

Acoustic Research Unit

Commercial insights and state-of-the-art capability in measuring and predicting sound and vibration from acoustic cleaning to the sound quality of products.

We are adept at applying our extensive knowledge and experience to solving vibroacoustic problems and addressing unique challenges, particularly those involving collaborative research and non-standard, innovative work with industry.

Our research has applications across a range of industries including manufacturing, automotive, marine, aeronautical, construction, environment, and energy. We have worked with clients as diverse as Museum of Liverpool, Baxi Group and Boeing Commercial Airplanes (USA) to find novel ways to address their highly specific and individual acoustic issues.

We have dedicated laboratories that feature a full range of instrumentation for measuring sound, vibration and material properties, supported by the latest software simulation tools. This allows us to take a project from development of a mathematical model to a scale model right up to creation of an actual size model.

Our facilities

Anechoic chambers (internal dimensions 5m x 4m x 2.5m)

Two flexible chambers designed to measure sound in a controlled environment with low noise in a free-field. The larger chamber features a removable floor to test in a hemi-anechoic or anechoic environment.

Reverberant chambers (internal dimensions 5.8m x 4.9m x 4.3m)

Used for a range of non-standard measurements requiring a reverberant sound field.

Reception plates

Used to quantify structure-borne sound power from machinery.

Impedance tube

For measuring sound absorption and impedance of small samples of material.

Audiometric booth (internal dimensions 2.7m x 2.1m x 2.1m)

A low-noise, low-vibration environment for subjective testing and evaluation.



Case study

Client: The Museum of Liverpool

“The ARU carried out detailed measurements and analysis before and during the concert. This was a successful outcome and we could not have gone ahead with the event without the skill, expertise and judgement of the Acoustics Research Unit.”

*Paul Gallagher
Acting Senior Curator of
Urban History
Museum of Liverpool*

Challenge: Vibrations, from machinery or loud noise, can have harmful effects on the objects inside museums and art galleries. Following a successful project for the National Conservation Centre looking at the effect of construction work on the Walker Art Gallery and World Museum Liverpool, the ARU was approached by the Museum of Liverpool for advice on potential vibrations from a pop concert in the atrium.

Solution: The ARU carried out a noise and vibration survey to relate the sound pressure level outside display cases to the vibration of the supporting surfaces inside the case. By establishing this relationship, the team could estimate vibration in display cases when exposed to the noise levels of a pop concert and set appropriate sound level limits for the event.

Impact: Understanding how artefacts respond to environmental noise and vibrations is vital for the protection of artefacts across the world. The ARU's knowledge and expertise in this important area has led to approaches by Museums Trusts in other cities concerned about the effects of vibrations on historical objects.



Contact Us

Acoustics Research Unit

Telephone: +44 (0)151 794 4939

Email: aru@liverpool.ac.uk

Business Gateway

Telephone: +44 (0)845 0700 064

Email: business@liverpool.ac.uk

www.liverpool.ac.uk/business

Why use the ARU?

- **Innovative:** We carry out internationally significant research that breaks new ground in acoustics, and are skilled at applying that expertise to industrial challenges.
- **Well-equipped:** Our dedicated laboratory complex features the latest instrumentation and software to test sound sources ranging from large, high-intensity sonic cleaning devices to the human whisper.
- **Proven impact:** Our research has been instrumental in developing European and international standards on sound and vibration.