

# ACOUCTECT

## Open Position at the University of Liverpool in the Field of Building Acoustics

### Modelling of structure-borne sound transmission in lightweight buildings (ESR3)

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Acoutect is a European project running from January 2017 until December 2020. The 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 carry out a PhD with the Acoustics Research Unit (ARU) in the School of Architecture at the University of Liverpool in the UK.

#### The Acoustics Research Unit at the University of Liverpool

The ARU specialises in research, supervision of postgraduate research study (PhD and MPhil), training, knowledge exchange and consultancy.

Our research focuses on airborne sound and structure-borne sound in the fields of engineering acoustics, building acoustics, room acoustics, audio acoustics, psychoacoustics, human vibration, environmental noise and industrial acoustics. Particular emphasis is placed on the development of prediction models with validation using laboratory experiments, and experimental studies on subjective evaluation.

In the last UK research assessment exercise, the Research Excellence Framework (REF 2014), the school was the highest ranked department submitted solely as a School of Architecture with a top six place for research intensity, a top ten place for grade point average and a top three place for research outputs, with 80% of our publications rated as world leading or internationally excellent.

Physically, the ARU offices and laboratories are situated in the Department of Engineering. These laboratories include an anechoic chamber, a semi-anechoic chamber, two reverberant chambers and an audiometric booth. State-of-

the-art instrumentation is available for sound and vibration measurement.

For more information on the ARU, please visit our website:

<https://www.liverpool.ac.uk/architecture/research/acoustics-research-unit/about/>

#### 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 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 research for the PhD will focus on the development of prediction models that can inform engineering design on noise and vibration transmission in lightweight buildings, particularly from machinery and impacts from people. There are several critical or unresolved aspects that need to be addressed: (a) modelling of vibration transmission across lightweight framed walls and floors which cannot be treated as precise periodic structures, (b) predicting maximum Fast time-weighted sound pressure levels in rooms due to building machinery and heavy impacts from people on lightweight floors (c) prediction of low-frequency airborne and impact sound insulation.

The modelling will be based around approaches such as Finite Element Methods (FEM), and steady-state and transient forms of Statistical Energy Analysis (SEA). The aim is to provide validated approaches to prediction that can be based around numerical models in combination with laboratory measurements.

The research will equip the ESR with skills and experience relevant to acoustic engineering jobs in the construction sector or academia, with skills that are potentially transferable to research in the automotive, marine and aeronautic sectors.

## Candidate Profile

All candidates must be fluent in English (Overall IELTS score of at least 6.5).

An ideal candidate will have an MSc or MEng in acoustics, mechanical engineering, building physics, or physics, alternatively a candidate with a first class BEng or BSc in one of these topics would also be considered.

Experience with finite element modelling, Matlab and signal processing for acoustics would be advantageous.

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 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 to facilitate mobility during the project.
- 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 the University of Liverpool. The duration of the full-time PhD is a minimum of 3 years up to a maximum of 4 years. Most students complete after 3.5 years.

## 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

The University of Liverpool is a founding member of the elite Russell Group of research-intensive universities in the UK. The university is ranked in the top 1% of universities worldwide according to the Academic ranking of world universities. By joining the University, you will be joining a pre-eminent research-based university with 32,000 students pursuing over 450 programmes spanning 54 subject areas.

Liverpool is a World Heritage City, the birthplace of The Beatles, the home of the most successful club in the history of British football, and home to the oldest Chinese community in Europe. Liverpool is also the second most cost-effective UK city to live in for university students (RBS survey, 2016).

## How to Apply

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

**APPLY NOW!** The application process opens on 1<sup>st</sup> February 2017. Evaluation of applications will start from 1<sup>st</sup> April 2017.

For general questions regarding this position, please email [info@acoutect.eu](mailto:info@acoutect.eu). For specific questions on the PhD, research topic and the University of Liverpool, please email [carl.hopkins@liverpool.ac.uk](mailto:carl.hopkins@liverpool.ac.uk).