

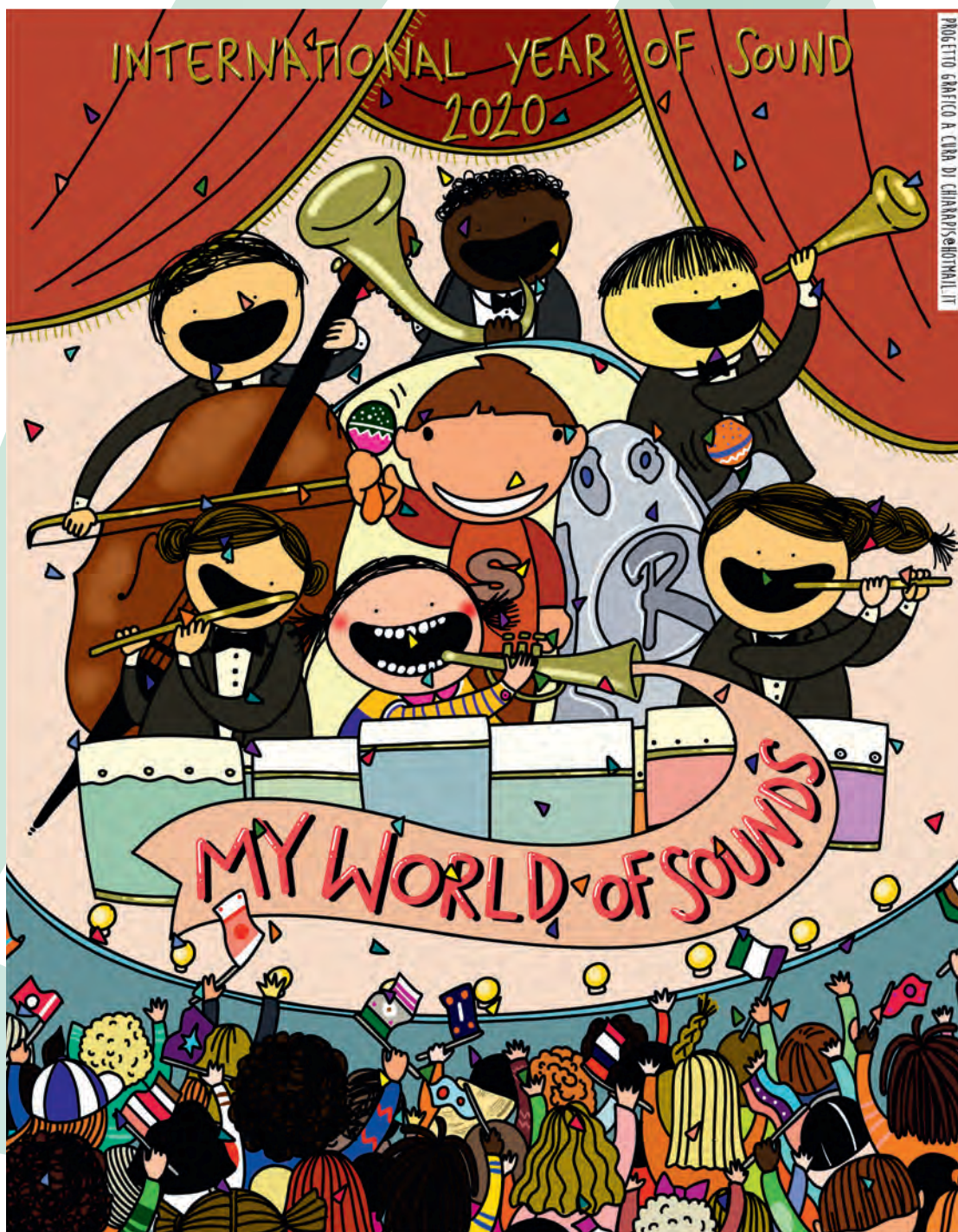
ACOUSTICS

BULLETIN

Tapping machines v rubber ball for field sound insulation tests

IOA STEM activity – ‘Big Bertha’ and air cannons are all part of the learning experience

The future of acoustics research in the UK



Our Noise insulation and Vibration damping solutions deserve a fanfare

REVAC
THE NOISE INSULATION EXPERTS

Acoustic Membranes

Dense and flexible polymeric noise insulation barrier products used within floor, wall, and roof constructions

- Single and Multi-ply membranes available.
- Products are recyclable and manufactured from sustainable sources.

DEDPAN
ANTI-DRUMMING MATERIALS

Anti-Drumming Material

High performance resonant damping treatments - for example on Metal Roof and Wall Systems.

- As referenced in DfES produced BB93 "Acoustic Design for Schools"
- Available as Self-Adhesive sheets or Spray & Trowel applied compounds.

WSBL
FORMERLY WARDLE STOREYS (BLACKBURN) LTD.

Durbar Mill Hereford Road Blackburn BB1 3JU. Tel: 01254 583825 Fax: 01254 681708
Email: sales@wsbl.co.uk Website: www.wsbl.co.uk



AcSoft
sound & vibration

Sensors and instrumentation for the professional engineer

- Long-term Monitoring
- Frequency Analysis
- Multichannel Analysis
- Acoustic Imaging
- Noise & Vibration Meters
- Electroacoustic Testing
- Building Acoustics
- Human Vibration
- Sound Quality
- Transducers
- Sound Engineering



01234 639550
sales@acsoft.co.uk
www.acsoft.co.uk

Scan the code for full contact details



Sound Engineering

Contacts

Publisher

Juliet Loiseau

Contributions, letters and information on new products to:

Nicky Rogers

Email: nickyr@warnersgroup.co.uk

Tel: 01778 391128

Advertising:

Dennis Baylis MIOA

Email: dennis.baylis@ioa.org.uk

Tel: 00 33 (0)5 62 70 99 25

Published and produced by:

The Institute of Acoustics
Silbury Court,
406 Silbury Boulevard,
Milton Keynes,
Buckinghamshire MK9 2AF
Tel: 0300 999 9675

Edited, designed

and printed by:

Warners Group Publications
The Maltings
West Street
Bourne
Lincs
PE10 9PH



Views expressed in Acoustics Bulletin are not necessarily the official view of the Institute, nor do individual contributions reflect the opinions of the Editor. While every care has been taken in the preparation of this journal, the publishers cannot be held responsible for the accuracy of the information herein, or any consequence arising from them. Multiple copying of the contents or parts thereof without permission is in breach of copyright.

Permission is usually given upon written application to the Institute to copy illustrations or short extracts from the text or individual contributions, provided that the sources (and where appropriate the copyright) are acknowledged.

The Institute of Acoustics does not necessarily endorse the products or the claims made by the advertisers in the Acoustics Bulletin or on literature inserted therein.

All rights reserved: ISSN 0308-437X

Annual Subscription (6 issues) £132.00
Single copy £22.00

©2019 The Institute of Acoustics

ACOUSTICS BULLETIN

Acoustics Bulletin Volume 46 No 1 January/February 2020

Institute affairs

- 5 President's letter
- 6 Engineering Division
- 8 New members
- 10 International events 2020
- 12 IOA STEM activity
- 14 John Connell awards
- 16 Branch news
- 18 Citations – Adam Hill and Francis Rumsay
- 24 2019 IOA Diploma results

Instrumentation Corner

- 30 Alternative methods for determining footfall noise transmission
- 36 New look IOA communications
- 38 Autumn 2019 IOA certificate results

Feature

- 40 The future of acoustics research in the UK

General news

- 46 World industry news
- 64 Product news

Technical contributions

- 49 The assessment of potentially actionable noise impact
- 57 Sound sensing in Smart Cities

Industry updates

- 62 AcSoft Group invests for further growth
Sounding out a STEM challenge for Tomorrow's Engineers Week
Armourcoat at The Surface Design Show
Bruel & Kjaer UK training courses

Regular

- 70 Committee meetings and Institute Council



The Institute of Acoustics is the UK's professional body for those working in acoustics, noise and vibration. It was formed in 1974 from the amalgamation of the Acoustics Group of the Institute of Physics and the British acoustical Society. The Institute of acoustics is a nominated body of the Engineering Council, offering registration at Chartered and Incorporated Engineer levels.

The Institute has over 3000 members working in a diverse range of research, educational, governmental and industrial organisations. This multidisciplinary culture provides a productive environment for cross-fertilisation of ideas and initiatives. The range of interests of members within the world of acoustics is equally wide, embracing such aspects as aerodynamics, architectural acoustics, building acoustics, electroacoustic, engineering dynamics, noise and vibration, hearing, speech, physical acoustics, underwater acoustics, together with a variety of environmental aspects. The Institute is a Registered Charity no. 267026



Institute of
Acoustics

50th
Anniversary Year

50 years at the forefront of acoustic measurement



We are shaped by our past

We adapt and learn to strive to offer the most comprehensive acoustic solutions on the market.



We focus on the present

We're here to support you to protect people's hearing, health and wellbeing.



We are the future

We'll continue to innovate and provide accessible technology today and in the future.

 **Cirrus**
Research plc

sales@cirrusresearch.com

www.cirrusresearch.co.uk

0845 230 2434



Dear Members

Happy New Year and welcome to the International Year of Sound (IYS). IYS 2020 is a global initiative that highlights the importance of sound and related sciences and technologies. The founders and drivers of this year-long programme are the major international acoustics societies, including the European Acoustics Association (EAA), of which the IOA is a member. The website (<https://sound2020.org>) contains information on national and international activities aimed to stimulate a worldwide understanding of the role that sound plays in all aspects of our society.

The IOA will be adding to the events calendar as part of its own project of public engagement, along with initiatives of the UK Acoustics Network (UKAN). I recommend that members visit the IYS 2020 events calendar, as well as the IOA site, particularly if they are planning an outreach event to introduce children to STEM through acoustics for example. They might find some clever stuff that is easy to replicate.

Awards

I attended the annual awards of the Noise Abatement Society (NAS) in the House of Commons last October. The NAS was celebrating its 60th anniversary with an evening of awards in memory of its founder, John Connell, who was a pioneer in alerting the public to the detrimental effects of noise.

The IOA sponsored the Innovation Award, which celebrates good acoustic design. Can the IOA learn anything from the NAS regarding engagement with the public and media? Possibly!

The evening was organised around many awards to mainly companies and consultancies, although local authorities were also recipients. It was, of course, an opportunity for networking and the event was well attended by IOA members. It raises a question regarding the IOA medals and awards programme – our awards are fewer in number and are mainly given to individuals of distinction, rather than to groups and businesses, although the Peter Lord Award and the recently introduced Sustainable Design Award are honourable exceptions. The individual awards allow recipients to give conference presentations in celebration of their achievements and I tend to favour continuing with this policy, but members might have alternative views and I would be pleased to hear from them.

On a personal note, my visit to the Palace of Westminster was my first and this northerner was impressed. First, with the splendour of the architecture and secondly, with the relative ease of access by the public and interaction with politicians. I had arrived early that evening and a kind constable suggested that I might like to visit the House of Lords. I spent an enjoyable half hour in the Strangers' Gallery during a debate. And yet,

one is left with the feeling of having been in a 'bubble', somehow divorced from day-to-day experiences and issues, so no future political roles for me.

Reproduced Sound

The annual conference, Reproduced Sound, took place in Bristol in November. It was chaired by Keith Holland and as usual, Linda Canty organised it so well. My presidential duties were to award the Peter Barnett Memorial Award to Francis Rumsey, for achievements in electro-acoustics, speech and education, also the Young Persons Award for Innovation in Acoustical Engineering, to Adam Hill of the University of Derby. Both recipients gave interesting presentations during the conference. Then to the SS Great Britain for the conference dinner. Conference delegates were able to wander about the ship, including the 'functioning' engine room – a testament to Victorian engineering and optimism.

Finally, a note from the Acoustics Research Unit at Liverpool, which hosted the IOA distance learning Diploma Laboratory School in November. Gary Seiffert, course coordinator at Liverpool, reports that the numbers for the Diploma Distance Learning programme remain high, as does the quality of attendees. Well done to all involved and, indeed, to all our personnel in the Milton Keynes office, responsible for administration of the course. ☺



Barry Gibbs, President IOA

Engineering Division



By Blane Judd, Engineering Manager

The Engineering Division works with members who wish to join the growing number of engineers professionally registered with the Engineering Council.

The Engineering Division recorded a recent presentation to the Central Branch, which is available at <https://www.ioa.org.uk/recognising-your-professionalism-video-presentation>. It should help you take the step to becoming professionally registered at CEng or IEng level with the Engineering Council (EC). We have also started the process of applying for a license to offer EngTech registration. This is a level of professional registration for those who can demonstrate that they:

- apply safe systems of work;
- contribute to either the design, development, manufacture, commissioning, decommissioning, operation or maintenance of products, equipment, processes or services;
- provide supervisory or technical responsibility;

- have effective interpersonal skills in communicating technical matters; and
- possess a commitment to professional engineering values.

Technician members

Technician members of the IOA are most likely to be eligible to gain this level of professional recognition, so we need a group of volunteers to work with us as we put the necessary systems and processes in place to gain this license.

If you would like to be part of this group, please send us an email with EngTech in the subject line and a brief career history to acousticsengineering@ioa.org.uk

Successful candidates

Three candidates were successful in our November interviews and you can read about two of them on page 7 (the third candidate will be featured in the next issue). While we are very happy

to support all candidates, we have to limit the number of times we can review documents as we rely on volunteers to review them and comment. Please make use of the self-help check sheet in the guidance documentation, it will help you to check what is required of you, where you are in the process and what is still left to do.

We remain dedicated to supporting members through the process. Neil Ferguson, who assists with the academic equivalence support, deserves our thanks – through him, we have been able to support applicants who do not have exemplifying qualifications as laid down by the Engineering Council.

Our next set of interviews will be held in the early part of 2020. We can offer face-to-face interviews or by video link. So, if you are interested in taking the next step to becoming a professionally registered engineer, contact us on acousticsengineering@ioa.org.uk.



There are two routes:

1. **Standard route** if you have the appropriate EC-accredited qualification (also referred to as an exemplifying qualification) in acoustics; and the
2. **Individual route**, which requires further preparatory work from you before submitting evidence of your competence.

We are here to guide you through the process and personal advice and support is offered to every candidate.

Required qualifications

For the **individual route**, the Institute accepts a number of courses in relevant subjects (such as audio technology) from certain academic centres as being equivalent to accredited courses for the purposes of EC registration, without the need for further assessment. It is also possible to provide evidence from the knowledge you have acquired in the workplace.

The requirements for academic qualifications for CEng and IEng changed in 1999. Pre-1999 an Honours Degree at 2:2 or above was required for CEng or a Higher Diploma/Certificate for IEng. Post-1999 this changed and for CEng a Master's Degree was required or an Ordinary Degree for IEng.

The Institute recognises the IOA Diploma course and the several Masters courses linked to it as providing evidence if you are looking to gain CEng registration. You could also offer a PhD qualification, depending upon the content of the associated taught element. We can also offer support for registration via a technical report route if you do not have the relevant qualifications to help you demonstrate that you are working as a professional engineer in acoustics.

The election process is overseen by the Institute's Engineering Division Committee, which comprises volunteers from the membership. They represent the 300 or so members holding EC registration and provide essential peer review process that affirms that you are at the appropriate level for recognition as an Engineering Council Registered Professional Engineer.

“I feel privileged to have received CEng registration and would thoroughly recommend applying to anyone looking to take the next step in their career.”

Arvind Deivasigamani

Successful candidates' profiles



Sam Bryant MPhys CEng MIOA

I graduated from Cardiff University with a Master's Degree in Physics, during which I specialised in musical acoustics. My first role was in underwater environmental acoustics at Subacoustech Environmental. I joined Cass Allen in 2013 as a consultant and now I am associate director. During my time at Cass Allen I have enjoyed working on a wide range of projects including schools, large-scale residential, industrial/ commercial and entertainment projects. I am currently responsible for the acoustic design of a number of high-profile residential-led mixed-used developments for some of the largest developers in the UK. I am also responsible for Cass Allen's marketing activity

and regularly present CPD seminars to developers, planning consultants and architects.

Becoming a Chartered Engineer was important to me as it is recognised industry-wide and demonstrates my experience and expertise during projects and seminar presentations. Becoming registered through the IOA is especially rewarding as you are recommended for approval by peers within the acoustics industry itself.

While the application process was a little daunting at first there was plenty of support from the team at the IOA so by the time it came to the interview, I felt prepared to answer any questions they had for me. I feel privileged to have received CEng registration and would thoroughly recommend applying to anyone looking to take the next step in their career.

Arvind Deivasigamani

I am very grateful to IOA for providing support throughout the preparation and interview process, which is not often available for acoustic engineers in other parts of the world. The interview did not just focus on the technical learnings and skills, but had equal emphasis on health and safety, sustainable and ethical practices. This industry recognition adds great value to my credentials, and I look forward to furthering my professional skills with IOA's support. 🌐



Approved Membership Applications

Thirty-two applications have recently been approved by the Council following the recommendations of the Membership Committee. Of the total, 14 were new members, five of these were IOA Diploma students. Four members were reinstated, and the remaining 14 had upgraded their membership.

MIOA

Aleksejs Apolskis	Dimitrios Doutsios	Jimmy O'Donnell
Gavyn Bache	Ben Holcombe	Vincent Parker
Michel Baron	Liam Kavaney	Vidya Sagar
Caroline Bowen	Matt Light	Nastassia Somikava
Robert Bungay	Octavio Lora Aranda	Lise Welzin Tjellesen
Alex Campbell	James Mackenzie	Guillermo Tomac

AMIOA

Alethea Belone	Ruth Frost	Rishab Suri
Richard Barham	Edward Guy	Tech IOA
Stanislav Briza	Rylan Norcross	Fazal Agha
Shane Cryer	Jon Ozimek	Marek Chmel
Thomas Dent	Jason Setiadi	

Tech IOA

Fazal Agha	Marek Chmel	Affiliate
		Adam Shaw



JOIN ACOUSTICS PROFESSIONALS, GET PROPERLY ACCREDITED!

SHORT COURSES AVAILABLE IN 2020:

The IOA runs the following short courses during the spring at accredited training centres across the UK (courses are held prior to exam dates and usually run for around five days):

Certificate of Competence in Workplace Noise Risk Assessment

Exams will be taking place on 6 March 2020 and on 2 October 2020

Certificate Course in the Management of Occupational Exposure to Hand Arm Vibration

The exam will take place on 3 April 2020 and candidates need to contact the accredited centre to confirm availability and the timing of the course.

Certificate of Competence in Building Acoustics Measurement

Exams will be taking place on: 1 May 2020 and 11 September 2020

Certificate of Competence in Environmental Noise Measurement

Exams will be taking place: 22 May 2020 and 9 October 2020

THE IOA WILL ALSO RUN THE FOLLOWING IN SCOTLAND ONLY:

Certificate of Proficiency in Anti-Social Behaviour etc. (Scotland) Act 2004 - Noise Measurements

Exams will be taking place on 22 May 2020 and then 9 October 2020.

FOR MORE INFORMATION:

www.ioa.org.uk/education-and-training E: education@ioa.org.uk T: +44 (0)300 999 9675



360° DIRECTIONAL NOISE MONITORING



PIN POINT THE DIRECTION OF SOUND WITH THE NOISE COMPASS FROM NORSONIC.



CAMPBELL ASSOCIATES
SOUND, VIBRATION & AIR SOLUTIONS



2020 Conference programme

The Art of Being a Consultant
12th February 2020
 Organised by the
Young Member Group
 London

Hear for Tomorrow
8th April 2020
 Organised by the **Hearing**
Conservation Association and IOA
 London

ACOUSTICS 2020
14th-15th May 2020
IOA Annual Conference,
Exhibition and Awards
 Chester

ICUA 2020
6th-10th July
 Organised by the **Underwater**
Acoustics Group
 Southampton

Reproduced Sound 2020
17th-19th November 2020
 Organised by the
Electroacoustic Group
 Bristol

For up-to-date information visit
www.ioa.org.uk

International events for 2020

3rd Euro-Mediterranean Conference
on Structural Dynamics and
Vibroacoustics jointly organised with
Italian Association of Aeronautics
and Astronautics (AIDAA)
 17th – 19th February, *Napoli, Italy*
medyna2020.sciencesconf.org/

International Conference on Voice
Physiology and Biomechanics
 (ICVPB)
 16th – 20th March, *Grenoble, France*
icvpb2020.sciencesconf.org/

Forum Acusticum 2020
 20th – 24th April, *Lyon, France*
Fa2020.universite-lyon.fr

The Nordic Baltic conference
(BNAM 2020) will be held in
 3rd – 6th May, *Oslo, Norway*
www.bnam2020.org

179th Meeting of the Acoustical
Society of America
 11th – 15th May, *Chicago*
www.acousticalsociety.org

XXXVI Symposium on
Hydroacoustics
 26th – 28th May, *Leba, Poland*
euracoustics.org/

Quiet Drones. A Symposium on
Noise from UASs/UAVs
 26th – 27th May, *Paris, France*
www.quietdrones.org

13th ICBEN Congress on Noise as a
Public Health Problem
 15th – 18th June, *Sweden*
www.icben2020.se
 11th International Styrian Noise,
 Vibration and Harshness
 (ISNVH) Congress
 17th – 19th June, *Graz, Austria*
www.isnvh.at/

International Conference on
Underwater Acoustics 2020
(ICUA 2020)
 6th – 10th July, *Leonardo Royal*
 Grand Harbour Hotel, Southampton
www.icua2020.org

Czech Republic 27th International
Congress on Sound and Vibration
(ICSV27)
 12th – 16th July, *Prague*
www.iiav.org

ICSV2020, International Congress
on Sound and Vibration
 12-16 July, *Prague, Czech Republic*
111.icsv27.org

49th International Congress and
Exposition on Noise Control
Engineering (INTER-NOISE 2020)
 23rd – 26th August, *Seoul, Korea*
www.i-ince.org

12° Iberoamerican Congress on
Acoustics (FIA 2020)
 20th – 23rd September,
Florianopolis, Brazil
fia2020.com.br/

180th Meeting of the Acoustical
Society of America
 9th – 13th November,
Cancun, Mexico
www.acousticalsociety.org ©

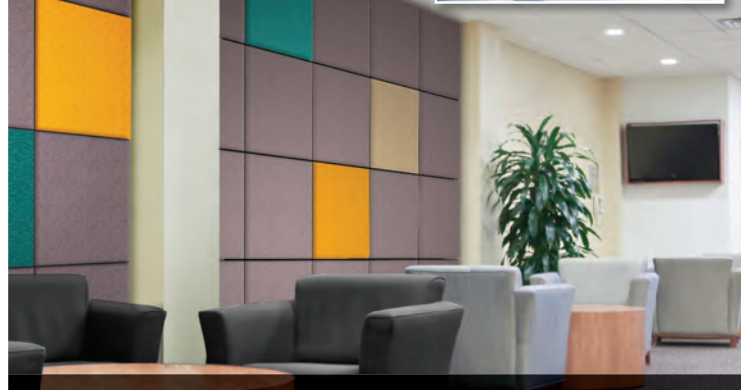


Acoustic Panels

Soundsorba manufacture and supply a wide range of acoustic panels for reducing sound in buildings.

www.soundsorba.com

Wallsorba™



- Wide range of modern vibrant colours
- Soft fabric facings
- Custom sizes can be manufactured
- Class A performance

Woodsorba™



- Beauty of real wood facings
- High impact resistance
- Modern face patterns
- Maintenance free

Wavesorba™



- Futuristic shape
- Soothing wave pattern
- Lightweight
- High acoustic performance

Cloudsorba™



- Wider range of different shapes available
- High acoustic rating
- Suitable for a wide range of building interiors

Soundsorba's highly skilled and experienced acoustic engineers will be pleased to help with any application of our acoustic products for your project.

