces. However, using state-of-art acoustic modelling approaches, mostly based on geometrical acoustics, could lead to incorrect predictions. Therefore, the aim of this research project is to develop other acoustic prediction modelling approaches for large open (interconnected) spaces, including non line-of-sight source-receiver paths, that are better suited to predict acoustics or can be used in complement to the current methods. At one hand, we aim for a wave-based acoustics method, a high-detailed method but computationally slow. The challenge is implement a wave-based method (already in use in our group) for room acoustic purposes and validate its applicability. At the other hand, we aim for a simplified approach (image source/diffusion equation) for the high frequencies. The advantage of this method is that it is fast, but the question is how appropriate it is for open plan spaces.

Your research project will focus on the development of two acoustic numerical modelling methods (see above) to predict the acoustics of open plan spaces. It contains development and implementation of the methods, and validation of the methods by comparing with real-life scenarios.

## 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, computational engineering, physics).

Knowledge of computational modelling, programming languages and signal processing is a strong advantage.

All members of the network are equal opportunity employers.

## 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](http://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 TU/e. The duration of the doctoral studies in the Netherlands 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 TUE 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

Eindhoven University of Technology offers to the selected candidate a stimulating and ambitious research environment. The city of Eindhoven lies in the technological heart of the Netherlands and has a population of 21,000 students.

Besides this, the TU/e has an excellent package of attractive benefits for employees, a child-care facility, and a modern sports complex. Assistance for finding accommodation can be given.

## How to Apply

Follow the instructions at [www.acoutect.eu](http://www.acoutect.eu).

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

Questions regarding this position: [info@acoutect.eu](mailto:info@acoutect.eu).