Please contact us by calling **01494 536888** or emailing info@soundsorba.com for any questions you may have.

SOUNDSORBA®
ACOUSTIC PRODUCTS

TEL: +44 (0)1494 536888
FAX: +44 (0)1494 536818
EMAIL: info@soundsorba.com

SOUNDSORBA LIMITED, 27-29
DESBOROUGH STREET, HIGH
WYCOMBE, BUCKS HP11 2LZ, UK

IOA STEM activity

‘Big Bertha’ and air cannons are all part of the learning experience

In this regular section of Acoustics Bulletin, we highlight the work that members of the IOA are doing in schools to promote the understanding of acoustics, and to encourage engagement with the industry. Dr Nikhil Mistry, a Research Fellow in Acoustics at the National Oceanography Centre, University of Southampton, reports on Winchester Cathedral’s annual science festival.

Since 2015, the Institute of Sound and Vibration Research (ISVR) has been participating in the Winchester Cathedral science festival. Throughout the year, the cathedral invites primary school pupils to learn about parts of the cathedral’s history, which relate specifically to the Key Stage 1 and 2 curriculum.

The science festival runs each November and provides an opportunity for primary school pupils to learn about the science that relates to the cathedral and the world around them. The ISVR was approached when the festival was initially being proposed, and participated in the pilot year.

The feedback from the first festival was so positive that the ISVR has been invited to participate in the festival each year and the children continue to vote the sound workshop as their favourite session. In 2019, staff from the Arup Acoustics group in Winchester joined the ISVR and gained first-hand experience of primary school engagement.

Workshop attendees from the ISVR included Maryam Malakoutihah, Steve Elliott, Daniel Wallace and Caroline Harvey. Ye Wilmshurst, Andy Officer, Helen Butcher, Napat Wiriyasubpachai, John Evans, Catrin Powell and Sarah Dennison visited from Arup Acoustics. The workshop was designed and co-ordinated by Nikhil Mistry.



Above:
Raising awareness
of the importance
of sound

Fun, effective learning

Over the two days, the sound workshop team taught more than 100 primary school pupils, from four Hampshire schools. The aim was to incite interest and have fun experimenting with acoustic principles such as absorption and reflection, human sound localisation and musical instrument acoustics – at the same time, raising awareness of the importance of sound and its presence in the world we live in.

The pupils, teachers and the team played with slinkies, felt the force from an air cannon, listened to binaural recordings from a dummy head and heard the grand sounds of the organ pipes, including the 32’ long ‘Big Bertha’, rumbling away at around 16 Hz!

The pupils are required to learn a number of key points as part of the syllabus on the science of sound, such as:

- sound travels as a wave (of vibrating air particles);
- sound takes time to travel;
- sound reflects off hard surfaces and is absorbed by soft surfaces; and
- the relationship between the size of an instrument and the pitch and volume of sound it makes.

The pupils enjoyed themselves and picked up on the key points very easily, making the event just as successful this year as former years and the extra help from Arup Acoustics was invaluable. The sound workshop has already been invited for this year’s festival and the hope is to have as many people turning up to participate again! 🎧

If you want to find out more about acoustics outreach, engagement, ideas for events or would like some training in outreach and communication, please email Nikhil at N.Mistry@soton.ac.uk

Total cloud based monitoring solutions



Noise. Dust. Vibration

- Cloud based data analysis and display
- Class 1 noise measurement
- Tri-axial vibration measurement
- Dust including PM10, PM2.5, PM 1 & TSP
- PPV peak particle velocity
- VDV vibration dose value
- FFT dominant frequency calculation
- Advanced triggers and alarms

SvanNET is the latest web portal that supports multi-point connection for all Svantek monitoring stations for noise, vibration and dust. The web user interface is easy to use and intuitive to operate and allows maximum flexibility for on-line and off-line reporting.

Svantek monitoring stations are designed and built to work in the rigours of a construction site. They use military standard connectors and have communication options to fit with the most remote site.



For further information and a demonstration call us now **01234 639551** or email us **sales@svantek.co.uk**

John Connell Awards The Noise Oscars

The John Connell Awards 2019 took place at the Palace of Westminster last October and were presented by Sonia Phippard CBE, Defra's Director General of Environment, Rural and Marine.

The awards are named after the Noise Abatement Society's founder, John Connell OBE, who lobbied the Noise Abatement Act through Parliament in 1960 when noise became a statutory nuisance in the UK for the first time.

These annual awards, known as the Noise Oscars, acknowledge the importance of the quality of sound in our lives, and champion advances in reducing the negative impact of unnecessary noise for the public benefit. More than 270 recipients from local authorities, industry, organisations and individuals have now been honoured for the significant impact they have made to improve the aural environment.

Recipients of the John Connell Awards 2019

John Connell Local Authority Award – sponsored by ROCKWOOL UK.

This award recognises services, campaigns and programmes that are shining examples of community cooperation, education and creative solutions to solving noise pollution problems.

Winner: City of London Corporation, for its 'Sounds of the City' Programme.

The City of London Corporation has developed robust evidence based on thousands of interviews, to support the London Mayor's 'Healthy Streets Approach' by working across traditional

departmental boundaries. Consequently, the indicator 'not too noisy' is now embedded in their transport planning and service delivery. All factors influencing people's experience of being on a street, including how it sounds, will now be considered when assessing projects. The assessment of planning applications for new buildings will also include the Healthy Streets Indicators which, coupled with the use of Transport for London's 'Healthy Streets Check for Designers', will avoid a significant adverse impact on the acoustic environment of surrounding streets.

Highly Commended were Lambeth Council, for its innovative and dynamic out of hours noise service, and Bradford Metropolitan District Council for its Public Space Protection Order to protect residents from anti-social behaviour and vehicle noise.

John Connell Noise App Award – sponsored by RHE Global.

This award recognises local authorities that have best used the new Noise App scheme to support assessment and management of local community noise problems.

Winner: Bristol City Council, for its full engagement with the Noise App.

To increase customer service effectiveness, the 'Neighbourhood Enforcement Team' found a more efficient method of responding to its many all-hours noise complaints by using the Noise App scheme.

Highly Commended was Accent Housing, for harnessing and expanding the Noise App opportunities.

John Connell Soundscape Award – sponsored by Anderson Acoustics.

This award recognises the advancement of Soundscape principles in line with the international and British standard BS ISO 12913-1:2014 and its practical 'real-world' application.

Winner: Arup and Heathrow Airport, for its integrated Planning Policy Edition 10 and Noise and Soundscape Strategy 2018-2023.

To help communicate complex changes on the airport expansion project Arup worked with their customer to develop mobile, soundproof sound booths, equipped with state-of-the-art virtual reality sound, immersive 3D and spatial audio demonstrations. This allowed communities to experience what proposed changes in aircraft noise would really sound and feel like for them.

Highly Commended was APEX Acoustics, for the development of a user-centric acoustic design method for open plan offices.



John Connell Innovation Award – sponsored by the Institute of Acoustics.

This award recognises original thinking when faced with particularly challenging acoustic issues, whether through noise control or reduction programmes, management, technology or good acoustic design.

Winner: Eave, for its powerful innovation to increase prevention of hearing loss in the workplace.

The Eave ear-phone system has state-of-the-art Hear-Through technology, which enables the wearer to communicate with a colleague without removing ear defenders and successfully deals with harmful effects of excessive noise exposure to construction workers.

Highly Commended were National Grid, for reducing the impact of a particular noise disturbance throughout England and Wales, and HearAngel®, for its innovative peak noise limiter to protect the hearing of headphone users.

John Connell STEM Award – sponsored by the Association of Noise Consultants (ANC) and ANV Measurement Systems.

As part of The ANC's #Explore Acoustics Initiative, this award recognises short video communications aimed at non-technical audiences, inspiring young people to consider acoustics as a STEM career and encouraging the acoustics community to get more involved in delivering STEM activities. (The longlist of submitted videos are on YouTube.)

Winner: SRL Technical Services, for its very effective, all-round message about sound and its effects on environment and people.

The video, 'Understanding airborne noise' used simple props and Lego people to highlight how people in the community could be annoyed by irritating noises and how these



Above: Eave won the John Connell Innovation Award, sponsored by the IOA, for its powerful innovation to increase prevention of hearing loss in the workplace

Background image: The John Connell Awards 2019 took place at the Palace of Westminster last October

disturbances may be addressed, implying that bigger mechanical noise problems in the real world can also be mitigated in a similar way. The video was easy to understand, visually attractive, relatable and the message well demonstrated.

Highly Commended was AECOM, for its interactive video set in Derby station, with plenty of easily digestible facts about the properties of sound, making this complex subject accessible and exciting to any audience. Also Highly Commended was LOCHER (Learning Occupational Health by Experiencing Risk), for its video about how sound waves travel through the air and through matter, with plenty of examples that could be easily replicated at school or home.

John Connell Silent™ Approach Award – sponsored by Brigade Electronics UK.

This award recognises significant advances in industry awareness and best practice to reduce noise from operations and logistics. This award is for organisations which have developed proven noise reduction programmes, whether through the adoption of quieter transport modes, low noise ancillary equipment, staff training or other pro-active noise awareness initiatives.

Winner: TESCO, for reducing noise pollution through the design, development and introduction of this equipment into their stores and distribution centres, and setting new industry standards.

Highly Commended was Evander, for its solution to the significant impact of chronic traffic noise across England.

John Connell Armstrong Next Generation Award – sponsored by Arup.

This new John Connell award is given in memory of the late NAS Trustee, David Armstrong, and recognises and supports the next generation of acoustic and soundscape practitioners.

Winner: Trailblazer Group, for its pioneering acoustics apprenticeship course conceived and produced by employers in the industry, making acoustics accessible to all and opening up the scope for acoustics innovation in the future.

John Connell Quiet Mark™ Award – sponsored by Salamander Pumps.

Quiet Mark is the international mark of approval for excellence in quiet technology and solutions initiated by the Noise Abatement Society. The Quiet Mark Campaign Award is given to a company which has shown outstanding use of its Quiet Mark to increase market awareness.

Winner: DYSON for its long-term and significant commitment to sound reduction within its high tech appliances for customer benefit.

The Noise Abatement Society (NAS) is a UK charity whose aim is to share a better understanding of what sound is, how it affects us and how we can solve noise problems in a pragmatic and sustainable way. Its work helps to relieve the physical and mental distress caused by excessive noise, which profoundly affects health and wellbeing, learning, productivity and social cohesion <http://noiseabatementociety.com/> ©

IT'S HERE

Acoustics Technician Apprenticeship Launch

The Occupational Standard for the new Acoustics Technician is now available – and the Level 4 Apprenticeship is approved for delivery.

This is an exciting landmark in the development of the programme and paves the way for recruitment to commence.

This employer-led, industry initiative is supported by ANC and IOA.

The Trailblazer Group behind the apprenticeship recently secured the Armstrong Next Generation Award, at the John Connell Awards, organised by the Noise Abatement Society.

More details about the standard can be found at <https://www.instituteforapprenticeships.org/apprenticeship-standards/acoustics-technician/>

As the Apprenticeship evolves, ANC will be regularly updating its website to keep the industry up-to-date with developments.



To find out more, go to www.association-of-noise-consultants.co.uk

ANC ACOUSTICS & NOISE CONSULTANTS

Eastern Branch

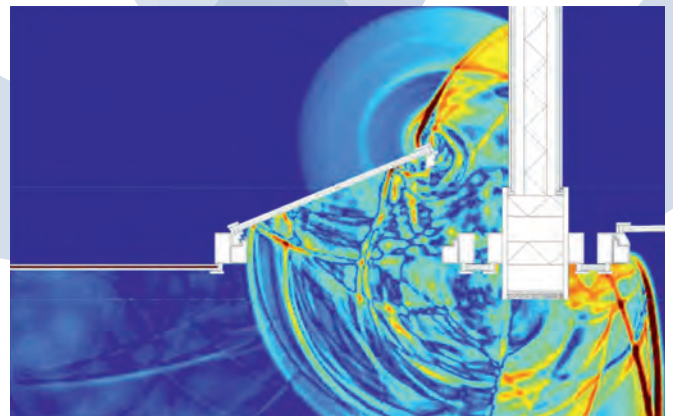
Building envelope design

At a recent Eastern Branch meeting, Ze Nunes, founder of Mach Acoustics, presented his team's holistic approach towards building envelope design. This entails juggling ventilation, heat gains and acoustic performance in order to ensure a well-balanced environment for the end user.

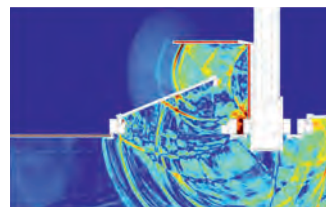
Through some brilliant FEM visualisations, Ze shed light on how outdoor sound ingresses into a building through different angles and for different window types. It was demonstrated that commonly used values for open window sound insulation performance might be a bit conservative and the design can be more relaxed once the window type and angle of incidence come into play.

The presentation in its entirety was a brilliant overview of new and existing acoustic mathematical modelling, which enables the seamless integration of acoustics into the skin, form and function of low carbon buildings.

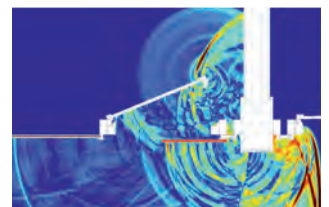
The meeting was closed by Curtis Thompson, the software developer behind a novel cloud-based platform that is aiming to make the life of sound insulation testers easier, by automating the calculation of all popular metrics and producing a customisable report ready for the client. More details can be found at www.soundtestingsoftware.com ©



Side hung widow with no acoustic barrier



Sound reduction with dog-leg acoustic barriers installed



Sound reduction with acoustic barrier positioned at window opening

Sound Masking

from aet.gb ltd

Open plan offices benefit from Sound Masking



Cellular offices achieve better speech privacy with Sound Masking

Sound Masking is a cost effective solution to the problem of improving speech privacy in today's modern office environment. Best installed during office fit out but often installed as retrofit, Sound Masking from AET has improved the office environment for many international companies throughout Europe over the last 20 years.

In today's office speech privacy becomes a key aim and open plan offices can suffer from two speech problems:

- Other people's conversations can be an irritating distraction
- Confidential conversations can be almost impossible to conduct

Similar problems also exist in cellular offices. Apart from noise breakthrough via partitions, flanking over, under and around them, other problem areas include light fixtures, air conditioning systems and services trunking. Sound masking compensates for these problems.

An investment in increasing privacy of speech is certainly cost effective, with Sound Masking one of the easiest ways of achieving this aim. Sound Masking systems along with acoustic panels and acoustic door seals are increasingly used to achieve the desired level of privacy by a number of our major clients including:

- Vodafone World HQ
- Procter & Gamble
- Swiss Re
- Mobil Exxon HQ
- Elizabeth Arden
- Barclays Bank
- Freshfields
- KPMG
- PWC
- BP



Sound Masking is now available with a host of extras including:

- PA, either all call or zone by zone call
- Dual level options for audio visual room etc
- Automatic ramping to conserve energy and produce profiled masking
- Fault reporting
- Automated amplifier changeover



www.aet.co.uk

AET.GB Ltd., 82, Basepoint, Andersons Road, Southampton, Hampshire SO14 5FE
Tel: 0044 (0)8453 700 400 sales@aet.co.uk



Sound Masking is also known as sound conditioning or white noise systems

IOA award for Dr Adam Hill

Dr Adam Hill has won the IOA Young Persons' Award for Innovation in Acoustical Engineering 2019.

The IOA Young Persons Award for Innovation in Acoustical Engineering is awarded every two years and is designed to recognise excellence and achievement in acoustical engineering among those who are aged under 35, or early on in their careers. It is also intended to increase awareness of the value of acoustic engineering and technology to the community at large.

Citation for the award:

Much of Adam's research career has aimed to achieve the 'democracy of sound,' presenting all individuals within a given space the same high-quality listening experience. This has resulted in not only high impact innovation, but also an excellence in teaching, where his knowledge and passion for the subject have made him an excellent educator and ambassador for acoustics.

Adam adopted his research focus when working on his PhD at the University of Essex. The aim of the project was to achieve consistent low-frequency energy distribution across a wide listening area in an enclosed acoustic space. This was achieved through a combination of chameleon subwoofer arrays (multi-element subwoofers, with frequency-dependent polar responses) and subjective replacement of problematic room-modes using virtual

Main image: Dr Adam Hill receives his IOA Young Persons' Award for Innovation in Acoustical Engineering 2019 from Martin Ellison of Cirrus Research, sponsors of the award

bass; both techniques developed by Adam. The virtual bass approach has been adopted within an Event Acoustics (Netherlands) product, BassCreator, which is used at large-scale outdoor events to eliminate low-frequency bands that are in breach of noise regulations. The virtual bass project continued as an interdisciplinary project between the Universities of

Derby, Essex and Exeter, looking at the health of coral reef where a component within the virtual bass algorithm was utilised to accurately estimate the health of a coral reef at any measurement distance. The larger project that this work fed into was featured on the BBC's Blue Planet II in 2017, with co-author Steve Simpson taking part in the episode. [P20](#)



SoundPLAN's world-renowned noise software...

JUST GOT BETTER

SoundPLAN essential 5.0

The upgraded version of our entry-level software package making this the perfect choice for infrequent users or more advanced users that don't require the full flexibility and power of its sister package

KEY FEATURES INCLUDE:

- Connection to Google Maps and OpenStreetMap for importing background images, elevation data and geometry of objects
- Bridges can now be built for roads and railways
- Line and area sources can now follow the terrain at specified relative heights
- Time correction calculator for industrial noise sources
- Easier Project transfer from SoundPLANessential to SoundPLANnoise

soundplan-uk.com



Live sound engineer

Adam has a sustained focus on large-scale sound reinforcement optimisation through his work as a live sound engineer, having designed and operated sound systems for over 1,000 artists to date. His work in this area focuses again on low-frequency optimisation attempting to achieve consistency in low-frequency response across the full audience area, while minimising sound in noise-sensitive areas. Areas of investigation have included ground-based horizontal and flown vertical array optimisation, the use of subwoofer clusters (and stressing the importance of the acoustic centre in their calibration) and tackling the trade-off between consistency and system efficiency. He regularly gives tutorial sessions at conventions of the Audio Engineering Society on these subjects.

This research has led to ongoing improvements in industry, primarily through Gand Concert Sound (Chicago, USA), where Adam returns every summer to implement new ideas at major music festivals. Additionally, Adam's work directly fed into the design of the subwoofer system for The Prodigy's latest (and potentially last) world tour in 2018/19, working alongside the band's long-time front-of-house engineer, Jon Burton. For this implementation, Adam deployed an array optimisation system using genetic algorithms (a form of artificial intelligence) to identify the best solution. This was adapted from his previous consultancy work for Alto Aviation (USA) where he was brought in to develop an electroacoustic optimisation system

to provide consistent in-cabin low-frequency coverage on private/corporate aircraft.

Cinema sound reproduction

Adam has also been involved with work focused on improvements to cinema sound reproduction (part of a wider SMPTE-led review of existing standards and recommendations). Adam worked with Philip Newell and Malcolm Hawksford, where they identified serious misunderstandings and oversights within the existing documentation regarding low-frequency electroacoustic calibration and optimisation and developed a set of recommendations to be considered by SMPTE when drafting new guidance/standards.

Adam's first PhD student, Jonathan Moore (now a DSP engineer at Midas), further developed the primary solution within the SMPTE work, termed dynamic diffuse signal processing (DiSP). DiSP is a time-varying signal decorrelation method that has been developed to ensure maximal electroacoustic decorrelation with minimal perceptual artefacts.

The method has been shown to be applicable to large-scale sound reinforcement down to small-room sound reproduction (even with only one subwoofer). Seat-to-seat variance in frequency response has been shown to be minimised using DiSP, often to the point of imperceptibility.

The process requires no calibration whatsoever; it is a universal turn-key solution and has already been deployed at a venue in New Zealand by acoustic


consultants Glenn Leembruggen and David Gilfillan (Acoustic Directions Pty Ltd, Australia).

University of Derby work

Having worked at the University of Derby since 2012, Adam teaches across all levels of higher education and he developed and launched the MSc Audio Engineering programme in 2015, which continues to grow and develop the next generation of electroacoustic research and development engineers (graduates have gone on to work for firms such as MQA, d&b audiotechnik and Bowers & Wilkins). In 2019, Adam was awarded the title of Associate Professor in recognition of his research excellence.

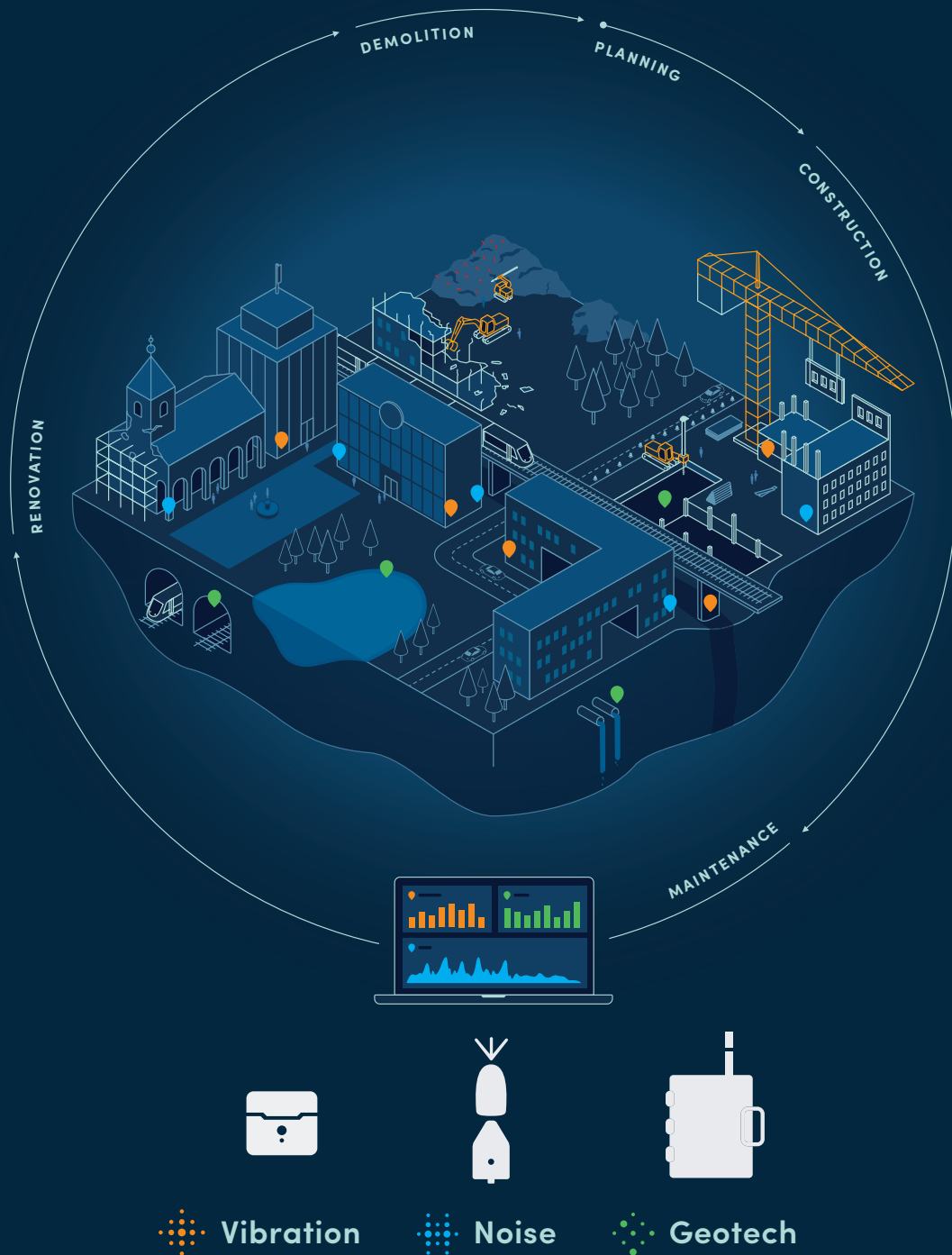
Professional, knowledgeable and passionate

Outside of academia and live sound, Adam has been a member of the IOA's Electroacoustics Group Committee since 2012, helping to organise Reproduced Sound every year. He is also currently the chair of the AES Technical Committee on Acoustics and Sound Reinforcement, where he is leading a working group on noise exposure and pollution due to outdoor entertainment events; a group consisting of some of the top audio engineers and electroacoustic consultants in the world. The work of this group will feed into AES standards as well as an ongoing WHO project on recreational noise exposure.

In summary, Adam exemplifies the qualities for the young person's award. He is professional, knowledgeable and passionate about his work, exhibiting impact across multiple projects in acoustics and regularly publishing high quality papers with his innovations and research featured in an impact case study in the Research Excellence Framework 2021. He focuses on the solving of real-world problems and is already recognised as someone to talk to when standards need reworking, or projects need a reliable and talented lead. He is an absolute joy to work with, and his work in education is held in high esteem by staff and students alike (he's been awarded lecturer of the year twice). There is no better recipient of this award, and we're delighted that this award recognises all his excellent work carried out to date. 

Adam has been a member of the IOA's Electroacoustics Group Committee since 2012, helping to organise Reproduced Sound every year

Intelligent monitoring of infrastructure project with the complete INFRA system



Undertaking construction or infrastructure projects carries a degree of risk. The **INFRA system** helps to identify and manage risk using a range of state-of-the-art sensors which remotely measure site activity and upload the data to a cloud-based database. Experience the time and cost-saving benefits with the INFRA system.

IOA award for Francis Rumsay

Francis Rumsay has won the 2019 IOA Peter Barnett Memorial Award.

Inaugurated in 2001 by the IOA Electroacoustics Group, The Peter Barnett Memorial Award honours Peter Barnett who died the previous year. This annual award recognises advancements and technical excellence in the fields of electroacoustics, speech intelligibility, and education in acoustics and electroacoustics.

Citation for the award:

Francis Rumsey received a BMus (Tonmeister) degree from the University of Surrey in 1983, before working as a lecturer and product engineer for Sony Broadcast. He started work as a lecturer at the University of Surrey in 1986 and within a short time, began writing books on a wide range of aspects of recording and audio technology, becoming a series editor for Focal Press.

He has since become the author or co-author of some nine books. By 2000, Francis had been promoted to Reader, and became Director of Research for the Institute of Sound Recording, focusing on spatial audio and psychoacoustics. He was promoted to Professor in 2005 and remained at Surrey until 2009. During his 23 years there, he educated hundreds of under- and post-graduate students, supervised many PhD students and was also appointed as a visiting professor at Lulea University of Technology in Sweden.

Since he left Surrey, he has been writing a monthly column for the Audio Engineering Society (AES) and has recently started an interview series. He is an organist and a consultant for Viscount Organs; making videos and recordings for them, as well as undertaking voicing of newly installed organs.

Francis' involvement with the AES continues and he is currently

consultant technical writer and editor for the AES Journal and was chair of the AES Technical Council from 2011 to 2018. Francis has run his own company, Logophon Ltd, since 2002, which specialises in technical writing, musical work and consultancy.

Francis is also the recipient of the following awards:

1995, AES Fellowship Award for significant contributions in the field of audio education, including the application of digital techniques to audio equipment and practices.

2014, AES Board of Governors Award in recognition of his Chairing the 52nd AES International Conference in Guildford.

2014, AES Bronze Medal Award in recognition of his outstanding long-term contributions to the AES, providing leadership to the Membership Committee, Regions and Sections, and the Technical Council, in addition to remarkable and sustained editorial contributions to the Journal of the AES.

Technical excellence

Through his many years of teaching Tonmeister students, authorship of highly-educational, yet accessible books and tireless devotion to the international audio community, Francis Rumsey is surely a very worthy recipient of this award. ☺



Francis Rumsay, recipient of the 2019 IOA Peter Barnett Memorial Award

NEED TO SIMPLIFY NOISE MEASUREMENT AND ANALYSIS?

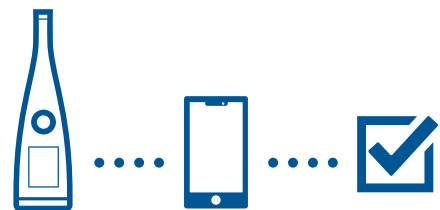
JOB DONE.



No matter which profession you are in, you need a sound level meter solution that gets your job done faster, easier and problem-free. The new B&K 2245 gives you absolute confidence and control through user-friendly mobile apps and functionality tailored for your task, including on-site analysis, photo embedding, smart data handling on your PC, and more.

To simplify your job-to-do, visit www.bksv.com/2245

INTRODUCING A NEW SOUND LEVEL METER DESIGNED FOR YOUR JOB.



Brüel & Kjær 

BEYOND MEASURE

Brüel & Kjær UK Ltd
Jarman Way · Royston · Herts · SG8 5BQ · UK
Telephone: +44 (0) 1223 38 98 00 ·
Email: ukinfo@bksv.com

IOA Diploma results 2019

By Professor Keith Attenborough, HonFIOA, IOA Education Manager

The 2018/2019 presentation of the IOA Diploma in Acoustics and Noise Control was centre-based at four Institutions (Derby University, Leeds Beckett University, Southampton Solent University and London South Bank University) and delivered in its tutored Distance Learning version through four centres (Milton Keynes, Trinity College Dublin, Bristol and Napier University).

There were 110 registered candidates (including eight resits) for the General Principles of Acoustics (GPA) Module in 2018/19. This is lower than last year (117) and well below the peak of 216 in 2006. There were 15 candidates for examinations in

Regulation and Assessment of Noise (RAN), 58 for Noise and Vibration Control Engineering (NVCE), 97 for Building Acoustics (BA) and 63 for Environmental Noise Measurement, Prediction and Control (EN).

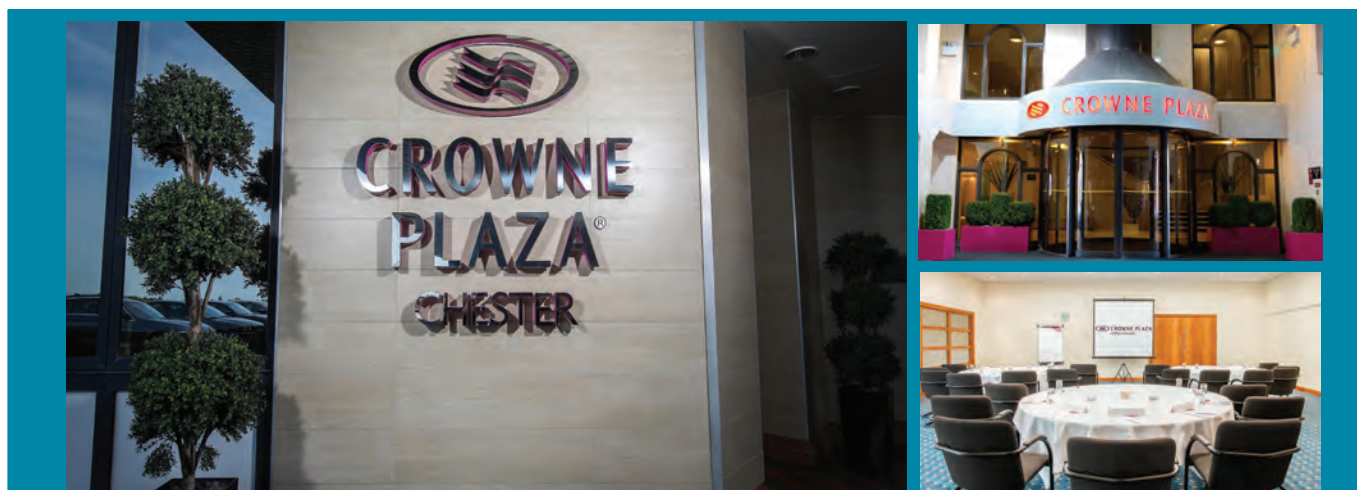
Of the 123 candidates registered for the Project Module, five are listed as having failed the project in the table of results, but 25 of these did not submit and will be required to repeat the project module next year.

On the General Principles of Acoustics written paper, a simple short answer question about the vibration of a mass on a spring was answered poorly, whereas longer answer questions on construction noise, outdoor sound propagation,

vibration transmissibility and sound transmission loss respectively, were popular and answered well.

GPA coursework assignment topics were (1) underwater sonar and (2) impulsiveness, tonality and masking and resulted in mean marks of 74% and 72% respectively.

As in previous years, a merit threshold of 70% was applied to the written GPA paper and the conflated GPA mark. The examination scripts of candidates satisfying the conflated mark threshold but gaining between 68% and 72% on the written paper were examined at moderation, re-marked where appropriate and judged individually as 'pass' or 'merit'. However, even if



Essential new diary date for all IOA Members

ACOUSTICS 2020

When: 14th-15th May 2020.

Venue: Crowne Plaza Hotel in Chester.

SEE YOU THERE!

FOR MORE INFORMATION

T: 0300 999 9675 E: linda.canty@ioa.org.uk www.ioa.org.uk



these criteria were satisfied, a merit was not awarded if the assignment mark was carried over from a previous year.

It was found necessary again to moderate some centre marks for the Laboratory Module to bring them into line with those for DL candidates.

The Specialist Module coursework topics this year included shooting range noise (NVCE), noise from building conversion (BA), Environmental Noise Guidelines 2018 (RAN) and Uncertainty (EN). The mean mark achieved for the BA assignment was significantly less than the mean marks obtained for the other specialist module assignments.

A criterion based on the means and standard deviations from the previous eight years was used again to decide whether to moderate marks for the specialist modules. On this basis, adjustments were made to the BA assignment marks. To obtain a merit grade on the specialist modules, candidates were required to have conflated mark and written examination marks of at least 70%. No merit was awarded if it depended on a deferred score.

The numbers of candidates who gained merits (M), passes (P) or fails (F) in each module are shown for each centre in the following table of results. The 'fails' include those who were absent from the written examinations. Thanks to the local tutor, a case of plagiarism was revealed. However, rather than be failed automatically, the two candidates involved elected to submit extra work to the specification of the chief examiner.

This year, seven candidates obtained five merits. The prize for best overall Diploma performance (based on gaining the highest overall marks for GPA, BA, NVCE, and merits for the Project and Laboratory Modules), is to be awarded to Irene Sofia Rodriguez (DL Dublin).

Letters offering congratulations on achieving five merits also, have been sent to Oliver Stephen Benson (Solent University), Paul Devine (DL Dublin), Ilaria Fichera (University of Derby), David John King-Hele (Leeds Beckett University), Lawrence Norman (London South Bank University) and Christopher Wright (DL Edinburgh).

Also, Irene Sofia Rodriguez will be receiving the prize for the best overall Diploma performance by an Irish student.

Daniel Forbes (DL Bristol) has been awarded the 2017-18 ANC Prize for his project 'Investigation of how the distribution of acoustic drapes within a multi-purpose hall affects the reverberation time within the space'.

Sadly, this Diploma year was affected by the prolonged ill health and hospitalisation of Bob Peters, preceding his untimely death in June. I am grateful to Richard Collman, Latha Vasudevan, Shahram Taherzadeh, Mike Alston, John Pritchard and Neil Ferguson for helping me to fill the many tutoring and project examining 'holes' created by Bob's absence. Also, I would like to express thanks to all tutors and examiners and to Edith Francis (née Borowicz, IOA Education Assistant), for their contributions during the 2018/2019 presentation year of the Diploma.

Project titles 2019

University of Derby

- The auditory masking of traffic noise using water features
- Noise impact of skateboard parks
- Critically evaluate Markeaton Park's 'tranquillity' using the tranquillity rating prediction tool
- Acoustic assessment of the horizontal test suite following aperture reline at British Gypsum, Saint Gobain
- Assessment of the noise exposure of residents in a permanent park home site in Warwickshire in the context of relevant UK guidance and legislation
- The accuracy of reverberation time prediction for general teaching spaces: comparison between analytical formulae and in-situ measurements
- Acoustic assessment of a space and its current sound system. Accessing methods to improve its performance for speech and music.

No submission:

- Evaluation of the predictions and implementation of a noise management plan
- Evaluation of personal noise exposure, of technical production employees at live music events
- Can smartphone apps be a reliable backup for type1 sound level meters?

Withdrawn:

- An investigation into the environmental noise impact from drones and what methods are used to assess them
- Evaluation of novel damping materials

- The effect of core structure on the acoustics of a partition
- Noise exposure levels to children during their daily activities
- Noise exposure of gym participants
- Investigating the tranquillity rating using TRAPT (tranquillity rating prediction tool) at Darley Park.

Leeds Beckett University

- An investigation into the sound power of household appliances and an assessment of their potential impact on health during sleep
- A BS EN ISO 3382-1:2009 assessment of the Vicarage Park Community Centre Hall, including a determination of its sound absorbing properties
- An exploration into the importance of the use of backward integration when measuring reverberation time using an impulsive noise source
- The effect of noise on marine mammals and guidance on the measurement of underwater sound
- Sonic equilibrium: An assessment of the acoustic characteristics of Wentworth Holy Trinity Church
- Road traffic noise - measurement vs prediction
- Reassessment of sound levels at a new housing estate located in a mixed commercial/industrial and residential area
- Impact sound insulation testing: An investigation into the representativeness of the tapping machine of human footfall impact sound
- Frequency comparisons of a Norsonic 277 standardised tapping machine, and Nor279 rubber ball impact test
- Tuning a control room into a studio
- BS4142:2014 to BS4142:2014 +A1:2019.

London South Bank University

- Comparison of gym floor products for effectiveness of isolation from impulsive impact noise
- Noise mapping the Queen Elizabeth Olympic Park, an urban quiet area assessment
- A noise impact assessment of alternatively powered leaf blowers operated in a residential area
- An investigation into the suitability of noise criterion curves in classrooms
- Monitoring of aircraft RET using sound level meters
- Acoustic properties of cement and basalt fibre composite **P26**

- Comparison of room acoustic prediction methodologies. Confirm and validate laboratory tests of fan coil units in a real-world environment at the Battersea Power Station redevelopment
- An objective and subjective diagnosis of acoustically defective, unsatisfactory meeting spaces
- Sound propagation from sound wells
- Environmental noise impact of emergency vehicle siren sound.

Southampton Solent University

- Cutting through the noise of local politics; an investigation into the speech intelligibility in Mid Sussex council chamber, and the potential influences of presbycusis
- Sound sources and diffuse fields in relation to past and present sound insulation measurement standards
- Acoustic issues within hospital wards
- Listening room acoustic design
- A critical evaluation of the 'Agent of Change Principle'; does the polluter still pay?
- Developing a framework noise management plan for park events.

Distance Learning (Milton Keynes)

- Acoustic challenges of vault and dome-like structures
- Testing of noise suppression greases acoustic design of a football stadium
- A study into the necessary spacing of in-duct silencers
- Reverberation time comparison
- An investigation into the validity of the ground cover correction in CRTN
- An investigation into acoustic screens' performance in open-plan offices
- Assessment of chiller plant noise and vibration
- Engineering noise control proposal to reduce noise exposure
- Open plan office acoustic assessment and design investigation

- Engine sound synthesis – phase coherence
- Variation in speech transmission index with source/receiver position
- Comparison of prediction and geometrical acoustic computer modelling
- Improving transmission loss of a train driver's cab/saloon partition
- Analysis of uncertainty of environmental noise measurements
- The control of noise at work regulations 2005: A critical assessment of a small music venue
- Noise predictions in the construction industry based on BS 5228 methods
- Application of Sabine and Eyring reverberation time equations
- Investigation of CRTN shortened measurement methodology
- An investigation of versatile absorption system within a multipurpose hall
- An evaluation of computational ray-tracing software in the prediction of reverberation time.

Distance Learning (Bristol)

- Hand-arm vibrations during mountain biking
- An assessment of the variability of impacts on local residents from various clay target shooting activities at a shooting ground
- Research into inharmonicity due to different guitar string material
- Sound insulation testing: An investigation into the importance of the '6dB Rule' defined under EN ISO140-4:1998 Paragraph 6.2
- A study of reproduced speech intelligibility in as reverberant space comparing different loudspeaker systems
- An examination of practical façade treatments by field testing in an area of high conflicting building uses.

Distance Learning (Edinburgh)

- Investigation of sound reduction by destructive interference
- Investigation into the effects of the draft Irish Wind Energy Development Guidelines on the ability of wind farms to meet their noise conditions
- Acoustic treatment for Thomas Coats Church
- Noise impact assessment of a night club and scheme of mitigation

- Determination of personal exposure to noise within the workplace and assessment of the effectiveness of hearing protection provided by the employer
- The design of a phase bung to improve the high frequency response of a horn loudspeaker
- Suitable solutions for improving speech intelligibility in lecture theatres
- Prediction of underwater radiated sound levels from on-board vibration measurements
- A comparison of local authorities' small wind turbine procedures in the highlands and islands of Scotland
- A Review of road traffic noise control measures for noise action plan priority area, Abergele
- An investigation into BS4142:2014 objective tonal assessment methodologies
- A case study: Music studio/control room transformation
- A serving of noise
- Creating good room acoustics for children with hearing loss
- Implementation of Nord test Method for Impulsivity (NT ACOU 112) in MATLAB.

Distance Learning (Dublin)

- Incorporating acoustics monitoring in open energy monitor
- Analysis of candidate noise management areas identified in round 3 of END in Belfast
- Road traffic noise prediction methods
- Noise impact assessment of a gym
- An investigation into the effects of vegetation in highway noise attenuation
- Driving decibels
- An investigation into noise control shortcomings during a new build music room; with a comparison of sound-proofing before and after remedial works.

Not received

- An evaluation of HVAC noise calculation procedures & background noise specification
- The requirements for and design of portable enclosures for drum kits and percussion instruments in theatre orchestra pits
- Acoustic modelling of a 290 seat auditorium
- A Precision analysis of reverberation time prediction and measurement techniques. [P28](#)

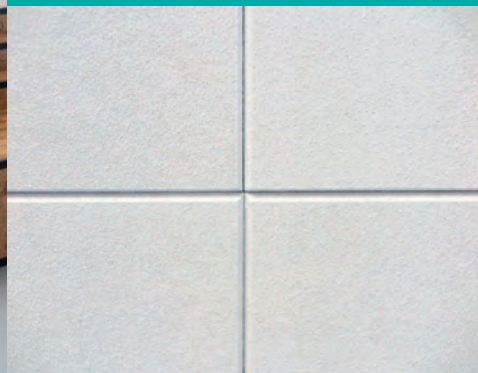


A better learning environment.

Positive Space = Positive Learning

Ceiling solutions that enhance learning spaces through acoustics whilst protecting students and the environment through sustainable building design.

armstrongceilingsolutions.co.uk



Armstrong[®]
CEILING SOLUTIONS



IOA Diploma Results Chart for 2018

Centre name		GPA	Labs	BA	NVCE	RA	EN	Project
Distance learning (Bristol)	Merit	2	0	2	3	0	0	1
	Pass	4	5	4	1	1	2	5
	Fail	1	0	0	0	0	0	1
Distance learning (Edinburgh)	Merit	7	5	2	2	1	6	7
	Pass	4	6	8	2	3	6	7
	Fail	0	0	1	1	1	0	1
Distance Learning (Milton Keynes)	Merit	14	4	7	8	0	6	10
	Pass	8	16	10	8	1	5	11
	Fail	4	2	7	8	1	1	0
Distance learning (Dublin)	Merit	7	4	4	3	1	3	6
	Pass	2	11	4	0	2	3	5
	Fail	0	1	1	0	0	0	0
Leeds Beckett University	Merit	2	5	0	0	1	5	4
	Pass	9	7	10	6	0	6	5
	Fail	4	1	3	0	1	3	2
London South Bank University	Merit	7	7	6	4	0	0	4
	Pass	7	5	8	9	0	0	6
	Fail	1	1	3	2	0	0	1
Solent University	Merit	3	1	3	2	0	3	2
	Pass	3	4	2	1	0	1	4
	Fail	0	2	1	0	0	0	0
University of Derby	Merit	5	5	1	1	0	5	2
	Pass	12	14	10	3	1	10	14
	Fail	4	2	5	1	0	0	0
Totals	Merit	47	31	25	23	3	28	36
	Pass	49	68	56	30	8	33	57
	Fail	14	9	21	12	3	4	5

Diploma awarded 2019

Distance Learning (Dublin)

Alorayed MSAM	Devine P	Portway R
Conroy CJ	Egan G	Rodriquez IS
Courtney D	Jansson-Peremans MF	Tyrell E
Delargy G	Plunkett G	

Distance Learning (Bristol)

Bryan A	Jennings K	Owen RJ
Hockley AJ	Messer NJ	Sohal T

Distance Learning (Edinburgh)

Ahmed B	Halcrow LH	Polat I
Anton CD	Lloyd R	Power P
Barnsley T	Magennis C	Richardson M
Cais C	McClymont JD	Shemeld TJ
Connolly AA	Needham S	Wright C
Georgescu EF	Parks DA	

Distance Learning (Milton Keynes)

Al Mouallem D	Lyster LJW	Suri R
Belone A	Marathe S	Sweeney DA
Cryer S	Onjun K	Tan KWL
Dixon A	Pickering L	Villasante Soriano R
Ellwood S	Roberts KR	Wong CK-W
Ioakeim D	Seiffert J	Wright W
Liew J	Stanton S	Xanthoulis G

Leeds Beckett University

Brady DJ	Gardham JE	Park J
Clayton N	Heenan J	Wilson J
Clough LE	King-Hele DJ	
Florentine JV	Malster RA	

London South Bank University

Allen JL	Grimes L	Rees HB
Budsha R	Hajko J	Roberts PGH
Charles R	Kelly A	Smith CM
Goodary J	Norman L	Yurdakul U

Solent University

Benson OS	David W L	Mitchell RJ
Chambers M	Edwards E	Walling R
Chatzilampri G	Hill A	

University of Derby

Ali-MacLachlan I	Hutchings JS	Spencer NAJ
Bladon WJ	Joynes S	Ward SC
Chee E	Karban HL	Wilkinson C
Dicker JJ	Lewis SJ	
Fichera I	McKean ADL	

TURN TO PAGE 38 FOR AUTUMN 2019 CERTIFICATE COURSE RESULTS



Live environmental monitoring

Clear, simple presentation of your live noise, vibration and air quality data



- Live streaming of measurement data
- Works with many different monitor types
- Customisable text and email alerts
- Automated reporting
- Tracks exceedances of noise insulation and temporary rehousing thresholds
- Customisable dashboard
- Section 61 Database
- HS2 ready
- Winner of the Tideway Award for Environmental Innovation

www.enbox.co.uk



We dropped the ball on this one

By Steve Cawser, AECOM



MASON UK LTD

Vibration Control Products
& Acoustic Floor Systems



ROYAL COLLEGE OF MUSIC

London

Acoustic ceiling



Wall supports

Acoustic floor

Mason hangers tolerate misalignment and use the most dynamically responsive material in the industry

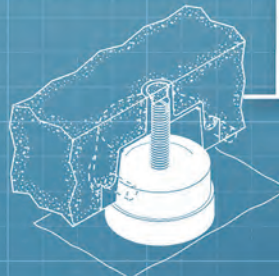
Mason UK are specialists in vibration isolation engineering for architectural, M&E and structural applications.

We deliver complete solutions for a wide range of problems and provide support from concept through to installation on site.

Our successful Royal College of Music project featured both established methods and bespoke engineering.

Mason jack-up floors are highly adaptable and provide a tuneable response

Mason structural bearings maintain performance for the life of the building



Most consultants who carry out building acoustics testing will be familiar with the use of tapping machines, which are used for determining footfall noise transmission between vertically adjacent spaces.

These have been in use for many years and allow a single number quantity to be determined for assessing the effectiveness of a floor construction. However, there are situations where the subjective response of floors does not correlate well with the measured data obtained using tapping machines.

Anecdotal evidence from residents and respondents show that noise generated by certain types of impacts (such as those of children jumping and people walking in bare feet) do not always agree that good levels of impact sound insulation have been delivered.

Alternative methods for testing

The primary cause of these discrepancies is often due to impacts that have a lot of energy in low frequencies, when compared to the more normal types of impact sound transmission. To attempt to overcome these low frequency discrepancies, ISO 10140-3:2010 introduced alternative methods for impact sound insulation testing that

can be used where the aim is to have a strong correlation between a ‘real’ source (e.g. a child jumping or someone walking in bare feet) and the source used for testing. These methods require either the modification of a tapping machine or using a dedicated rubber ball.

BS EN ISO 16283-2:2018 was introduced in February 2018 to detail the latest procedure to be used for the field measurement of impact sound insulation and replaced the procedure from ISO 140-7, which was withdrawn. ISO 16283-2:2018 refers to the use of these alternative methods for assessing ‘heavy, soft’ impacts; however, only the rubber ball method is included within the Standard, so the use of modified tapping machines may not be used for field sound insulation testing. Within this article, the rubber ball will be examined and the difference between it and the tapping machine will be discussed.

Rubber ball spec

The rubber ball allowed to be used for field sound insulation tests consists of a hollow ball of 180 mm diameter and 30 mm in thickness and a mass of 2.5 kg. The ball is dropped from a height of 1 m above the floor under test. An example of the type of ball which can be used for the testing is shown in Figure 1.

The specification for the rubber ball, including the material type and the force input characteristics and the frequency response are all given in ISO 10140-5:2010. These types of ball are now available as standard items of equipment from many manufacturers. A quick internet search in preparation for this article found them listed on the websites of many of the major manufacturers, including Norsonic, Rion and Svantek.

Testing methods

The differences in the testing methods when compared to those required for using a tapping machine are not great. When measuring the sound pressure level in the receiving room using a rubber ball, the Standard requires at least four source positions, which is the same as when using a tapping machine. The receiving room measurements should be carried out using fixed microphone locations, either hand-held or tripod mounted, which are also permissible when using a tapping machine. The tapping machine additionally allows the use of mechanically or manually swept microphones, which cannot be used when using the rubber ball as the source.

The first big difference between the two source methods is the metric used to measure the sound pressure in the receiving room. P34

Main image (on page 30): Anecdotal evidence from residents and respondents show that noise generated by certain types of impacts (such as those of children jumping) do not always agree that good levels of impact sound insulation have been delivered

Below: Figure 1: Example of a rubber ball for impact sound insulation testing (pictures courtesy of Norsonic).



Manufacturing solutions for architectural acoustics and vibration problems since 1969.

Download the full catalogue here:



CALCULATION SOFTWARE ALLOWS ACOUSTIC ENGINEERS TO MAKE PRECISE ACOUSTIC HANGER SELECTION REPORTS

1 ENTER IN OUR WEB APP Enter www.akustik.com and click the App button.



Change country or language >

Downloads Business Agents Contact News **B2B area** +34 943 696 102



About us Products Acoustic results Long term behaviour **APP** References Wooden structures

2 FILL IN THE INPUT DATA

Indicate if you want to isolate a floor or a ceiling. Then introduce the weight per square meter and distance between hangers/mounts.

Location: CEILING FLOOR

Metric: METRIC IMPERIAL

Load:

Distance between points:

Freq:

I know the natural frequency

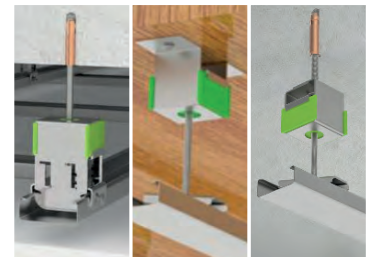
Material: RUBBER SYLOMER SPRING

3 SELECT THE PERFORMANCE LEVEL

Introduce the natural frequency that you require. If you ignore this value you can select if your preference is high isolation or cost effectiveness. You can also select if the elastic material is rubber, Sylomer or spring.

4 SELECT THE INSTALLATION TYPE

In case that you want to isolate a ceiling, you must indicate if the hanger has to be anchored to the slab, to the metallic beam or between rods. This will provide you a range of selected hangers and mounts that will fulfill your requirement.



Straight to profile Straight to slab Between threaded rods

Finally select the hanger that suits best.

SEARCH RESULTS

AKUSTIK GB + SYLOMER[®]
Number of items in this product range: 2

AKUSTIK LATERAL + SYLOMER[®]
Number of items in this product range: 2

5 OBTAIN RESULTS

This will lead you to a page where you will be able to check the isolation level. On this page you will be able to receive the complete vibration isolation level, data sheet, installation video or even request a quotation/offer.

AKUSTIK LATERAL + SYLOMER 30 TYPE B

REFERENCE	DEFL.	LOAD	NAT. FREQ.
23510	3.53 mm	60%	9.19 Hz

Name	AKUSTIK LATERAL + SYLOMER [®] - Akustik Lateral + Sylomer 30 Type B
Date:	5/30/2019 5:25 PM
Reference	23510
Load(Kg.)	18
Load (%)	60 %
Defl. (mm.)	3.53
Nat. Freq. (Hz)	9.19 Hz

Frequency (Hz)	Isolation (%)	Decibel (dB)
5 Hz	-42.06 %	-3.05 dB
10 Hz	-442.44 %	-14.69 dB
15 Hz	39.93 %	-4.43 dB
20 Hz	73.24 %	11.45 dB
25 Hz	84.38 %	16.13 dB
35 Hz	92.6 %	22.61 dB
50 Hz	96.5 %	29.13 dB
75 Hz	98.48 %	36.34 dB
100 Hz	99.15 %	41.4 dB
200 Hz	99.79 %	53.49 dB
300 Hz	99.91 %	60.55 dB

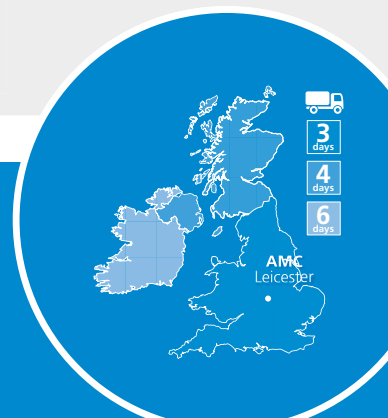
DATA SHEET

AMC Lateral Acoustic Hangers

Bipin J Mistry BSc
Technical Sales Manager

www.mecanocaucho.com
www.akustik.com
bjmistry@amc-ui.co.uk

158 Kedleston Road. Leicester,
Leicestershire, LE5 5BL
+44 (0) 7711 349 425
+44 (0) 1162 219 659



The tapping machine requires the use of an energy-averaged sound pressure level, whereas the rubber ball uses the maximum sound pressure level measured with a fast time weighting and energy averaged across each source position. The methods used for measuring the reverberation time of the receiving room are identical for both the tapping machine and the rubber ball.

The major difference with using a rubber ball when compared to a tapping machine is the frequency range which the measurements cover. For a conventional tapping machine, measurements are carried out in the frequency range covering the one-third octave bands between 100 Hz and 3150 Hz, which can be extended to cover 50 Hz to 5000 Hz, with the additional low frequency range requiring a special procedure for rooms with a volume of less than 25 m³. The frequency range for the rubber ball covers the one-third octave bands between 50 Hz and 630 Hz.

The low frequency procedure for a tapping machine requires additional measurements in the corners of rooms of a defined volume (<25 m³), whereas the rubber ball does not require these additional measurements to cover the lower frequency bands. This difference may yield savings in surveys times when carrying out field measurements.

When presenting the results from the impact sound insulation testing, the results from using a tapping machine are presented in terms of L'_n in one-third octave bands between 50 Hz and 5 kHz, and when rating in accordance with

The major difference with using a rubber ball when compared to a tapping machine is the frequency range which the measurements cover.

ISO 717-2, allows the calculation of a single number rating, $L'_{n,w}$. These can either be presented as the standardised values or normalised for reverberation time.

When using the rubber ball, the results are presented as a standardised maximum sound pressure level $L'_{i,Fmax,VT}$ in one-third octave bands between 50 Hz and 630 Hz. The standards do not currently allow for the calculation of a single number rating for impact sound insulation when using a rubber ball as the source.

Interpretation of data

One aspect of using a rubber ball that needs to be borne in mind is that there are currently no guidance values within Standards against which to assess the measured data. Therefore, the interpretation of any data acquired by this method will need to be assessed by the practitioner. Most of the Standards and guidance used in the UK are based on carrying out impact sound insulation tests with a tapping machine as the sound source. This means that until guidance values are published, it is unlikely that the rubber ball will see much use as part of a standard suite of tests for sound insulation.

Building Regulations compliance

The important aspect of any instrumentation is where it would be most useful and save practitioners time. The current revision of the Building Regulations includes Approved Document E, which was last amended in 2015. This version states that impact sound insulation testing should be carried out in accordance with ISO 140-7:1998,

which has now been withdrawn and does not include for using the rubber ball.

Therefore, any measurements done for Building Regulations compliance should be done according to the

withdrawn Standard, at the time of writing this article. This will preclude the use of the rubber ball for the measurements that would most likely benefit from its use. However, there will be other situations where impact sound insulation testing is required, and the use of the new Standard will allow the rubber ball to be used and may be useful for assessing the performance of heavy, soft impacts. However, any such measurements should be undertaken with the consideration of there being any guidance values against which to assess the results, which may limit the usefulness of the results.

Results

Developers and regulators prefer the use of single number values when setting regulations or contract specifications as it makes it simple to decide if something has passed or failed. The results from rubber ball tests do not currently have single number values to assess against, which limits their use in many circumstances. But their use does give developers the opportunity to give further evidence of the performance of their buildings beyond that required by the Building Regulations. But widespread adoption may be limited until a better evidence base exists to compare results against.

Evidence from impact sound insulation testing indicates that the use of tapping machines may not always provide results that, while compliant with the Building Regulations, correlate well with the subjective response of residents. The rubber ball has been introduced in Standards to attempt to address this potential shortcoming of the tapping machine method. However, the lack of guidance values against which to assess the results from the rubber ball, alongside the method yet being adopted in the Building Regulations, may mean that the rubber ball will not become a regularly used item of instrumentation for many years. ©

BELOW: The ball is dropped from a height of 1 m above the floor under test





architectural acoustic finishes

Oscar Elite exceptionally smooth acoustic plaster was used throughout this impressive office reception to control reverberation, give clarity of sound & reduce overall noise levels for this multi-award winning refurbishment at the Halo Building, Kings Cross, London.

With our extensive range of recycled, seamless, acoustic decorative finishes, we enable designers to create beautiful & inviting modern spaces that sound just as good as they look.

Credit to Steffian Bradley Architects & Gary Britton Photography.



OSCAR
acoustics

New look IOA communications

The IOA has undertaken a review and refresh of its brand identity. Paul Smith, of branding and design consultancy, Sun Street, has masterminded the work and here he explains how this will help improve the perception of the Institute among its many stakeholders.

An organisation's brand and its visual expression is the way in which it is represented to everyone it comes into contact with.

To make it recognisable at a glance, the IOA felt that it needed the appearance of all its communications (across all platforms) to be more consistent. The communication style had become diluted over time, partly as a result of organic growth and change and partly because several IOA products were being produced by different suppliers with no fixed guidelines in place for them to follow.

Multiple graphic devices were used that were originally derived from the Institute's logo. In addition, there were several image styles and typefaces in use, leading to a confused look. None of this is conducive to communicating a clear and confident message about the IOA.

Although perhaps not recognised immediately in isolation, there was more than one interpretation of the blue that is used by the IOA as its main identifying colour. Sometimes it was a royal blue, other times it was almost turquoise.

The website was also due for an update in order to take advantage of improved content, allowing it to become easier to use and navigate.

visual style of ommunications needed to be updated in order to attract the attention of younger members.

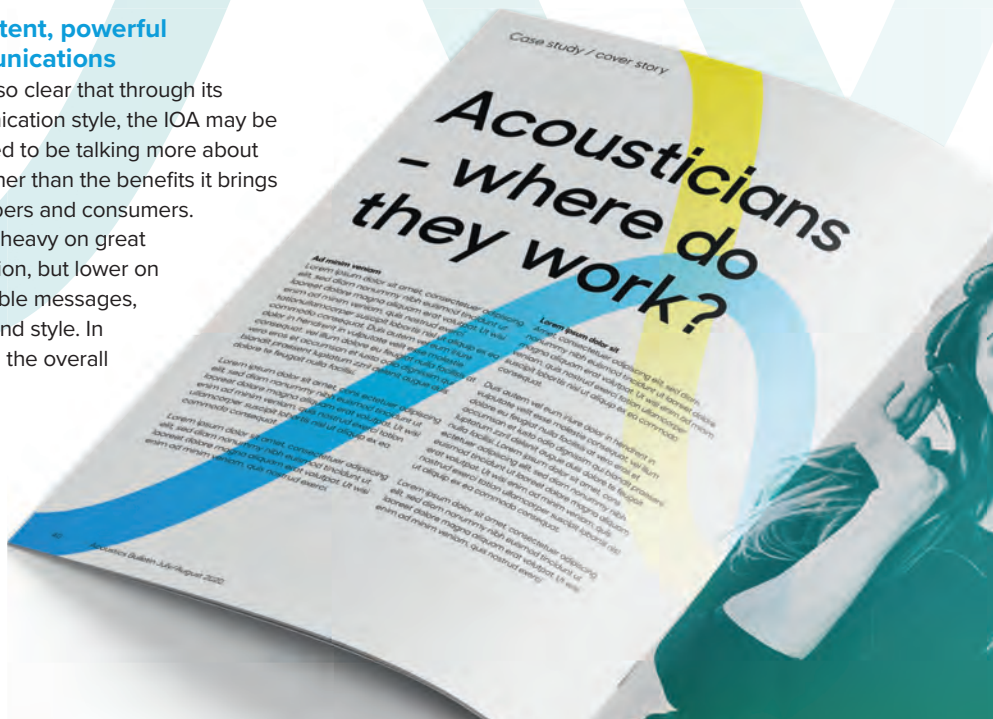
There is a great deal of familiarity with the IOA's logo, and the use of blue as a main colour. These elements have not been changed.

Consistent, powerful communications

It was also clear that through its communication style, the IOA may be perceived to be talking more about itself rather than the benefits it brings to members and consumers. In short, heavy on great information, but lower on memorable messages, impact and style. In addition, the overall



Below: Paul Smith, Sun Street



Sun Street explored four options for evolving and refreshing the existing communication style; deconstructing existing elements and reassembling them into something more consistent, powerful and easier to manage. The most common element used across communication items was a sound waveform and in most cases, a sine wave or curve. This appeared in many different styles – but more typical in a very technical ‘mesh like’ structure.

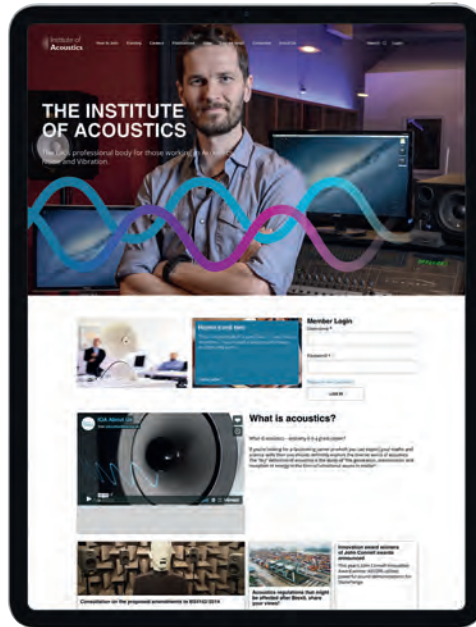
Sun Street created a simpler soundwave device to complement and support the logo. This device is designed to be used in multiple, gradated colourways and can appear on its own or used to frame and highlight images.

The waveform’s size, shape, cropping and colour can be modified according to the audience and message type and it’s a flexible device, which makes a great masthead for Acoustics Bulletin as well as an effective wall graphic or banner on the website.

The IOA now uses a single consistent blue across all applications and reproduction processes, this blue will be supported by a defined set of colours, often used within a colour gradation. The subject matter and colour balance of images has been rationalised and more emphasis will be put on showing consumer benefit.

Other changes include the use of a consistent typeface, a dynamic layout which makes greater use of white space, and the introduction of new pictograms. The end result is a look and feel which has been designed to create a sense of energy and purpose.

The aim is to ensure that the IOA communication style is easier to understand and manage across all the agencies it works with, while minimising costs and reducing the different styles that are used at any one time. ☺



IOA certificate results for autumn 2019

By Professor Keith Attenborough, HonFIOA, IOA Education Manager

In September 2019, the Certificate of Competence in Building Acoustics Measurements (CCBAM) was taken at Solent by 11 candidates. All were successful.

In October 2019 there were 100 candidates (including five resits)

for the Certificate of Competence in Environmental Noise Measurement (CCENM) of which 93 were successful.

An extended version of CCENM is being prepared to address the creation and critical assessment of noise-related reports.

Of five candidates for the Certificate of Competence in Workplace Noise Risk Assessment (CCWPNRA) last autumn, four passed.

The pass lists are below.

List of successful candidates:

Certificate:

Building Acoustics Measurements

Exam date: 13th September 2019

Solent University

<u>Chadwick SMJ</u>	<u>McVeigh B</u>
<u>Cooney M</u>	<u>Mirnajafizadeh SA</u>
<u>Costigan SJ</u>	<u>Murniadi DK</u>
<u>Devine P</u>	<u>Norcott C</u>
<u>Kraveishvili A</u>	<u>O'Connor D</u>
<u>Leyland DJ</u>	

Certificate:

Workplace Noise Risk Assessment

Exam date: 4th October 2019

Make UK

<u>Bryson M</u>	<u>Moore S</u>
<u>Jenkins D</u>	<u>Walker C</u>

Certificate:

Environmental Noise Assessment

Exam date: 11th October 2019

Bel Noise Courses

<u>Adair JI</u>	<u>Hume N</u>
<u>Gray D</u>	<u>Salisbury M</u>
<u>Gunn E</u>	

Colchester Institute

<u>Edwards L</u>	<u>Tate L</u>
<u>Hassett M</u>	<u>Wodward K</u>

University of Derby

<u>Boffey J</u>	<u>Langston A</u>
<u>Chakravarty A</u>	<u>Martin D</u>
<u>Clemett PA</u>	<u>Morne K</u>
<u>Culyer S</u>	<u>Rowe O</u>
<u>Eden L</u>	<u>Shacklock C</u>
<u>Fallon O</u>	<u>Shaw R</u>
<u>Harrison P</u>	

Leeds Beckett University

<u>Bolton A</u>	<u>Hill J</u>
<u>Brandreth A</u>	<u>Key P</u>
<u>Dawes R</u>	<u>Szymonowicz A</u>
<u>Frost R</u>	<u>Waugh M</u>
<u>Havenhand S</u>	

Liverpool University

<u>Bolt R</u>	<u>Kostovasilis D</u>
<u>Coates M</u>	<u>Lewis G</u>
<u>Davies S</u>	<u>Ridley K</u>
<u>Evans R</u>	<u>Ware J</u>
<u>Evans A</u>	<u>White S</u>

Make UK

<u>Ashton S</u>	<u>Terrington M</u>
<u>Brown S</u>	<u>Vaughn L</u>
<u>Robinson S</u>	

Moloney & Associates

<u>Doyle I</u>	<u>McGill K</u>
<u>Fagan S</u>	<u>Moloney C</u>
<u>Kiely M</u>	<u>Mrs O'Dwyer P</u>
<u>Lynch C</u>	<u>Mr O'Dwyer P</u>
<u>Martin E</u>	<u>O'Sullivan O</u>
<u>McDonnell A</u>	<u>Traynor N</u>

Shorcontrol Safety Ltd

<u>Ahern U</u>	<u>Doyle C</u>
<u>Byrne P</u>	<u>France D</u>
<u>Clarke J</u>	<u>Ganly J</u>
<u>Cogan R</u>	<u>Guerriero A</u>
<u>Condell J</u>	<u>Kane N</u>
<u>Curran J</u>	<u>McCann J</u>
<u>Dalton E</u>	<u>McCaughy A</u>
<u>Daly K</u>	<u>Murphy R</u>
<u>Doran D</u>	<u>Ni Chlaonadh R</u>

Solent University

<u>Agha F</u>	<u>Rozin A</u>
<u>Bate KM</u>	<u>Salim MA</u>
<u>Dickinson BR</u>	<u>Shortt DP</u>
<u>Flack GP</u>	<u>Sillars-Powell L</u>
<u>Handley SM</u>	<u>Tasker AEH</u>
<u>Pasztor N</u>	<u>Vargas Crespo L</u>
<u>Pickford DP</u>	<u>Wootton C</u>
<u>Reddings AJ</u>	

Ulster Environmental

<u>Ross JR</u>



The Mobile Binaural Family

presented by HEAD acoustics

SQadriga III, SQobold, B2U

Binaural recordings wherever you go: Combine our portable measurement units and highly-accurate binaural recording systems for smart recording and playback. Enjoy easy operation and reproducible aural accuracy.

Acoustics research and its future in the UK

By Kirill V. Horoshenkov, Professor of Acoustics, Department of Mechanical Engineering at the University of Sheffield.

The acoustics industry contributes £4.6 billion to the UK's economy annually, employing more than 16,000 people, each generating over £65,000 in gross value added across over 750 companies nationwide [1]. The UK acoustics industry is dominated by small companies and operations – 98% of UK acoustics businesses would be considered SMEs. Each of these businesses employs fewer than 250 people as a whole or within the proportion dedicated to acoustics. 75% of UK acoustics operations are 'micro' in size, employing no more than 10 people. However, 7% of medium and large companies from this list generate more than 80% of acoustics revenues, suggesting that there is a greater efficiency within larger organisations.

Innovation

Innovation in acoustics is a key to its industry success. UK Research and Innovation (UKRI) is the main funding body in the UK, which supports research and development in acoustics through various funding mechanisms. As a result, the acoustics industry in the UK is underpinned by a vibrant knowledge

base with 169 research grants from the UKRI (as per May 2019) that is worth in excess of £163 million (this information has been obtained from the open UKRI database at <https://gtr.ukri.org>).

Table 1 shows data on the distribution of this funding between five key areas of acoustics: (i) audio and speech; (ii) general acoustics; (iii) ultrasound; (iv) vibration; and (v) noise. The £163m of research funding reflects the multi-disciplinary environment in which acoustics operates, from social and health to engineering sciences. In terms of the value of research grants (3% of UKRI total (£5.4bn)) acoustics punches above its weight, because it only accounts for approximately 0.6% of the whole UK manufacturing sector, both in terms of numbers employed and GVA contribution. This reflects the importance of innovations in acoustics to the health of other areas of science and engineering. Detailed information on the current level of funding for research in acoustics is published annually by the IOA and EPSRC UK Acoustics Network and it can be found here: <https://acoustics.ac.uk/resources/list-of-running-ukri-grants-related-to-acoustics-per-may-2019/>.

Table 1. The distribution of UKRI funding for research and innovation in five areas of acoustics (May 2019)

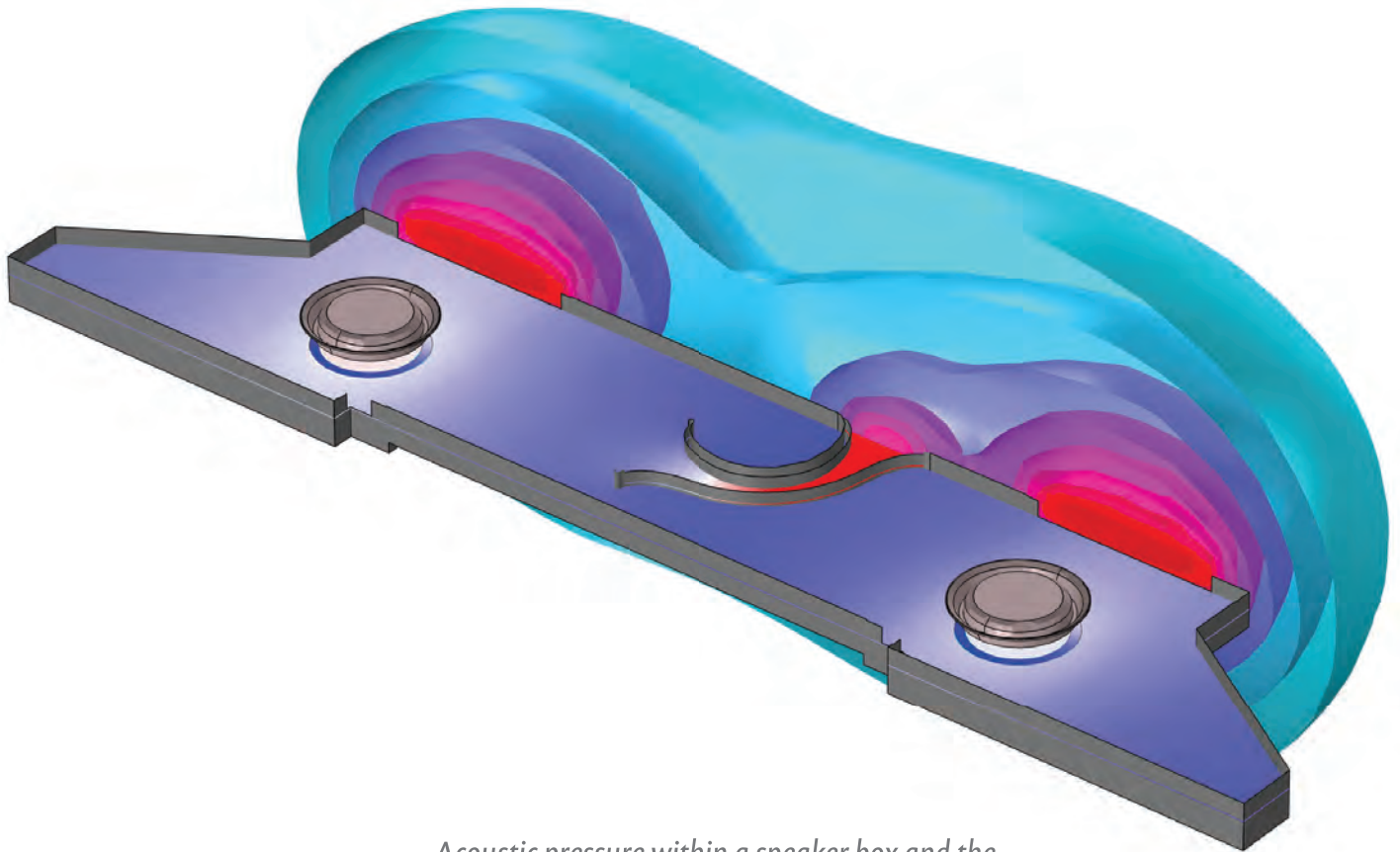
	Total value	Number of grants
Audio and speech	£48,173,792	43
General acoustics	£61,362,843	70
Ultrasound	£30,324,134	35
Vibration	£9,178,047	9
Noise	£13,986,741	12
Total:	£163,025,557	169

Table 2. Breakdown of the funding for acoustics related research by research council

Granted by	Grant value	Number of grants
EPSRC	£128,480,820	107
Innovate UK	£14,778,577	25
MRC	£7,853,504	6
NERC	£5,541,815	11
ESRC	£3,356,658	9
BBSRC	£3,187,692	7
AHRC	£504,758	4
NC3Rs	£99,114	1

The UKRI is an umbrella for the nine research councils in the UK: (i) Arts and Humanities Research Council (AHRC); (ii) Biotechnology and Biological Sciences Research Council (BBSRC); (iii) Engineering and Physical Sciences Research Council (EPSRC); (iv) Economic and Social Research Council (ESRC); (v) Innovate UK; Medical Research Council (MRC); (vi) Natural Environment Research Council (NERC); and (vii) Science and Technology Facilities Council (STFC); and (ix) Research England (<https://www.ukri.org/about-us/our-councils/>). Table 2 presents the breakdown of the overall figure for the acoustics research of funding by research councils. This data suggest that the majority of funding for acoustics-related research comes from the Engineering and Physical Sciences Research Council (EPSRC) in the form of academic research grants. The EPSRC encourages academics to seek support for this research from the industry. This support mainly comes in the form of in-kind contributions and there is a clear scope for the community to invest more industry funding in this research. This is particularly important as the level of funding

Simulation + testing = optimised loudspeaker designs



Acoustic pressure within a speaker box and the sound pressure level in the surrounding domain.

A global leader in electronics rose to the top of the audio industry by adding multiphysics simulation to their design workflow. COMSOL Multiphysics® enables audio engineers to couple acoustics analyses and other physical phenomena to address design challenges inherent to loudspeaker and soundbar designs.

The COMSOL Multiphysics® software is used for simulating designs, devices and processes in all fields of engineering, manufacturing and scientific research. See how you can apply it to your loudspeaker designs.

comsol.blog/loudspeaker-design

Figure 1.

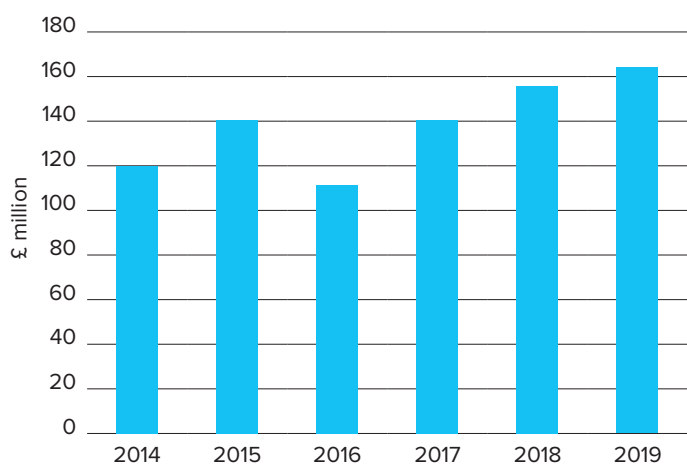
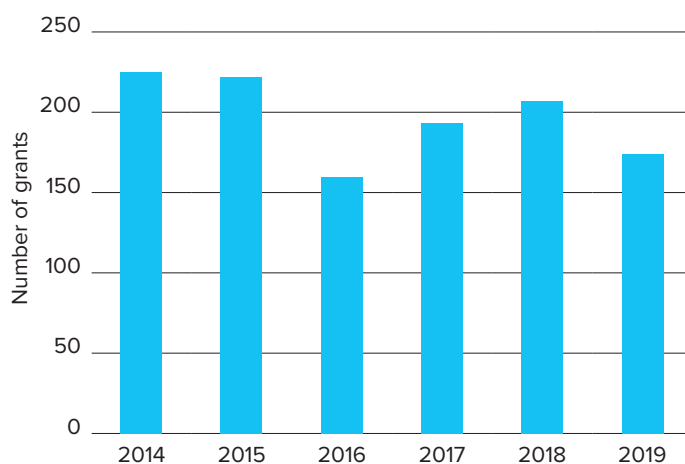


Figure 2.



from the Innovate UK (see Table 2) is relatively low, given the fact that this part of the UKRI is key for the translation of the results of academic research into industry, i.e. into better/new products, services and software. Translation of research requires considerable funding for academic research outcomes to pass through the so-call ‘valley of death’, i.e. to translate research from a relative low to relatively high technology readiness level (TRL).

The positive news is that there has been steady growth in the UKRI funding for acoustics-related research since the 2014. This is the year that the IOA Research

Coordination Committee started the records. **Figure 1** illustrates the change in the UKRI funding since 2014. There has been a modest (5%) growth in funding since the last year and impressive 49% growth since 2016.

The analysis suggests that the number of acoustics-related grants has been gradually reducing since 2014, reflecting the fact that funding for individual grants increases, i.e. grants tend to grow in value. This may also reflect the inter-disciplinary nature of acoustics, which underpins and serves a number of mainstream disciplines of science, engineering, environment and healthcare.

Above left: Figure 1. Trends in UKRI funding for acoustics related research since 2014

Above right: Figure 2. The change in the number of UKRI grants for acoustics related research since 2014

Funding

Since 2014, there have been changes in funding for the five key areas of acoustics. Funding for vibration research has gone down from 13% in 2014 to 6% in 2019. Funding for research in noise propagation and control has gone up from 3% in 2014 to 9% in 2019 and funding for ultrasound research (e.g. non-destructive testing, evaluation and medical ultrasound) has gone down from 34% in 2014 to 18% in 2019. The most radical change has been for funding for audio and speech processing research, which has gone up from 5% in 2014 to 29% in 2019.

The UK’s acoustics industry and research feeds into many major global markets, including the \$10 billion market for sound insulation materials in construction, \$7.6 billion ultrasound equipment market and \$31 billion market for voice recognition. This is before the vital role of acoustics in automotive, aerospace, marine and defence is taken into consideration, all major

The UK acoustics industry is dominated by small companies and operations – 98% of UK acoustics businesses would be considered SMEs



JACOBS is one of the world's largest and most diverse providers of technical and management services. We offer a full-spectrum of consultancy support to commercial, government and industrial clients across many sectors

We're looking for dynamic and engaged people to join our team. Bring your passion, your ingenuity and your vision. Let's see the impact we can create together.

Acoustics Consultants – UK Flexible

BI 0008YY Graduate / Acoustician / Senior Acoustician / Principal Acoustician – UK Flexible
BI 0008WX Acoustician / Senior Acoustician based in Croydon
BI 0008WZ Acoustician / Senior Acoustician based in Manchester
BI 0008YY Senior / Principal / Technical Director specialising in Aviation – UK Flexible

As an Acoustician you will predominately work on environmental acoustics projects (transportation, commercial/industrial, power, renewable energy, etc.) but there are also opportunities for involvement in buildings acoustics projects.

We are committed to equality across our business and we work with external organisations such as **STEM, WISE** (Women in Science & Engineering) and **Stonewall**. We are also **Disability Confident Committed**; therefore, we guarantee to interview all disabled applicants who meet the minimum criteria for a vacancy.

With eight active, passionate employee networks we're celebrating inclusion and diversity more than ever before.



Careers
Network



Womens
Network



Harambee



Enlace



OneWorld



VeNet



ACE



PRISM

Visit www.jacobs.com/careers and apply online by searching for the relevant reference number

Jacobs

Challenging today.
Reinventing tomorrow.

UK industries which leverage acoustics expertise, or the indirect environmental and societal value is considered.

Four Grand Challenges

The four Grand Challenges identified in the 2017 UK Industrial Strategy require acoustics innovation. The Industrial Strategy Challenge Fund (ISCF, <https://www.ukri.org/innovation/industrial-strategy-challenge-fund/>) focuses on areas all of which need support from acoustics as an enabling technology. **Figure 3** illustrates the four Grand Challenges and lists areas of acoustics that contribute to these Challenges directly.

Below: Figure 3. The four Grand Challenges and relation of acoustics to these challenges

The central role of acoustics

The future of acoustics research in the UK depends on its ability to contribute to the Four Grand Challenges. Countless examples are emerging to demonstrate the central role of acoustics in addressing the four Grand Challenges and particularly through more focused research. The UK Acoustics: Sound Economics Report [1] details these examples. The acoustics-related research base in the UK is internationally competitive, but it is important to continue to link this research directly to the four Grand Challenges. In this process, the roles of UK Acoustics Network

(UKAN) and IOA Research Coordination Committee are important. UKAN is working in collaboration with the IOA on a new EPSRC proposal which, if funded, will develop a new roadmap for acoustics research in the UK related to Grand Challenges and facilitate explorative (pilot) cross-disciplinary research projects between industry and academia, which follow from the agreed roadmap.

In summary, the good news is that there has been some growth in funding for acoustics since the record started in 2014. However, there is a clear scope for achieving a better balance between funding into key areas of acoustics and higher levels of funding for relatively underfunded areas, e.g. research in noise control and underwater acoustics. Also, there is a scope for better levels of funding for acoustics-related research from Innovate UK, and for better engagement of academia with non-academic partners to win support to translate the results of their low TRL research closer towards industry applications and markets. ©



Reference

1. UK Acoustics: Sound Economics report. <https://acoustics.ac.uk/wp-content/uploads/2019/05/Acoustics-sound-economy-report-May-2019.pdf>. Last accessed on 29 November 2019.

With over 15 years in acoustics, we're all ears.



Penguin Recruitment Ltd is a multi-disciplined Engineering and Environmental Recruitment Consultancy established in 2004. We offer Nationwide and International Recruitment Services covering both the permanent and contract/temporary markets.

With extensive experience in the Acoustics and Air Quality Industry, we are proud to offer an energetic can-do approach to any recruitment requirements ensuring candidates and clients receive a friendly, professional and knowledgeable service at all times.

SPECIALIST SKILLS SECTORS INCLUDE:

- Environmental Noise
- Building and Architectural Acoustics
- Industrial Noise and Vibration
- Instrumentation and Measurement Design
- Business Development and Sales
- Calibration and Testing
- Quality Assurance and Technical Management
- Audio Visual and Electro-Acoustics
- Noise Control and Product Design
- Vibration and Stress Dynamics
- Noise, Vibration and Harshness Testing

For an informal chat, please call Amir on **01792 365007**, or alternatively email amir.gharaati@penguinrecruitment.co.uk

PENGUIN
RECRUITMENT



www.penguinrecruitment.co.uk

Searching for the best in UK engineering innovation

The Royal Academy of Engineering MacRobert Award is open for entries, seeking the best of UK engineering innovation in 2020.

This award recognises outstanding engineering innovations developed in the UK that can demonstrate commercial success and a tangible benefit to society. The team behind the winning innovation receives a

£50,000 cash prize, a gold medal and national acclaim.

The MacRobert Award has celebrated a string of engineering firsts developed in the UK that have impacted on many sectors, including medicine, transport, manufacturing and technology. In 1972 it recognised the life-saving potential of the CT scanner,

with Sir Godfrey Hounsfield and his team at EMI winning the MacRobert Award seven years before he was awarded the Nobel Prize.

Entries are currently open at: <http://www.raeng.org.uk/grants-and-prizes/prizes-and-medals/other-awards/the-macrobert-award> and the deadline for applications is 31st January 2020.

Microphone could diagnose 'noisy' arthritic knees



New technology can 'hear' the difference between the signals produced by healthy knees and those with osteoarthritis

Technology used by engineers to listen for faults in bridges could be used to diagnose 'noisy' arthritic knees, a study suggests.

A tiny microphone is attached to participants' knees to pick up high-frequency sounds. The waveforms can be analysed by computers to give an insight into knee health and potentially, better diagnosis of osteoarthritis and more tailored treatments, the researchers said.

Osteoarthritis of the knee is a common degenerative joint condition, which can cause pain, stiffness and swelling in the joint. Normally, the body can repair low-level damage to the joints, but with osteoarthritis, the protective cartilage on the ends of bones breaks down and cannot mend itself.

In this study, involving Lancaster University, the University of Central Lancashire and Manchester University, researchers 'listened' to the noise produced by the knees of 89 adults with osteoarthritis. They were all asked to stand up from a seated position five times

while acoustic signals from their joints were recorded.

They assumed the knees would act like engineering structures; with "smooth and well-lubricated surfaces" moving quietly against each other, and "uneven movements of rough, poorly-lubricated surfaces" generating acoustic signals.

Their results showed that the technique could 'hear' the difference between the signals produced by healthy knees and those with osteoarthritis.

Professor John Goodacre, from Lancaster University, who led the study, said: "The current way of grading knee osteoarthritis usually involves an X-ray, and the picture can change every few months.

"This is a more sensitive way of grading severity without relying on an X-ray."

Professor Goodacre said the technique could lead to treatments tailored to the particular characteristics of someone's knee condition and that with more research, the new approach could be used as a diagnostic tool for athletes to avoid injury.

New acoustics technician apprenticeship launches to industry

Organisers behind a pioneering new apprenticeship in acoustics are launching the programme to industry.

Information about the Acoustics Technician Level 4 Apprenticeship programme is being presented at a cross-sector event, taking place in London in January 2020.

The apprenticeship has been developed as an employer-led, industry initiative, with support from the IOA and the Association of Noise Consultants (ANC).

Richard Grove, Acoustics Director at BDP, is Chairman of the working group which has developed the apprenticeship. He said: "The new apprenticeship will help deliver the acousticians of the future, which are needed across a range of industries to meet demand.

"It will also bring benefits to the higher education sector, by acting as a feeder for degree courses, either under the apprenticeship route, or as a sponsored degree by a company."

Mr Grove added: "Apprentices will have a clear, defined career path and the programme will offer opportunities for diversity and inclusion within the acoustics industry.

"We expect the first cohort of apprentices to start in 2020 and our hope is that employers support it."

To find out more about the apprenticeship launch event in January, please email info@theanc.co.uk

More details about the apprenticeship standard can be found at: <https://www.instituteforapprenticeships.org/apprenticeship-standards/acoustics-technician/>



French Company's showroom. A-traits Architecture agency - architect : Nathalie Darriet. Photo © Vincent Monthiers.



Vibrasto, textile acoustic covering for walls and ceilings

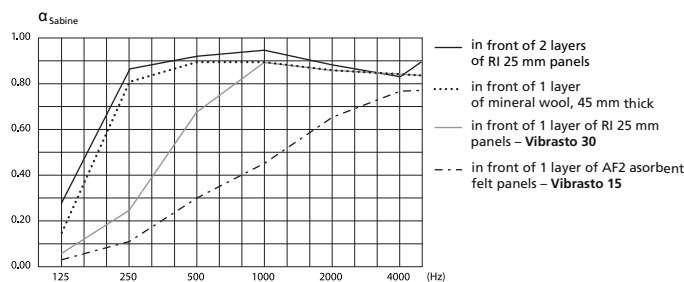
Fire resistant Europe (SBI): B-s1,d0 equivalent Class 0

Sound absorption: Class A, B, C

Resistance: Dust and soil repellent coating

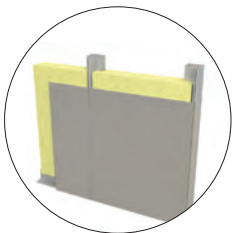
Durability: 10 years warranty

Acoustics: For Vibrasto stretched and anchored over concrete



	α_w	Class	NRC	FREQ (Hz)	125	250	500	1,000	2,000	4,000
Vibrasto + two 25-mm RI panel	0.95 (H)	A	0.90	α_{sabine}	0.27	0.86	0.92	0.94	0.88	0.83
Vibrasto + 45-mm thick mineral wool	0.90 (H)	A	0.90	α_{sabine}	0.15	0.81	0.89	0.89	0.86	0.84

Test reports available on request – Standard NF EN 20354 / ISO 354



Texaa® has over forty years experience in designing and manufacturing innovating sound absorbing products. Developed and made in the Texaa workshop, the diverse range of products are followed every step of the way, from knitting machine to final assembly. A constant exchange with architects and acousticians has enabled a better understanding of the specific needs and has over time resulted in innovative and highly efficient range of products.

Contact

Christophe Foulonneau
tel: 0207 092 3435 / cf@texaa.co.uk

International Year of Sound



Sparking curiosity at the Winchester Science Centre

Logo courtesy of Education and Outreach Coordinator Acoustical Society of America

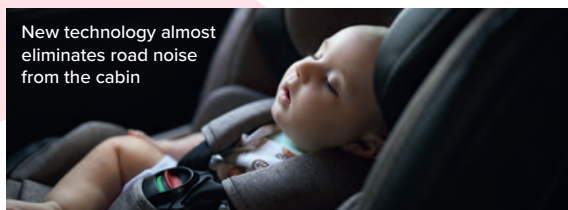
The International Year of Sound is a global initiative, which aims to highlight the importance of sound and related sciences and technologies for all in society. The International Year of Sound will consist of coordinated activities on regional, national and international levels.

These activities will also encourage an understanding of the need for the control of noise in nature, the built environment and the workplace.

The Winchester Science Centre is planning to build an acoustics-based, interactive attraction to run throughout the International Year of Sound, to educate children about sound and acoustics.

The International Year of Sound will be launched at the Sorbonne, Paris on Friday 31st January 2020. <https://sound2020.org/>

End road noise with new technology



New technology almost eliminates road noise from the cabin

Hyundai has developed a new technology aimed at almost eliminating road noise from the cabin.

Its Road Noise Active Noise Control (RANC), it's said to cut noise coming into the cabin through the chassis and engine by 3 dB over existing technology.

It builds on the firm's Active Noise Control system (ANC) software that actively counters exterior noise and works by picking up vibrations from the road via sensors, those sound waves are then countered by an inverted sound wave to minimise what comes into the cabin.

Unique brain changes in blind people who learn to 'see' with sound

Blind people who use echoes to map their surroundings, have an adapted brain region that allows them to 'see' with sound, a new study suggests.

The human brain normally interprets signals from the eyes in the primary visual cortex, but in some cases, especially when vision is deprived, this flexible system might also use the same organising principles to interpret sound.

By testing people expert in mouth-click-based echolocation, researchers have shown a pattern of brain activity remarkably similar to that of sighted people when they're looking at light.

It's the first evidence that activity in the primary visual cortex can be flexibly ordered by *how* a sense is used, not necessarily the *kind* of sense being interpreted. And it suggests that when this primary region is being under-stimulated, its system can be adopted by sound to map spatial locations.

Using brain imaging of expert echolocators in action, the new research tested whether the 'visual' cortex can map the spatial layout of sounds in the same way as visual input.

While lying in an MRI scanner, five blind people, five blind echolocators and five sighted people listened to recordings of a clicking sound bouncing off an object at different locations in the room, and guessed where it was coming from.

The findings show that stimulus maps for sound in blind echolocators are directly comparable to those for vision in sighted people. And the more skilled the echolocator, the more similar this map becomes.

What's more, these same maps don't appear in people who are blind but don't use echolocation; this suggests the brain activity is not simply a result of higher cortical regions producing mental imagery.



Results of MRI scans show that stimulus maps for sound in blind echolocators are directly comparable to those for vision in sighted people

Animated 'sound holograms' that you can touch

It is now possible to create a 3D moving image using nothing but a tiny polystyrene ball and an array of small speakers.

Ryuji Hirayama at the University of Sussex, UK, and his colleagues built the device from 512 speakers, positioned above and below a small 3D stage that acts as the image display. The speakers emit silent ultrasound to create small pockets of low air pressure in which the polystyrene ball floats. By manipulating the soundwaves emanating from the speakers, it is possible to rapidly shift the precise 3D position of the low-pressure pockets, and so control the position of the bead.

If the bead moves fast enough, it creates what appears to the viewer to be a 3D shape, and it is even possible to change the form of that shape over time to give the impression of a moving 3D object. But all this has to happen extremely quickly. The 3D shape has to be traced out in full in less than 0.1 seconds – any slower and the visual effect is lost.

It is even possible to add colour to the 3D objects by directing beams of red, green and blue light onto the bead.

People are also able to touch the image. This works because the speakers create an area of higher pressure air that surrounds the bead. If someone reaches towards this area, it feels as if they are touching the image, even though they are just touching air.

The assessment of potentially actionable noise impact

By Daniel Baker, Senior Environmental Health Practitioner, MAS Environmental Ltd and Mike Stigwood, Director and Lead Consultant, MAS Environmental Ltd.

(Reviewed by Professor Andy Smith, Director, Centre for Occupational and Health Psychology, School of Psychology, Cardiff University)

This article considers elements of noise impact; independent, or only partially reliant on the decibel level. It relates to sources of specific sound from one premises affecting another that is potentially ‘actionable’ in law.

One example of actionable noise in the UK is noise emitted from premises that is prejudicial to health or a nuisance regulated by a local authority.^{1,2} Consideration is given to non-acoustic and situational factors (‘context’) and how they affect the perception, interpretation and reaction to actionable sound at the individual level.

When is sound noise?

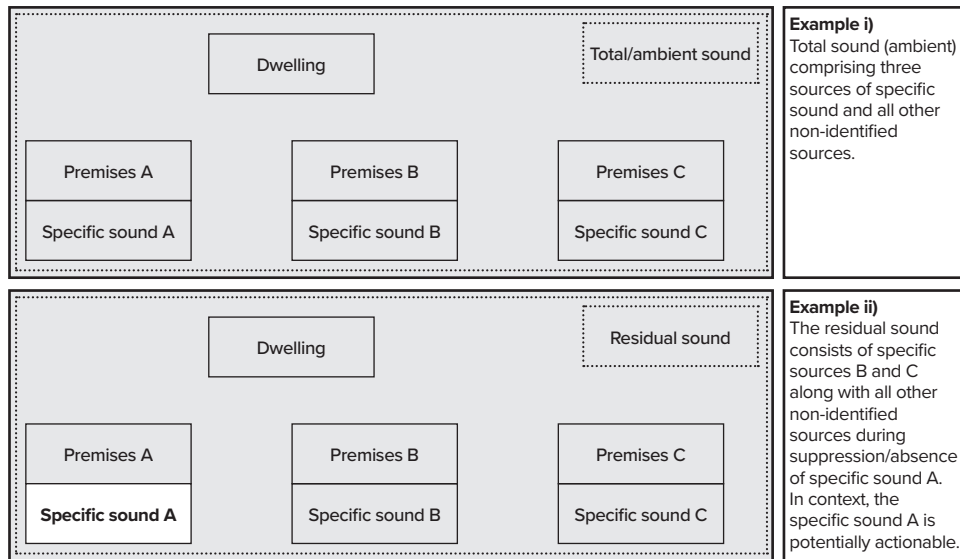
In air, sound is an aural sensation caused by pressure variations. The pressure variations are waves of energy. Sound is the human perception of those pressure waves via the hearing mechanisms located within the ear as interpreted by the brain. The pressure variations are transmitted via the middle ear (air), inner ear (fluid) and converted into nerve impulses mainly within the cochlea. The nerve impulses are detected and interpreted by the brain.

The perception of a sound, whether desired or unwanted will depend on a wide range of acoustic and non-acoustic factors, memories, associations, sensitivity and expectation. Sound can have positive psychological connotations such as a songbird reminding the

Main image: Sound waves that are disruptive, alien, unwanted, occurring in the wrong place, at the wrong time or otherwise in an unexpected way (context), are usually considered noise

“The perception of a sound, whether desired or unwanted, depends on a range of acoustic and non-acoustic factors, memories, associations, sensitivity and expectation.”

Actionable/specific sound within the acoustic environment



listener of nature. This provides a positive association with the acoustic environment. Where sound waves are disruptive, alien, unwanted, occur in the wrong place, at the wrong time or otherwise in an unexpected way (context), is usually considered noise.

Categories of noise and description of sound in context

In England, the Department for Environment, Food and Rural Affairs (DEFRA) within the Noise Policy Statement for England (NPSE) 2010 recognises noise as falling into three categories:

- ‘environmental noise’ which includes noise from transportation sources
- ‘neighbour noise’ which includes noise from inside and outside people’s homes; and;
- ‘neighbourhood noise’ which includes noise arising from within the community such as industrial and entertainment premises, trade and business premises, construction sites and noise in the street”

Noise affecting sensitive locations such as dwellings can fall into any of the categories both externally and/ or internally. The total (ambient) sound encompasses all categories of noise. Sources of actionable noise most commonly fall into the ‘neighbour’ and ‘neighbourhood noise’ category. The specific sound is emitted from a specific source and usually identifiable by the receiver within the acoustic environment as to where it emanates from and what

it is caused by. The total, specific and residual sound is illustrated in Figure 1 above.³

In Figure 1, example i shows a dwelling juxtaposed with premises A, B and C. The premises operate independently, and each emit a specific sound respectively, also as A, B and C. The grey area represents the total sound comprising all sources near and far. In the context of example ii, premises A emits a specific sound of noticeably different character. Premises B and C along with all other non-identified sources of sound within this example acoustic environment contribute to the residual sound, as observed when the specific sound from premises A is suppressed. The occupants of the dwelling consider the specific sound emitted from premises A to be unwanted (noise) and intrusive within the context of a residential receiver. Depending on the context and different approaches to analysis in each of these two examples, the specific sound can be considered as part of the residual sound or as specific sound that is intrusive and unwanted at the residential receiver. ‘Context’ can therefore have widespread interpretation and application.

The term ‘context’ is increasingly used within environmental management and noise assessment. A wider definition suggests context is “A set of physical (geographical, topographical, meteorological, and structural), social, psychological, cultural,

situational conditions, relevant to determine a particular individual or collective behaviour, attitude, emotion toward an environmental stressor”.⁴ In relation to noise, the International Organization for Standardization (ISO) considers that context concerns the interrelationships between person, activity and place in space and time through auditory sensation, interpretation of that sensation and response.⁶ Thus, generally, noise should not be considered in isolation but in the context of wider situational factors. However, for actionable noise those affected and regulators are often less concerned with factors such as wider societal benefit when assessing noise and focus on how it affects the individual based on the circumstances of impact.^{6,7}

Above: Figure 1

Situational factors and psychological reaction

Noise is commonly defined as unwanted sound or sound without value. Noise may arise in a variety of situations from a dripping tap, someone else’s loud telephone conversation, an intruder alarm or sound including unusual or otherwise irritating features that disrupt thought processes. Conversely, the greater our mental effort or concentration on a task, the less attention we pay to other stimulants such as noise. As a result, noise disrupts activity such as relaxation and rest to a greater extent than activities requiring higher concentration. For example, undertaking manual work tasks, concentrating on an important telephone call or cutting a hedge.

The term ‘noise’ introduces a subjective (emotionally based response) element to the individual’s decision of whether a sound is wanted or unwanted. It is normally an unconscious response. It is important to note, whether a sound is noise and whether that noise is expected or annoying is dependent upon the circumstances/situational factors in which sound is received. For example, a relatively quiet dripping tap may be thought of as not too annoying but can prevent/ disturb sleep if audible in a hotel bedroom at night when it is otherwise quiet. Likewise, an objectively loud audible intruder alarm sounding on the streets of towns and cities during the day may cause little annoyance to a transient

listener but with the same sound energy level can become a serious annoyance when repeatedly malfunctioning at 2am in a residential neighbourhood. 'Noise annoyance' can be defined as negative feelings of dissatisfaction, displeasure, disturbance or irritation caused by a specific sound.⁸

A loud telephone conversation of another passenger can be very annoying when trying to relax, read or concentrate on a long train journey. The speech content and use of language is likely to continuously trigger attention. However, the person making the call is less distracted by the noisy environment around them as they are concentrating on the call. These aspects of annoyance are far less determined by the decibel level other than in relation to audibility and possibly dominance, but by the constituents of the sound (character, message imparted to an inadvertent listener etc.) and how they are perceived (expectation, level of interruption etc.) in context.

The likelihood a sound is considered noise and will cause annoyance is multifactorial. The individual interpretation and reaction includes modifiers such as attitude/

perception of the source and source operator, attitude to the message imparted, necessity to community life, perception of control over the specific source, individual sensitivity and sensitivity to any specific characteristics present that grab attention i.e. disrupt rest, relaxation or activities requiring concentration. This is shown diagrammatically in Figure 2 below.

Figure 2 shows the detection/sensation, perception/interpretation and reaction/coping at the individual level.⁹ Sensation relates to the physiological detection of sound and acoustic variables. Perception/interpretation refers to modification due to non-acoustic and situational factors applied during the psychological processing of sound within an internal or external environment. Non acoustic factors can arise from unconscious or conscious responses. Reaction follows psychological processing and modification to determine whether the sound is wanted or unwanted. Problem-focused or emotion-focused coping strategies may then be applied which are multidimensional and situation specific.¹⁰ Coping strategies can be maladaptive, for example, the use of

alcohol to sleep during repeat noise exposure. This form of maladaptive coping can lead to unintended adverse health outcomes. The aim of coping strategies is to counteract adverse impact arising from exposure to the noise stressor, usually in a way that disrupts desired lifestyle the least.

Interpretation also depends on related memories, for example, if a particular activity (neighbour's party) led to disturbed sleep at an important point in lifetime then any related memories to noise from that neighbour could trigger emotive responses relating to the historical experience. One example would be a party affecting sleep the night before an exam and such recurrence is likely to more readily trigger negative response. The specific sound arising from industrial/commercial use is likely considered wanted by staff or those associated with the business as it informs on operations and imparts a positive (economic) message. However, it can be considered unwanted by residents when received in the context of a home environment where there is no equivalent positive message or perceived benefit. **P52**

Below: Figure 2

Human response to actionable sound

Detection/sensation



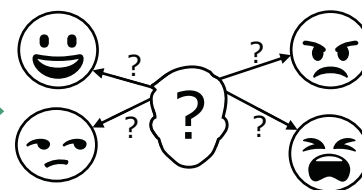
Relates to the physiological detection of sound (aural sensation) within receiving (internal or external) environment

Perception/interpretation



Refers to the modification applied during psychological perception and interpretation of sound

Reaction and coping



- Is the sound wanted or unwanted?
- Determined as noise?
- Are coping strategies necessary and effective to offset impact?

Acoustic variables – temporal variation of source and propagation conditions (e.g. wind direction, presence of screening etc.), duration, presence of special character (including number, combination and dominance), loudness, frequency content, residual sound level and total sound level.

Context relates to the interrelationship between a specific source of sound from one premises affecting residential use. For example, specific sound from industry, entertainment, bell ringing, dog barking etc. where the source/process/operator is identifiable as a specific element within the acoustic environment.

Non-acoustic and situational modifiers – character of neighbourhood, whether expected or unexpected, time of day, regularity, activities interrupted and level of interference, impact on basic human need including sleep and communication, duration and quality of respite, necessity, predictability, cumulative noise impact, presence of related (e.g. vibration) or unrelated stressors (e.g. odour, light, dust, air pollution), how easily avoided, perceptibility over internal or external background sound level, message imparted (e.g. fear) and whether positive or negative connotation etc. Additional factors can include age and lifestyle, previous experience and individual sensitivity.

Coping strategies – extent and regularity of application during, or in anticipation, of impact.

Problem-focused: Closing doors and windows, use of TV or radio to mask noise, undertaking activities to divert attention, completing works to reduce sound transmission, change in normal occupancy and use e.g. move bedroom or abandon dwelling, cessation of social events etc., complaining to authorities, local politician, community group or person responsible.

Emotion-focused: Seek sympathy from friends and relatives or social media, crying, use of alcohol or pharmaceuticals.

The aural experience will also depend on the condition of the ear and especially the inner ear which changes with age, exposure to excessive noise (sustained or sudden) and natural/genetic variation. Age introduces changes into this evaluation of noise both in terms of physiological and psychological changes where loss of hearing capacity due to presbycusis means generally there is less recognition of higher frequency intruding sounds.^{11,12} Conversely the increased range of memory of different sounds, voices of individuals and exposure to societal experience introduces greater causes of distraction where attention is unconsciously drawn. Thus, a young child will recognise and be drawn by a parent's voice but not attracted by a wide range of sounds it has little experience of and therefore memory of. This has been demonstrated with smoke alarms where children who

have not experienced the alarm may sleep through it but those trained to respond and treat the noise as a sign of danger (imparts a message) or is based on a known voice will more readily awaken.¹³

Cognition and habituation

Unlike other environmental stressors such as light, noise cannot be 'shut out' physiologically by the body.¹⁴ However, habituation to some forms of noise does occur when the message interpreted by the brain is determined as not presenting a risk of the need for fight or flight (psychological and physiological stress response) such as road traffic noise. Humans typically habituate to noise that does not impart a message of concern. Similarly, a noise may not trigger psychological stress responses as there is no perceived threat but nevertheless draws attention because it triggers

unconscious responses such as recognition of the noise and what it represents.

Humans are continuously and unconsciously listening. Humans aurally observe the environment for threat even when asleep which may trigger awakening in response to salient, sudden or loud sounds. This appears a natural response meaning it is difficult to prevent either awakening where the brain perceives a response may be needed, or attention when awake for example, triggering a memory such as from a known voice. Equally, alien and unrecognised sounds will trigger attention and awakening as the brain will be seeking input from all senses in a conscious state to determine its source and, whether it carries a threat or other message. These responses do not require loudness but sufficient recognition or degree of unconscious concern to trigger awakening. As a result,

Below: Sources of actionable noise most commonly fall into the 'neighbour' and 'neighbourhood noise' category

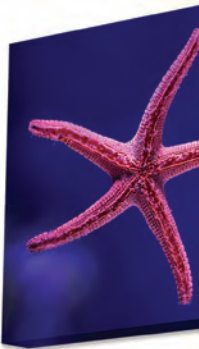
P54

14. For example, where eyes are exposed to high levels of light the eyelids can close and the iris constricts. There is no alternative or comparative mechanism for aural protection albeit it is understood there is a physiological mechanism of dampening to muscles connected to bone within the ear in response to sudden loud noises e.g. the middle-ear reflex/stapedius reflex.



**CHILDREN NEED
STIMULATION
TEACHERS
NEED QUIET
SUPERPHON ART
PROVIDES BOTH**

Sound absorption wall panels. Up to Class A acoustic performance. Almost any image can be accommodated.



All images for illustration purposes only.



gyms

absorption

ceilings

walls

floors

industrial



CMSDANSKIN
ACOUSTICS

T 01925 577711 / 01698 356000
E info@cmsdanskin.co.uk
W www.cmsdanskin.co.uk

CMS Danskin Acoustics is part of the
PTG PERFORMANCE TECHNOLOGY GROUP
www.PerformanceTechnologyGroup.com

awakenings and distraction when awake arising from alien, unwanted or disliked sounds is not directly related to its loudness and more a factor of its detection, perception (audibility) and identification (interpretation) whether conscious or unconscious. An observer's auditory impression of the relative strength or intensity of the sound is less relevant once identified in a particular situation and humans do not normally relate to them in terms of their loudness in such cases. This is recognised in particular by the courts in nuisance cases.

Other effects include the 'irrelevant speech effect' which is an example of an effect that doesn't depend on the intensity of the noise. The irrelevant speech effect is the finding that performance on immediate serial recall tasks is impaired by the presence of background speech, even though the background speech is completely irrelevant to the task.¹⁵

In cases of continuous or constant noise exposure, for example distant road traffic noise, habituation occurs reducing adverse response at the individual level. However, in cases of repeat exposure to actionable noise, sensitisation occurs where the message causes increasing alertness or alarm due to the absence of physical or emotional coping.^{16,17} The determination of sound as noise, depends upon which type of response is triggered, whether we habituate to it and thus

the negative response reduces and the consequence of the response such as awakening, disruption of activity, negative or positive interpretation.

As the disruption of brain activities by noise is an unconscious process, we cannot prevent its effect. It can be reduced by concentrating on the task we do not want disrupted but in turn this requires increased mental focus altering cognition. This in turn is a higher level of alertness and concentration which is not conducive with relaxation and rest. Thus, in the presence of noise on a train we will more readily be able to focus and respond to a message from a work colleague but when at home reading a novel for relaxation, will less likely be able to maintain the relaxation we are seeking to achieve.

Below: Sound can have positive psychological connotations such as a songbird reminding the listener of nature

Noise impact on humans

There are generally two categories of sound source. The first are commonly classified as anonymous sources such as road, rail and aircraft. They are anonymous as we do not unconsciously associate them with a particular person or operator. Thus, when heard they less often draw our attention. They are normally present daily without exception and thus become embedded in memories that do not trigger the need for conscious response.

Sound from transportation is generally considered unwanted and defined 'environmental noise' by national noise policy.¹⁸ Impact is primarily related to energy dose and physiological effects of a high level of continuous sound energy causing sleep disturbance, annoyance and triggering hormone type responses. Adverse health effects from transportation noise (anonymous) arise primarily relative to their decibel level and transportation type causing impact (rail/road/air). It can be time specific such as where activity only arises at certain times, for example holiday traffic or operations of a port relating to ferry times. In most cases adverse impact follows a dose-response relationship and daily impact where an increasing decibel level of exposure increases the incidence of adverse health outcomes. A systematic review of evidence by the WHO (2018) identified different trigger levels for air, road and rail traffic.¹⁹ Health effects including but not limited to annoyance and sleep disturbance are recognised to impact at certain trigger/onset levels of sound energy where a stepwise change occurs in the percentage of a population adversely affected.

Environmental noise affects everyone in society to varying degrees. Transportation noise can include special characteristics that require consideration (e.g. low frequency noise from aircraft) and reaction is influenced by non-acoustic and situational factors.

One outcome is the development of different guideline levels for aircraft, road traffic and rail noise as provided in the WHO 2018 and the necessity for



individual evaluation. There is a recognisable benefit of transportation sources, socially, for mobility and movement of goods. It is long recognised humans tend to habituate to low levels of distant or localised road traffic noise over time as it does not threaten safety (impart a message of danger) or trigger a fight or flight psychological stress response and is present virtually every day with no related adverse outcome (depending on context). It is noise that is ubiquitous within society, benign in terms of threat, acceptable as a social norm and characterless to the point it does not normally draw attention or directly relate to some other stressor. Such sources are not normally actionable in law and complaints do not result in direct regulatory action.

Exceptions do occur such as a very noisy exhaust on a motorbike and military flying.

The second category is effectively actionable noise. This sound and its circumstances of impact typically contain acoustic and non-acoustic characteristics. Non-acoustic factors, generally, are considered to be all factors other than sound level alone which contribute to noise annoyance and similar effects.²⁰ This can include a wide range of sources such as music or noise from an industrial site associated with a particular identifiable activity, process or operator. If the responsible person (individual or business) can be identified it is more likely the resulting impact will be perceived as noise by the receptor. Related memories will increasingly be set down as the noise is experienced and reinforce negative responses increasingly over time. Sound with this character unconsciously draws attention associating adverse response with the source, process and person or organisation responsible. As a result, non-acoustic factors associated with the source add to impact (interpretation) and psychological stress caused by the noise (reaction) resulting in the application of coping strategies.

The source recognition and unconscious response, to the process or person responsible, become more readily identified in the brain resulting in increased sensitisation and drawing of attention. Over time, improved recognition develops in the same way a musician recognises faults with their instrument and a conductor recognises what part of the orchestra is at the wrong tempo or dominance. Heightened sensitivity is a normal human reaction following repeat exposure and should not be confused with individuals who may exhibit 'over-sensitivity', generally, to noise i.e. hyperacusis. This leads to a general principle that humans tend to habituate to environmental/ transportation noise but sensitise to noise with attention drawing character or that imparts an adverse message. Important parameters include lack of controllability, unpredictability and where a noise is considered unnecessary. Intermittent (non-continuous) noise can have a greater effect on reaction due to the modification attributable to these non-acoustic and situational factors.

Impact from actionable noise with specific/acoustic characteristics is determined more by non-acoustic factors such as regularity, times of occurrence, duration and quality of respite periods, message imparted and how individuals interpret it, character of the neighbourhood and what activities are affected. Audibility, dominance, attention grabbing, regularity, duration, times of occurrence and what is disturbed are important non-acoustic and psychoacoustic factors. One example is music bass beat from specific premises where music emissions are regularly audible. Regardless of decibel level, when observed inside the home they are widely recognised as unacceptable. Even when infrequently occurring at night it is recognised as unacceptable as it will disturb sleep. It does so not because of its decibel level but due to the detection and

interpretation by the receiver and human responses which trigger awakening or impede mechanisms which lead to the onset of sleep. In the case of bass beat within music, there are two primary effect multipliers including the low frequency content and regular modulation. There are generally multiple reasons for increased human response including expectation and message imparted (speech). In such cases assessment is based on the acoustic characteristics, the mechanisms by which it intrudes, when it occurs and its frequency and duration along with other non-acoustic factors. Other acoustic factors are also important and can include the spectral distribution, and changes in level along with the duration of such sound energy levels.

Relationship of noise character and loudness or sound energy level

The World Health Organization (WHO) attribute only one third of noise annoyance to the decibel level with non-acoustic factors demonstrating greater importance. Whether noise causes adverse or significant adverse impact depends on several factors as recognised in the UK courts in nuisance cases including how loud it is in relative terms, what sort of noise it is, where, when and how regularly it occurs, how long it lasts and its frequency/ spectral content. Numerous other factors are also relevant.

Difficulty arises when trying to relate impact causing adverse psychological human response to sound energy level. Whilst loudness is a clear factor and is processed by different neurons to those triggering attention or emotional responses, the relevance and importance of loudness compared to factors such as attention drawing character in the noise is less well researched. The latter relates more to its audibility and dominance rather than loudness.

It is generally recognised within planning policy and noise guidance, **P56**

18. Exceptions exist where it is necessary for transportation to be heard for safety reasons e.g. train horn but it nevertheless remains unwanted by exposed residents, especially as many cases are avoidable but is convenient or financially beneficial to the operator. However, it would likely be considered noise when received in a home environment to a resident living close to a crossing and many complaints arise.

19. For example, those at a late-night party enjoying themselves at the cost and disregard of others losing a night's sleep.

20. Determined through experience of both authors and feedback from the training of local authority officers responsible for the investigation of noise complaints and enforcement.

“It is generally recognised within planning policy and guidance, that once there is a high sound energy dose in an environment the tolerability of additional noise is reduced particularly where it has attention drawing character.”

that once there is a high sound energy dose in an environment the tolerability of additional noise is reduced particularly where it has attention drawing character.²¹ It should be recognised quiet environments generally experience increased incongruity by intruding noise particularly where they are not expected. However, in a loud and cacophonous sound environment, low levels of additional noise may not increase attention disruption as there is already a wide range of ongoing attention-grabbing sounds triggering greater attention on tasks in order to avoid disruption. In that instance, the brain is flooded by such effects leading to more complex human responses including potentially a general increased unconscious avoidance of exposure.

Consider an evening environment impacted by a loud relatively steady roar of road traffic at levels of 65dB LAeq,T but with additional music noise emissions from an adjacent entertainment facility that is just audible. The music may increase adverse impact even when only just audible due to the total dose. Compare that to a busy vibrant city centre location with the same average noise level but composed of multiple sources.³⁰ Imposing the same music in this cacophony/sound environment is less likely to intrude due to the saturating cacophony of sounds.

The brain receives separate stimuli in terms of loud noise from multiple sources and has to determine directionality but also elements drawing attention and whether the sound contains a message e.g. threat. So the louder a noise that draws attention the more it will disrupt even higher mental focus except this could change having regard to the context and complexity of the sound

environment. Complex sound environments may affect discernibility of some minority sounds. Simply put, in environments with underlying anonymous noise not drawing attention the louder it is the more it would disrupt not just rest and relaxation activities but those in a workplace. In complex sound environments the noise is likely to disrupt and intrude at lower loudness levels, but the intruding noise may not trigger the same complex responses as these aspects of cognition are already in a state of stimulation.

The total level of sound can potentially be important, therefore, in situations where the total sound is high due to all sources near and far and where the specific sound forms one of many individual sources (low signal to noise ratio). Less attention is drawn to a single element of the acoustic environment and impact is more related to the continuous and high levels of noise plus the presence of any individual acoustic features and available coping subject to the complexity of the ambient sources. However, when considering the specific sound in areas of low noise, a high signal to noise ratio relative to the residual sound or background masking sound and minimal competing attention-grabbing character, it can make the sound incongruent focusing attention on that single element. In sound environments that impose a high dose but are not primarily dominated by a single continuous transport source, a more complex relationship can arise. Where community noise includes a range of attention drawing sources, for example the cacophonous sound environment described above, this can make assessment of any individual source complex. More

research is required as the various contributing factors and their importance remain unknown although it is considered these general principles are supported.

Conclusion

For actionable noise, a noise assessment should consider factors such as audibility and dominance whether internally or externally, frequency and duration, the times it occurs and activities affected, the nature and character of the sounds that unconsciously draw attention and those other factors discussed above in relation to this type of noise. Additionally, impact will vary depending on what human activity is affected. If the noise cannot be escaped from anywhere within the dwelling, this would impact far more than a scenario where it only affects limited rooms used in a limited way such as bathrooms.

Whilst not considered here, audibility and dominance are not necessarily as simple as emergence above background and ambient sound levels, but this is clearly a factor.

In many cases of impact, the decibel level is insufficient to determine whether a specific sound is considered acceptable particularly where certain acoustic and non-acoustic characteristics are present. Whilst pressure variations in the air are a form of energy that can be measured using scientific instruments the reaction to sound is predominantly psychological. This includes within both source noise and residual and background sound environments. The assessment of actionable noise requires more than an understanding of acoustics particularly as knowledge and research into noise with special or specific characteristics is limited. It is possible complex noisy environments may exhibit a greater tolerability of additional characterful noise than less complex quieter environments and is an area for future research.

There are too many variables to provide precise levels or decibel ranges to such influencing factors, but we can draw reasonable conclusions. For example, where a noise is both loud and attention drawing, it does not become

21. For example, when considering context in BS4142:2014+A1:2019 Methods for rating and assessing industrial and commercial sound. London: BSI. Reference to 'absolute level' within online planning noise guidance. See <https://www.gov.uk/guidance/noise--2> accessed 20/12/19.

acceptable by simply reducing its loudness when still above the point it continues to draw attention. The latter element is less related to loudness and more related to the acoustic characteristics or message imparted by that noise which do not disappear until it is no longer discernible.

When undertaking noise impact assessments, it should be remembered noise falls into distinct categories and the resulting level of annoyance or stress increase can be dependent on a variety of acoustic, non-acoustic and situational factors independent of the decibel level. Dominance, audibility, noisiness and

attention drawing elements need to be analysed along with all the other factors discussed such as message imparted, frequency and duration but which can be further complicated by the constituents of the existing sound environment. Other factors such as additional environmental stressors within the receiving locale are also important. 🌐

References

1. Environmental Protection Act 1990 Section 79(1) (g) and 80.
2. Refers specifically to the 'nuisance' limb of statutory nuisance under section 79(1) (g).
3. Based on Figure 1 from Dutilleux G, Gjestland T and Licitra G. Review: Challenges of the Use of Sound Emergence for Setting Legal Noise Limits. *International Journal of Environmental Research and Public Health* 2019, 16, 4517, page 3.)
4. Lercher P, 2019. Combined Transportation Noise Exposure in Residential Areas. In: Nriagu, J (Ed.) *Encyclopaedia of Environmental Health*. Elsevier Vol. 1, pp.695-712.
5. BSi, 2014. BS ISO 12913-1:2014 Acoustics – Soundscape. Part 1: Definition and conceptual framework.
6. The wider societal, economic and environmental (sustainable development) considerations would be relevant when considering land use planning applying the NPSE 2010.
7. Baker D. Author's response to comment on "Application of noise guidance to the assessment of industrial noise with character on residential dwellings in the UK"; D Baker 93 (2015) 99-96. *Journal of Applied Acoustics*. Vol. 145, February 2019, Pages 25-26.
8. Ouis, D. Annoyance Caused by Exposure to Road Traffic Noise: An Update. *Journal of Environmental Psychology*. Volume 21, Issue 1, March 2001, Pages 101-120.
9. Based on Figure 1 from Baker D. Preliminary evaluation of the relative importance of acoustic, non-acoustic and context related factors in reactions to noise at the individual level. *Proceedings of Inter noise 2017 27-30 August Hong Kong*. Pp 4501-4512.
10. Mark G and Smith A. Coping and Its Relation to Gender, Anxiety, Depression, Fatigue, Cognitive Difficulties and Somatic Symptoms. *Journal of Education, Society and Behavioural Science* 25(4): 1-22, 2018; Article no.JESBS.41894.
11. Wiley T et al. Aging and High-Frequency Hearing Sensitivity. *Journal of Speech Language and Hearing Research*. Volume 41, 1061-1072, October 1998.
12. Wiley T et al. Changes in Hearing Thresholds over 10 years in Older Adults. *Journal of the American Academy of Audiology*. 2008 April; 19(4): 281-371.
13. Smith G, Chounthirath T and Splaingard M. Effectiveness of a Voice Smoke Alarm Using the Child's Name for Sleeping Children: A Randomized Trial. *The Journal of Pediatrics*. February 2019, Vol. 205, Pages 250-256.
15. Farley L, Neath I, Allbritton D and Surprenant. Irrelevant speech effects and sequence learning. *Memory & Cognition*, 2007, 35 (1), 156-165.
16. Cooper, S, 2018. The inaudible soundscape of a wind farm. *Proceedings of Euronoise 2018*, 27-31 May, Crete, pp 2383-2390.
17. Relates to investigations and situations of actionable noise investigated by the author's and as debated in various noise nuisance cases.
18. World Health Organization, 2018. *Environmental Noise Guidelines for the European Region*. Copenhagen: World Health Organization Regional Office for Europe.
22. Flindell IH, Witter IJ. Non-acoustical factors in noise management at Heathrow airport. *Noise & Health* [serial online] 1999 [cited 2019 Nov 6];1:27-44. Available from: <http://www.noiseandhealth.org/text.asp?1999/1/3/27/31715>
23. Stigwood M. Diminishing reliability of the application of Standards on Environmental Noise in the UK. *Proceedings of Inter noise 2017 27-30 August Hong Kong*. Pp 4489-4500. World Health Organisation, 2000. *Technical Annex – Local Authorities Health and Environment*.
24. Baars BJ and Gage N, 2010. *Cognition, Brain and Consciousness: Introduction to Cognitive Neuroscience*. Second Edition. Oxford: Elsevier.

Advertising feature

Secondary glazing enriches Art Deco revival of Hatfield's most iconic building



The Comet Hotel is at the junction of the Barnet by-pass with St Albans Road in Hertfordshire, close to the Selectaglaze office and factory.

Formerly known as the Ramada Hatfield, the Comet's multimillion pound refurbishment, which began in 2017, is now complete. A new three storey extension block annexed to the rear of the hotel has added a further 52 rooms, which reflects

and enhances the silhouette of the heritage building. This new extension is shared with a student residential development.

In addition, the hotel has also opened its own independent restaurant, 'Element Bar & Kitchen'. A replica of the Comet Racer, mounted on a 20ft high pylon stands tall outside the hotel.

The hotel had retained the building's original Crittal sash windows, but this did not provide the required level of noise insulation to a number of the guest rooms, restaurant and function spaces.

To remedy this, St Albans-based Selectaglaze installed 104 secondary glazed units. The secondary windows were made bespoke to ensure the best fit and included four different systems, specific to the project's needs. All units were finished in white to match the original external windows.

The new secondary glazing to this Hatfield landmark will help lower energy

bills and afford the guests a good night's sleep, and those visiting the hotel will be guaranteed a pleasant experience.

Hotel refurbishments are often fast-track projects requiring close cooperation between client, contractor and specialists. Selectaglaze has wide experience of working in buildings up to Grade I Listed and offers a technical advisory service and specification advice to ensure correct interface with other trades.

Established in 1966, Royal Warrant Holder Selectaglaze is the leading specialist in the design, manufacture and installation of secondary glazing and will be exhibiting at Future Build 2020 from 3rd – 5th March 2020. 🌐

For further information, please contact Selectaglaze on **01727 837271**
Email: enquiries@selectaglaze.co.uk
Visit: www.selectaglaze.co.uk

Sound sensing in smart cities

By Dr Benjamin Piper, co-founder, Acoustic Sensor Networks Limited

The Measurement and Instrumentation Group held a one-day meeting on 16th October at the Urban Innovation Centre in Farringdon (home of the Connected Places Catapult), on the subject of 'Sound Sensing in Smart Cities'. The meeting explored limited recent developments in instrumentation for distributed and long-term noise monitoring, the development of appropriate analytics for handling large and varied datasets, how machine learning can be utilised in this context, approaches to measuring and quantifying soundscapes and a number of example case studies, including those where acoustic data is combined with other measurands.

Presentations

The first presentation of the day, **A Little Electronic Milky Way of Sound – The IoT and the Future Sound of Cities**, was given by Dan Pope from RSK. Dan began with an overview of smart cities and noise with a focus on health impacts before giving details of a holistic soundscape design toolkit, which included considerations such as soundmarks, labour force, sustainability and housing, mass transit planning and tranquility.

The second presentation was given by Yalena Coleman of the Connected Places Catapult. Yalena explained the history and role of the Connected Places Catapult, giving details of some of their key activities. She went covered details of the Urban

Technology Testbed, which is run by the Catapult in the Queen Elizabeth Olympic Park and gives SMEs and start-ups a platform to test out their solutions in a real urban environment.

The next presentation was on the complex subject of **Standards for Smart Cities**, which was presented by Dr Richard Barham of Acoustic Sensor Networks Ltd. Richard began by explaining why we have standards, before exploring the standards available for smart cities and for electroacoustic devices. He then discussed how these sets of standards can be brought together. Richard also gave details of the recent developments in IEC TC29 WG43, which is tasked with developing the standards for modular equipment.

The fourth presentation of the day was given by Dr Paul McDonald of Sonitus Systems with the title **'Getting Smarter – Turning Sound Level Monitors into Smart City Tools'**. Paul's presentation asked the audience to consider what is 'smart' in terms of what it means for acoustics within urban noise monitoring projects, giving an overview of how house noise monitoring fits within the smart city ecosystem. He went on to present a number of relevant case studies including the Dublin city noise monitoring project and sports and entertainment monitoring use cases.

Dr Andreas Herweg from HEAD Acoustics gave a presentation on **'Tools for Data Collection in Soundscape Applications'**. He began by reviewing the soundscape approach and the standards that have been developed in this area, before giving an overview of the tools available, which included sound walks and surveys as well as various types sound recording equipment, such as binaural and HATS systems. He finished by giving results from a case study performed in the town of Kohlscheid near Aachen, that specifically explored the impact of a new road scheme.

Professor Mark Plumbley from the University of Surrey presented on the fascinating subject of **AI for Sound: A Future Technology for Smart Cities**. He explained the types of machine listening that are currently available and how they are applied, while highlighting the huge potential for growth in this area and the urgent need for more sound examples for algorithm training. He gave a number of interesting examples including domestic audio tagging, birdsong identification, Alexa Guard, vehicle noise and urban noise classification. He also discussed the accuracy of algorithms and issues surrounding privacy before highlighting some potential future applications.

Grant Waters then gave a presentation on **Tranquil Cities**, which is a cross-disciplinary project focused on curating urban calm and promoting the identification and use of tranquil spaces within our cities. Grant explained what tranquillity means in this context and how this fits in with soundscapes. He then gave details about the creation of the Tranquil Pavement, which is a map of London highlighting user submitted locations of tranquillity, along with a colour coded map layer where

the rating is based on a combination of noise and air quality data. He explained how this could be used to generate community engagement through activities such as tranquil walks.

The final presentation of the day was given by Matthew Muirhead of AECOM with the title **'More Measurement Data – More Knowledge or Just More Noise?'** Matthew gave details of the history of noise monitoring from single point measurements to large scale and long-term deployments; highlighting the huge amounts of data generated by the latter. He then gave a forensic examination of how long-term monitoring can influence the meaning of data, highlighting the increased variation and better understanding of the uncertainty that this leads to, as well as the requirement for more supporting information such as weather conditions and spatial context.

Each presentation was very enjoyable and thought provoking and there was a lively discussion after each. The Measurement and Instrumentation committee would like to thank all of the speakers for their contributions and everybody who attended and contributed to the event. ☺



AcSoft Group invests for further growth

As part of an ambitious long-term future growth strategy, Bedford-based AcSoft Holdings Ltd, which comprises AcSoft, GRAS UK and Svantek UK, has announced that General Manager, Paul Rubens, has acquired a 50 percent interest in the business, making him joint partner alongside founder and MD, John Shelton.

Paul, who has extensive experience in the health, safety and environmental technology markets across the world, started working with AcSoft as a marketing consultant in 2011. At that time, it was one small company, employing just three people but representing some key international manufacturers in the sound and vibration monitoring market.

Now AcSoft Group employs 15 people. It comprises three businesses offering a range of advanced noise and vibration instrumentation, software and sensors for environmental and occupational health monitoring applications, as well as measurement microphones



Above:
(L-R) AcSoft's John Shelton and Paul Rubens

for automotive, aerospace and defence industries.

John Shelton, who founded the AcSoft Group in 1994 said: "AcSoft's growth is in no small part due to Paul's efforts, and at the end of last August, Paul and I became equal partners in the AcSoft Group, which sets us on the road for continued investment and expansion.

Paul Rubens said: "AcSoft Group's growth prospects are bright and I am excited about investing in and owning the business alongside John as part of a long-term growth strategy.

"Becoming an equal shareholder is a reflection of my commitment to helping AcSoft Group achieve even more success in the future."

Sounding out a STEM challenge for Tomorrow's Engineers Week

Budding engineers looking to make a sound career choice can now watch a series of short films that were launched at the end of last year to mark Tomorrow's Engineers Week.

The Association of Noise Consultants showcased a range of videos, aimed at a school age audience, showing acoustics in action. The playlist features nine films made by acousticians as

Below:
SRL Technical Services, winner of the John Connell STEM Award

part of the John Connell Awards programme.

Held last October, the John Connell STEM award recognised short film communications relating to acoustics, made by people studying or working in the field. SRL Technical Services won the award with a film highlighting how people in the community could be annoyed by irritating noises and how they can be addressed.

AECOM and LOCHER (Learning Occupational Health by Experiencing Risk) were both Highly Commended.

ANC Board member, Paul Shields, said: "These films leave a great legacy, as the applicants have explained a highly technical subject in ways that engage with their young audience.

"They offer a useful resource for people interested in acoustics and STEM in general to tap into."

More information, including links to the John Connell STEM Award playlist, is at www.association-of-noise-consultants.co.uk/explore-acoustics



SRL Technical Services, winner of the John Connell STEM Award

Since 2004, MSA has provided a bespoke recruitment service to clients and candidates working in Acoustics, Noise and Vibration. We are the UK's niche recruiter within this sector, and as a result we have developed a comprehensive understanding of the industry. We pride ourselves on specialist market knowledge and an honest approach - we are focused on getting the job done and providing best advice to clients and candidates alike.

With a distinguished track record of working with a number of leading Consultancies, Manufacturers, Resellers and Industrial clients – we recruit within the following divisions and skill sectors:

- Architectural / Building / Room Acoustics / Sound Testing
- Environmental / Construction Noise & Vibration Assessment
- Vibration Analysis / Industrial / Occupational Noise & Vibration
- Measurement & Instrumentation
- Electroacoustics / Audio Visual Design & Sales
- Underwater Acoustics / Sonar & Transducer Design
- Manufacturing / Noise Control & Attenuation
- Structural Dynamics & Integrity / Stress & Fatigue Analysis
- Automotive / NVH Testing & Analysis

**For a confidential discussion call Jim on
0121 421 2975, or e-mail:
j.mcnaughton@msacareers.co.uk**

Our approach is highly consultative. Whether you are a candidate searching for a new role, or a hiring manager seeking to fill a vacant position - we truly listen to your requirements to ensure an accurate hire, both in terms of technical proficiency and personal team fit.



Armourcoat celebrates the best in innovative surface design

Decorative specialists, Armourcoat, will be exhibiting at The Surface Design Show from 11th to 13th February. With this year's theme 'Close to Home' it is an event for architects, designers and specifiers looking for material inspiration from all over the world.

Held at Islington's Business Design Centre, this is the trade show to source products, gain new insights and connect with innovative and exciting materials, including Armourcoat's Acoustic Plaster System on stand 102.

Designed to optimise the acoustics of interior spaces, Armourcoat Acoustic comprises a mineral wool composite panel that is bonded onto the substrate and finished with a seamless layer, presenting an elegant marble-based plaster finish while allowing sound energy to pass through the surface.



The Village Hall Improvement Grant Fund helps those responsible for managing and maintaining village halls to undertake improvement work

Armourcoat will be featuring the 'quiet zone' on their stand to highlight the benefits of their acoustic system, recently granted

the Quiet Mark Award.

For more information and to register for tickets, visit www surfacedesignshow.com

Advance your acoustic and vibration knowledge with Bruel & Kjaer UK

Bruel & Kjaer UK has added a new training course to its 2020 calendar, providing delegates with a variety of optional acoustic and vibration sessions over three days.

The Acoustic and Vibration training course – taking place from 28th to 30th April – comprises specialised training sessions, so attendees can select the most relevant topics. Sessions include Labshop Introduction, which focuses on setting up the Pulse Labshop software for basic and advanced measurements.

Another session, Handheld Instruments Introduction, teaches

delegates to set up projects on the company's 2250 Sound Level meter and get the best from their most frequently used applications. Other sessions include Material Testing and SSR, Building Acoustics, Sound Intensity and Array Acoustics.

The company will also provide a thorough introduction to its data analysis software, BK Connect with a two-day course on 3rd and 4th March. Attendees will learn about this powerful tool for processing, comparing and reporting sound and vibration data. The class is for new and existing PULSE LabShop/Reflex users looking to unleash the power

of the BK Connect platform.

Participants will learn how to utilise the software to increase their efficiency with analysis, post-processing and reporting.

For those involved with test houses and shakers, the two-day Vibration Testing for Engineers and Technicians course on 10th and 11th March, provides a practical introduction explaining how to interpret vibration test specifications and apply them to a vibration test system. The course is designed for engineers new to the field of vibration testing, but also acts as a useful refresher for more experienced users. There's an optional third day of training called Vibration Hands-on Practical, which covers the LDS Laser USB Controller for sine, random, shock and mixed-mode testing.

Brüel & Kjær also provides free webinars covering a variety of topics – from general acoustic, environmental and industrial topics to more specialised product training. <https://www.bksv.com/en/Training/training-courses>



Left: The Bruel & Kjaer UK Acoustic and Vibration training course is scheduled from 28th to 30th April

New £3m government fund could help deliver village hall acoustics upgrades in England

Excessive noise and poor speech intelligibility within village halls in England could become a thing of the past thanks to the launch of a new £3m government fund, which enables trustees to apply for grants to upgrade their facilities.

The Village Hall Improvement Grant Fund is issuing awards for up to 20 percent of improvement costs, with a minimum grant of £10,000 and a maximum grant of £75,000 available. Applications, which are being administered by the rural community support charity, Acre, will need to be finalised by the end of March 2020, unless the fund is fully committed sooner.

The England-only funding is designed to help trustees and those responsible for managing and maintaining village halls to undertake major improvement work in order to make their facilities useable, safe and practical for today's wide variety of community activities. This can include improving



the acoustics, which is often poor in village halls due to excessive sound reverberation resulting from hard wooden floors, surfaces and furniture, solid walls – combined with very limited soft materials such as furnishings.

Sound Reduction Systems, who have worked with many village hall trustees to improve the acoustics

within buildings, can help anyone interested in making sound improvements as part of their upgrade programme.

Sound Reduction Systems offers village hall trustees a quick, free estimate and specification with its online 3-Step-Estimator – visit: www.soundreduction.co.uk to use this tool or find out more.

Above: The Village Hall Improvement Grant Fund helps those responsible for managing and maintaining village halls to undertake improvement work

New acoustics, ventilation and overheating guide set for launch

After almost two years of research, the Association of Noise Consultants (ANC), is launching its Acoustics Ventilation and Overheating (AVO) Residential Design Guide.

The guide provides a resource for practitioners and designers to balance the interdependence of noise, ventilation, and overheating in the acoustic assessment of new residential developments.

Intended for the consideration of new residential developments that will be exposed predominantly to airborne sound from transport sources, and to sound from mechanical services that are serving the dwellings in question, ANC sought cross-industry consultation to obtain input from a range of sectors for the project, including building services and environmental health.

Dan Saunders, Chairman of the ANC said: "We've received a considerable amount of support and interest from organisations including

the IOA, CIBSE and CIEH, who recognise the need for more guidance and closer collaboration in this area of work.

"The issue of noise, ventilation and overheating is a pressing one, particularly in light of the changing climate patterns and drive towards more energy efficient homes, and the AVO guide will provide a useful reference point in an issue of growing significance."

Information to help avoid potential pitfalls is featured in the guide, including health and wellbeing risks for occupants, design risks for consultants and legal risks for developers. It also includes an explanation of ventilation requirements under the building regulations and in Approved Document F, along with typical ventilation strategies and associated noise considerations, as well as an explanation of the overheating assessment methodology described by CIBSE TM59.

As supplementary guidance to the Professional Planning Practice Guidance (ProPG): New Residential Development, the Acoustics Ventilation and Overheating (AVO) Residential Design Guide provides a consistent and complementary approach to the acoustic assessment.

It recognises that there is not a 'one-size fits all' style assessment and sets out the potential range of acoustic criteria and guidance relating to different ventilation and overheating conditions for both environmental noise ingress and building services noise and concludes with a worked example of the application of the AVO Guide, including indicative design solutions.

The guide can be viewed at <https://www.association-of-noise-consultants.co.uk/avo-guide/>



Revolutionary thinking at Passivhaus Harris Academy

High performance ceiling and wall systems made a valuable contribution to the innovative £40m Harris Academy Sutton, South London – the first secondary school in the country to be built to Passivhaus energy performance standards.

The main tenets of the ideology include high performance, multi-layered glazing and increased insulation to create air-tightness that is eight times better than current building regulations, and the use of natural and recycled building materials. Along with mechanical ventilation, this style of construction results in major savings on energy costs and provides excellent air quality and stable temperatures.

Products that are recyclable, or incorporate recycled material, help to reduce the building’s ecological footprint and excellent thermal insulation properties and high light reflectance help to minimise the need for power to regulate heat and light.

Acoustic ceiling and wall systems play an important role at Harris Academy, which has exposed concrete or cross laminated timber soffits. Project architects – Architype – wanted to expose as much of these materials as possible for both aesthetic and practical reasons. Architect, Mark Martines said: “The ceiling we chose can be installed around slab soffits and the linear bulkheads, which are used to distribute services around the building. This offers good sound control, absorption and reverberation and allows us design freedom without compromising on performance. Their cut-to-fit capability also reduces material waste.”

Willmott Dixon Construction Manager, Graham Thompson, said: “Rockfon supplied systems for use throughout the school, from its sports hall where impact resistance was key, to teaching areas, toilets and food tech spaces – each with their own demands in terms of performance characteristics.”



The sports hall at Harris Academy



Rockfon supplied systems for use throughout the school

New acoustic drainage CPD

Marley Plumbing & Drainage has introduced a new CPD on the benefits of an acoustic drainage system.

Good acoustic design is becoming an increasing priority throughout the construction

industry, and poorly specified drainage systems have the potential to create excess levels of noise. This latest CPD: ‘The Benefits of Using an Acoustic Drainage System’, explores the issue of noise within a building’s soil and waste system

and discusses how specifiers can work to reduce these sound levels, by first considering the design of all pipes, stacks and brackets.

Adam Gatrell, Technical Sales Manager at Marley Plumbing & Drainage, said: “It is evident that the issue of acoustics in the plumbing sector is now a matter of wellbeing. As a result, we believe that it is important to consider how building’s acoustics should be considered at the specification stage.

“This CPD will provide participants with an understanding of airborne and structure-borne sound within soil and waste systems, as well as a detailed overview on the ways in which these sound levels can be reduced to provide a quiet and comfortable environment.”



Left: The Marley Plumbing & Drainage CPD will provide participants with an understanding of airborne and structure-borne sound within soil and waste systems



UKAS accredited calibration facility, see UKAS website for scope of UKAS accredited calibrations offered: anv.ms/ukas



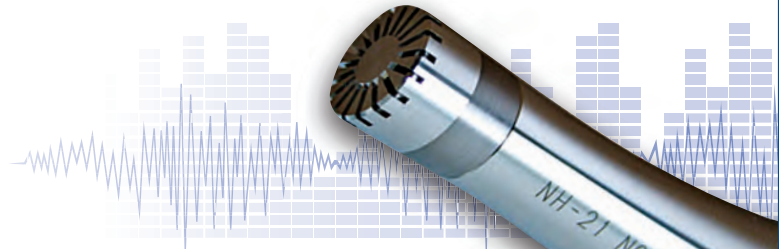
SALES - HIRE - CALIBRATION

One-Stop Shop for Acoustic & Vibration Calibration

- Sound Level Meters
- Acoustic Calibrators & Pistonphones
- Microphones*
- Octave/Third Octave Filters
- Accelerometers*
- Vibration Meters*
- Tapping Machines
- Reverberation



*not accredited by UKAS



FOCUSED ON:

- Fast Turnaround
- Competitively Priced
- Customer Service

"We are very pleased with the excellent service we received from ANV in recent months. Most notably, they provided an efficient and hassle free calibration service with which we couldn't have been more satisfied." - Jack Richardson
Hilson Moran Partnership Ltd

[WWW.NOISE-AND-VIBRATION.CO.UK](http://www.noise-and-vibration.co.uk) | CALIBRATION@ANV.UK.COM | [01908 642846](tel:01908642846)



Make better spaces with the complete software solution for room acoustics



Start your free trial at www.odeon.dk

Elegant and user friendly interface

Fast and reliable simulations and measurements

Available as: **B** Basics, **I** Industrial, **A** Auditorium & **C** Combined

L-Acoustics helps Institute of Physics achieve ambitious aims

The Institute of Physics for the UK and Ireland (IOP) has an impressive new London HQ, built from the ground-up with a modern architectural statement that has AV designed-in from the start.

The site is an old plumbing supplies shop in the developing creative industries area near Kings Cross. Leaving just the original brick façade, it has been transformed into something completely new. The polished concrete structure of this £13.5 million project brings focus to the large screens and interactive experiences that will greet more than 200,000 IOP visitors every year. It is a space that required visual and audio technologies to be as much a part of its essence as the concrete itself.

Recursive AV, the AV consultant on the project liaised with the architects for more than two years, allowing them to achieve the best visitor experience possible.

Recursive MD, David Yates, specified L-Acoustics Syva and Kiva for the audio solutions. "We really felt that the IOP deserved a high-end audio approach," he explains. "They have people visiting from all over the world; academics, policymakers and broadcasters etc, so we wanted to be sure that the sonic quality and the visual impact would be absolutely correct, and that the system could cope with a challenging space. We needed to deliver fantastic intelligibility and a consistent sonic signature in several configurations."

Good planning and predictable results were key for this project, as the building design did not allow room for mistakes. The building's interior makes a feature of clean, polished concrete, so would not tolerate having any cables or cable conduits on display. Cable routes had to be precast in the concrete and additional holes were out of the question as the water used in drilling could have stained it. This meant that acoustic modelling was key to the planning stage, so speaker positions could be worked out before construction.

A special feature of the IOP building is a large, flexible auditorium that can be divided into two

sections with a movable wall, and another front wall that can be removed, opening into a large, triple-height gallery area beyond. The centrepiece of the gallery is a custom-made 11-metre wide screen that uses three edge-blended projectors for its expansive image. On Recursive's advice, the project architects actually increased ceiling heights in that area and turned the whole space through 90 degrees. A big priority for Yates was ensuring that the flexibility of this space would be served by a consistent audio signature.

Recursive selected L-Acoustics Syva for left and right speakers around the main gallery screen, along with four 108P and an SB15P sub that can be deployed in flexible ways around the gallery, dependent on need. Two Kiva II are hung in the auditorium, left and right, with two more SB15m subs.

"We needed the systems to work as one when the space was opened out, and we also needed the components to work aesthetically," states Yates. "Syva was designed with art galleries in mind and works for this environment. Also, the gallery suffers from a high reverb time, and Syva deals with that very well.

"For the auditorium we needed a wide stereo image and something that would punch, while keeping the sound consistent when it's opened up. It's also got a low ceiling. Kiva II is a compact box and works really well in that area."

Yates acknowledges that the IOP facility has been a challenging system to design but notes that the flexibility of the L-Acoustics range and the accuracy of Soundvision's predictions played a big part in getting it right the first time.

"We've had a long history of working with L-Acoustics. It's a brand we know and trust. As well as the tools they provide, the support they give on the ground is excellent. They're always there for us and we know that we are collaborating on projects as a partnership.

"This is not a typical L-Acoustics system; we haven't followed the rule book rigidly. However, the systems are so well matched across all the ranges that we were confident it would work, and it did."

Brüel & Kjær launches a robust and reliable pressure-field microphone

To help engineers and acousticians achieve accurate measurements in everyday tasks, Brüel & Kjær has created a miniature microphone ideal for high-precision acoustic measurements tests within confined spaces – Type 4988-A.

The ¼ inch low noise microphone is optimised for use in pressure-field applications such as use with couplers, measuring close to audio device sound ports or flush-mounting. The microphone also works as a general measurement device when the operator makes use of the inclusive electronics corrections; these include response at different angles of incidence in a free field, corrections in a diffuse field or grid influence.

The microphone has a laser welded diaphragm and is paired to a ¼" Constant Current Line Drive (CCLD) preamplifier. This connects to CCLD input conditioning, ensuring all measurements meet the industry standard IEEEP1451.4 V1.0.

Type 4988-A's all-titanium design is resistant to corrosion and suitable for a range of acoustic tests, even in the presence of magnetic fields. It's practically immune to temperature and humidity changes; this extreme stability, combined to a minimal spread in frequency response between individuals (guaranteed ±1 dB from 20Hz to 20KHz), make it ideal for integration in a production line or for general audio measurements.

Constructing efficiency from above

To help counter the increased building demand of tomorrow, a drive towards greater construction efficiency is required. While the building envelope is an obvious focus for building faster and more effectively, the internal space should not be overlooked.

Involving ceiling manufacturers at the beginning of the design and specification stage is critical to establish a collaborative, transparent working environment involving all parties. It ensures that that key concerns are raised earlier, leading to less rework down the line and a team that works together clearly and cohesively also works more efficiently.

In our always-on world, everyone expects to be able to get what they want with a single tap, click or call, which is why Armstrong Ceiling Solutions provide everything from industry-leading products and

expert support right through to training. For example, in the UK 90 percent of Armstrong products are available next day, while a 24-hour call-to-site service is also available.

Armstrong Ceiling Solutions builds efficiency into its portfolio and to complement their range of tiles, they have developed a range of highly engineered products, including grids and canopy kits, which simplify installation and maintenance, helping minimise time on site and accelerating project completion.

Among Armstrong Ceiling Solution's range are products certified as 'Cradle to Cradle' (C2C), which means they're responsibly manufactured and endlessly re-usable. Already a requirement for certain projects in the United States and Europe, C2C is sure to become more widespread, helping contractors provide transparency and protecting our environment for future generations.

Armstrong Ceiling Solutions' highly engineered products help to minimise time on site and accelerate project completion



Armstrong Ceiling Solution's 'Cradle to Cradle' products are responsibly manufactured and re-usable



New Norsonic Noise Compass

Unattended environmental noise measurements are commonly undertaken to measure background noise, to check compliance to established noise limits and to investigate complaints for example.

It is not cost effective to make manned measurements for durations of longer than a few hours, and this often raises the question; how do you know if you have a good measurement and you are measuring the sound you thought you were?

To assist with this, audio recordings are often recorded in parallel with sound levels to help identify the source of the noise. However, it is time consuming to listen to and analyse these recordings and they can also be inconclusive.

Advances in signal processing has meant that sound level meters can process far more information than previously possible. Norsonic have introduced a nine-channel microphone for environmental measurements to help automate the location of noise sources. Eight of the channels are MEMS microphone devices, which are phase matched. The delay in the signal reaching the microphones enables a location to be identified in a horizontal and vertical orientation. This 3D functionality enables, for example, aircraft to be picked out from normal community noise.

The ninth channel is a standard class one system, which has type approval to ensure that overall sound levels are certified with the highest levels of accuracy.

The system uses PoE so a single LAN connection powers the system and collects all the data directly from the Lan port of the Norsonic 145 sound level meter. Data can be downloaded locally and displayed in software or the complete measurement can be analysed in the NorCloud system using the 4G/WiFi connectivity built into the Nor145 sound level meter.

Nor Cloud has been developed to visualise the direction of the sound. The system has a sector display and it identifies resulting markers and directional alerts can also be set. Using this, LAeq is easily calculated for sound coming from the site of interest only. This enables efficient and accurate analysis without expensive time on site.



Above: Norsonic's nine-channel microphone for environmental measurements

NoiseMap five

Mapping the way to a quieter future...

... for smaller consultancies

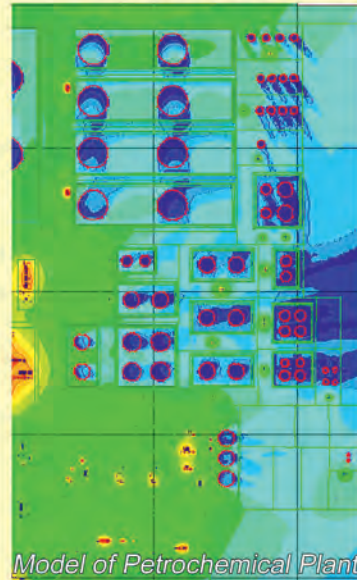
- Pay-as-You-Go Licence - modest upfront cost
- Pay only when NoiseMap is running
- All UK standard calculation methods available:
Road, Rail, Construction, Industrial, Minerals
- Easily create noise models from capture of screenshots or scan of plans
- Overlay of noise maps onto base plans
- Context-sensitive built-in help & sample models
- On-line videos and support by email
- Long-established, proven reliability

For details see our website:

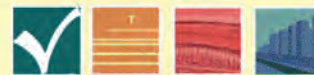
www.noisemap.com

email: rogertompsett@noisemap.com

tel: +44 20 3355 9734



NoiseMap



NTi
AUDIO

NOISESCOUT - A SOLUTION THAT SIMPLY WORKS

Unattended Noise Monitoring

Live level reporting and alerts.



New artificial head for low noise measurements of ANC headphones and more

Measuring very low signal levels like idle noise of Active Noise Cancellation (ANC) headphones requires highly accurate measurement equipment. With HMS II.3-LN (Low Noise), HEAD acoustics is launching a new artificial head that is suitable for low noise measurements of close to the ear sound sources. Ear simulators with highly sensitive microphones assure a very low inherent noise of 16 dB SPL(A) of the binaural artificial head measurement system. Therefore, it is ideally suited to assess the quality of ANC headsets and headphones as well as other close to the ear audio and telecommunication equipment. HMS II.3-LN complies with the international standard ITU-T P.58 and is based on the standards ITU-T P.57 and IEC 60318-4.

“When evaluating the quality of ANC devices, the idle noise should be considered, since this can be disturbing for the user. HMS II.3-LN was specially developed to meet this challenge and is currently the only system on the market that enables precise measurements even at low signal levels”, explains Dr Hans W. Gierlich, Managing Director Telecom, at HEAD acoustics.

Due to its maximum sound pressure level of 149 dB SPL HMS II.3-LN is also suitable for medium and high level measurements. The ear simulator covers the complete human hearing range. The new artificial head is equipped with a two-way mouth loudspeaker capable of fullband measurements. The transmission range in sending direction is from 50 Hz to 20 kHz and in receiving direction from 3 Hz to 20 kHz. Like all artificial head measurement systems from

The new HEAD acoustics artificial head is suitable for low noise measurements of close to the ear sound sources

HEAD acoustics, HMS II.3-LN can be optimally controlled via the measuring and analysis software ACQUA. The equalisation is comfortable and automated.



Vicoustic wins award for sustainability

The VMT line of acoustic solutions created by Vicoustic has been recognised by the Lusio-French Chamber of Commerce and

Industry, winning the 2019 innovation trophy for the introduction of its new sustainable raw material, VicPET Wool.



PET Wool is a non-woven textile predominantly made from recycled plastic bottles, with superb acoustic performance. Following extensive research and testing, this material is now used in a wide range of products, under the Virtual Material Technology (VMT) label, including acoustic panels and clouds such as Flat Panel VMT, ViClouds VMT, VicWallpaper, VicOffice, and Vixagon.

Producing acoustic solutions in a sustainable and environmentally conscious way has been at the forefront of Vicoustic’s mind. Since they started production with this material, they have manufactured acoustic products using more than 250 tons of plastic waste, roughly equivalent to 22 million standard PET bottles.

Made from recyclable PET bottles (65%), VicPET Wool meets EuroClass B fire regulations and is certified to OEKO-TEX 100 Standard, and is completely recyclable at the end of its life.

Institute Sponsor Members

Council of the Institute of Acoustics is pleased to acknowledge the valuable support of these organisations

Founding Key Sponsors **Brüel & Kjær**



Key Sponsor



Acrefine Engineering Services Ltd	Cole Jarman Ltd	Monarfloor Acoustic Systems Ltd	SITMA
Advanced Noise Solutions Ltd	Direct Acoustic Solutions Ltd	Noise Solutions	Sound Reduction Systems Ltd
AECOM	Echo Barrier Ltd	noise.co.uk	Spectrum Acoustic Consultants Ltd
Amorim Cork Composites	EMTEC Products Ltd	Nova Acoustics	Wakefield Acoustics
AMS Acoustics	Farrat Isolevel Ltd	NPL (National Physical Laboratory)	Waterman Infrastructure & Environment Limited
ANV Measurement Systems	Finch Consulting	Peter Brett Associates	WSBL Ltd
Apex Acoustics	Gracey & Associates	Pliteq (UK)	WSP
Armstrong World Industries Limited	H&H Acoustic Technologies	RBA Acoustics	
Arup Acoustics	Hann Tucker Associates	Rockfon	
Bickerdike Allen Partners LLP	Hayes McKenzie Partnership	Saint-Gobain Ecophon Ltd	
Campbell Associates	Hilson Moran Partnership Ltd	Sandy Brown Associates	
Christie & Grey Ltd	Isomass Ltd	Sharps Redmore	
Clement Acoustics	KP Acoustics Ltd	Siderise Group	
CMS Danskin Acoustics	Mason UK Limited		

Applications for Sponsor Membership of the Institute should be sent to the Milton Keynes office. Details of the benefits will be provided on request. Members are reminded that only Sponsor Members are entitled to use the IOA logo in their publications, whether paper or electronic (including web pages).

Committee meetings 2020

DAY	DATE	TIME	MEETING
Thursday	6 February	11:00	Publications
Thursday	27 February	1:30	Education
Tuesday	3 March	10:30	Diploma Examiners (London)
Wednesday	4 March	10:30	Executive
Wednesday	18 March	10:30	Council
Tuesday	24 March	11:00	CPD Committee
Thursday	26 March	10:30	Meetings
Tuesday	7 April	10:30	CCWPNA Examiners
Tuesday	7 April	1:30	CCWPNA Committee
Thursday	23 April	10:30	Membership
Thursday	7 May	11:00	Publications
Thursday	14 May	10:30	CCHAV Examiners
Thursday	14 May	1:30	CCHAV Committee
Wednesday	20 May	10:30	Executive
Tuesday	26 May	10:30	Research Co-ordination (London)
Wednesday	10 June	10:30	Council
Tuesday	23 June	10:30	ASBA (Edinburgh)
Tuesday	14 July	10:30	Distance Learning Tutors WG
Tuesday	14 July	1:30	Education
Wednesday	15 July	09:30	CCBAM
Wednesday	15 July	10:30	CCENM Examiners
Wednesday	15 July	1:30	CCENM Committee
Thursday	16 July	10:30	Meetings
Thursday	6 August	10:30	Diploma Moderators Meeting
Thursday	13 August	10:30	Membership
Wednesday	9 September	10:30	Executive
Thursday	17 September	10:30	Engineering Division
Wednesday	23 September	10:30	Council
Tuesday	29 September	11:00	CPD Committee
Thursday	8 October	10:30	Meetings
Thursday	15 October	11:00	Publications
Thursday	29 October	10:30	Membership
Tuesday	3 November	10:30	Research Co-ordination (London)
Tuesday	10 November	10:30	CCWPNA Examiners
Tuesday	10 November	1:30	CCWPNA Committee
Wednesday	11 November	09:30	CCBAM Examiners
Wednesday	11 November	10:30	CCENM Examiners
Wednesday	11 November	1:30	CCENM Committee
Thursday	12 November	10:30	Diploma Tutors and Examiners
Thursday	12 November	1:30	Education
Tuesday	24 November	10:30	ASBA Examiners (Edinburgh)
Tuesday	24 November	1:30	ASBA Committee (Edinburgh)
Wednesday	25 November	10:30	Executive
Wednesday	9 December	10:30	Council

Refreshments will be served after or before all meetings. In order to facilitate the catering arrangements it would be appreciated if those members unable to attend meetings would send apologies at least 24 hours before the meeting.

Institute Council

Honorary Officers

President

Prof B Gibbs FIOA
Liverpool University

President Elect

S W Turner Hon FIOA
ST Acoustics

Immediate Past President

L J Webb FIOA
Wood Group

Hon Secretary

R Richardson MIOA
RBA Acoustics

Hon Treasurer

D Wallis MIOA
Cirrus Research

Vice Presidents

J Hill MIOA
AAF Ltd

Dr P A Lepper MIOA
Loughborough University

G A Parry FIOA
ACCON UK

Ordinary Members

Dr K R Holland MIOA
ISVR

Dr M R Lester Hon FIOA
Lester Acoustics LLP

P J Rogers FIOA
Sustainable Acoustics

E Shanks MIOA
Health & Safety Laboratory

V L Stewart MIOA
Atkins Acoustics

Dr C Barlow MIOA
Solent University

C Hurst MIOA

Three Spires Acoustics Ltd

Dr B Fenech MIOA

Public Health England

A Lamacraft MIOA

ACCON UK

Chief Executive

Allan Chesney
Institute of Acoustics



Gracey & Associates

Setting Hire Standards 

Graceys have been supporting our customers for over 45 years. With our extensive range of sound and vibration monitoring equipment, we are confident we can offer you a hire solution that meets your needs.

Contact us on 01234 708835 : hire@gracey.co.uk : www.gracey.co.uk



CAMPBELL ASSOCIATES
SOUND, VIBRATION & AIR SOLUTIONS

Cadna  A[®]

CADNAA 2020 SPRING TRAINING

FOR BEGINNERS AND EXPERTS
EMAIL: HOTLINE@CAMPBELL-ASSOCIATES.CO.UK
TO BOOK YOUR PLACE TODAY

THE ENVIRONMENTAL INSTRUMENTATION SPECIALISTS

Noise, Vibration, Dust & Weather all on one website



Available for Purchase & Hire

- A Truly Web-based Solution
- No Software Required
- Fully Certified & Site Proven Hardware

Simultaneous, MCerts PM10 & 2.5 Dust Monitoring based on the TSI DustTrack™ DRX



Imitation is the sincerest form of flattery but don't be fooled.
Not all Remote Systems are created equal.

- Real Time (1 minute uploads) Data; Essential for Pro-Active Control
- Data is available from the server (you don't have to download it from instruments in the field)
- Noise and Vibration sensors excellent for use beyond the monitoring
- Google Maps based interface
- Designed for professionals
- Full control and access to data from any web-enabled device
- A minimum of 5 simultaneous limits available for each sensor
- Up to 24 sets of limits per day and different limits each day

Rion VM-56 - Groundborne Vibration Meter The Consultants' Instrument



- Intuitive User Interface - Just Like Rion NL-52
- Simultaneous VDV, PPV, DF & Displacement
- Equally suited to Attended or Long-term Unattended measurements
- Live to Web Monitoring with LivePPV / LivEnviro
- Third octave and wav file recording options available
- BS 6472:1, ISO 8041, DIN 45669, BS 5228: 2 and BS 7385: 2 compliant

Rion NL-52 Setting the Standard for Environmental Noise Measurement



- Class 1 - PTB Type Tested with and without Outdoor Microphone Protection
- Low Power Consumption - 10 days on a single 12Ah gel-cell battery
- Single 130dB range
- Unrivalled Reliability
- Easy to Use
- CSV data on an SD card
- 10 msec sampling as standard
- Options transferable between meters
 - Audio (WAV) recording
 - Octave/Third Octave
 - FFT
 - Reverberation Time

