in this issue...
High Court judgement sends shockwaves

plus... 44th Annual Report of the Council

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Dear Members

As I write this Bulletin letter, we're just two weeks away from our annual conference in Cardiff. We'll hear at the conference about how Wales has put the interests of its people at the heart of its legislative structure through the Well-being of Future Generations Act. If you're not aware of the Act and how the Welsh Government proposes to use it to influence legislation and guidance, it's worth a look. Their aspiration is to improve the social, economic, environmental and cultural well-being of their communities.

At IOA head office, our team continues to prepare us for the move to Milton Keynes. The exact timing of the move is not definite yet and sadly, not all of our team feel able to make the move with us. As this could be the last Bulletin before the move, I would like to extend my thanks, and that of our membership and students, to our head office staff for their substantial contribution to the success of the Institute. To those who are able to come with us, we appreciate your continued support. To those unable to move, we wish you the best for your future.

**IOA annual report**

You'll find the IOA annual report with this issue of the Bulletin. As ever, it's a reminder of the massive contribution of our volunteers to the success of the Institute. I would like to thank all those who volunteer and those who attend our events for continuing to give their time to keep moving the Institute forward. For those of you unable to attend events in person, we are making progress with our learning platform and developing our skills for successful electronic meetings. We're not as far along with these as we'd hoped, but we are making progress with our learning platform and developing our skills for successful electronic meetings. We're not far along with these as we'd hoped, but we are making progress.

Browsing through the annual report it's clear that we've provided a substantial programme of events, many of which give members information on updated standards and guidance. The BS4142 sessions are a great example of this, with members taking the opportunity to actively engage in the workshops. Response to the 2014 version has been mixed – perhaps the greater flexibility and inclusion of consideration of context have been changes that have left some feeling uncomfortable. Change in itself can be unsettling, but it can also be an opportunity to think differently about things and encourage us to take a different path or challenge the status quo.

**Edinburgh International Science Festival**

This year, we are sponsoring activities at the Edinburgh International Science Festival (EISF) for the second time. We were invited to the presentation ceremony for the Edinburgh Medal, which was awarded to Professor Cordelia Fine. She gave an enlightening and often humorous address around her work on the understanding of gender stereotypes, which actively challenges gender perceptions. The address included some surprising (and worrying) examples of conclusions from scientific studies, which were just not proven by evidence from the studies. Those same studies were behind the newspaper headlines that many of us have quickly and without question assimilated into our understanding of gender differences. I'm hoping that EISF might post the presentation so that we can publish a link – but in the meantime, you can pick up some of Professor Fine's talks on YouTube. I'll be putting her latest book, Testosterone Rex (about risk-taking and gender stereotypes) on my Christmas list, while remembering with a smile the perpetual fight with my sister over a yellow toy concrete mixer.

Jo Webb, President

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For up-to-date information visit www.ioa.org.uk
The Institute has continued to serve the interests of its members through its established programmes in the areas of education, professional development, meetings and publications, and by providing representation in areas such as the Engineering Council, Standardisation and International Affairs.

The Trustees confirm that in the exercise of their powers as charity trustees they have had due regard to the published guidance from the Charities Commission on the operation of the public benefit requirements, and the aims of the charity are carried out for the public benefit.

The strategic aims confirmed by Council remained as:
1. Advise public policy with regard to the impact and nature of acoustics
2. Increase public awareness of good acoustic design
3. Increase understanding of acoustics by other professionals
4. Developing tomorrow’s professionals
5. Providing better support for members
6. Increasing members’ professional understanding.

To achieve these aims Council agreed the following objectives against which progress in 2017 is listed.

<table>
<thead>
<tr>
<th>Objective</th>
<th>Progress in 2017</th>
</tr>
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<tbody>
<tr>
<td>To advise policy makers on acoustics</td>
<td>The Institute has regularly sent a representative to the Parliamentary and Scientific Committee meetings and has supported the Campaign for Science and Engineering (CaSE). The President has attended a round table workshop with the Secretary of State for Industry and the Parliamentary Liaison Group has given evidence to select committees related to housing and the environment.</td>
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<tr>
<td>Increase public awareness of good acoustic design</td>
<td>The Institute in partnership with the ANC and CIEH published Planning and Noise: Professional Practice Guidance on Planning &amp; Noise - New Residential Development as an advisor document for the sector. It is planned to recruit marketer in 2018 to improve the Institute's presence on social media.</td>
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<tr>
<td>Create opportunities for other professionals to gain a better understanding of acoustics and its interaction with their specialist field</td>
<td>The Institute continues to be involved in the joint working group on 21st Century PEIs Professional practice and guidance document on noise-sensitive development (jointly commissioned with the ANC) was published.</td>
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<tr>
<td>To develop links with undergraduate students</td>
<td>The student e-zine was produced once in 2017 but has been stopped pending a review of student engagement post the recruitment of a digital marketer in 2018. Student membership increased from 397 at the end of 2016 to 467. The Institute ran the ICSV24 conference in London with 1050 attendees from over 50 countries; approximately 20 students helped out at the event. Young members Group have actively engaged with students at both ISVR and Salford – see Young Members Report</td>
</tr>
<tr>
<td>To support school children’s understanding of acoustics</td>
<td>The Institute sponsored Generation Science teaching in primary schools and secondary schools’ Careers Hive in Scotland, in partnership with the Edinburgh International Science Festival in 2017. The Institute has agreed to doubled its sponsorship for 2018. A project using noise monitoring equipment on a school close to Edinburgh Airport is under development. It is hoped that this project can be used by other schools.</td>
</tr>
<tr>
<td>To improve the operational efficiency of the Institute</td>
<td>A contract to develop an education management system and a learning platform was commissioned. Work started in late 2017 and is due to be completed by June 2018</td>
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<tr>
<td>To develop mechanisms for supporting members’ professional development</td>
<td>10% monitoring of members’ CPD continued. A series of conferences and events was held during the year, including online events attended by groups across the UK. A learning platform capable of delivering online CPD courses was planned, has been commissioned, and is due to be completed by June 2017.</td>
</tr>
</tbody>
</table>
Committee welcomed four young members to its ranks at the outstanding service to the Committee over several years. The his replacement; Jonty Stewart has been appointed as Vice March 2017 meeting and Bob Peters has been appointed as Big Bang Fair 2020. Festival in 2017 and is considering exhibiting in the national decision to participate in the Edinburgh International Science continue to be monitored and pursued including local through Acoustics Ambassadors on the Committee, using demonstration equipment purchased in 2012. Also, and devolved guidance (e.g. Scottish and Northern Ireland regulations and guidance, there is the possibility of increasing has taken advantage of this opportunity in 2016-17. However, of learning outcomes. This may include on-line learning and 'formal' CPD, where there is a defined syllabus and assessment continued to be used for overseas and DL candidates. In 2017, the numbers taking and passing the Certificate Courses were as follows: Hand-Arm Vibration, 21 students, 19 passes; Environmental Noise, 142 students, 129 passes; Building Acoustics Measurement, 45 students, 42 passes (including presentations made in Ireland, Workplace Noise Risk Assessment; 50 students, 32 passes. The Certificate of Proficiency in Anti-Social Behaviour (Noise) continues to be run in Scotland by Bel Noise Courses and by Strathclyde University, 8 students, 8 passes. Since 2011, any members have been able, for CPD or other reasons, to register for additional specialist modules. Nobody has taken advantage of this opportunity in 2016-17. However, in view of recent changes in Planning and Assessment regulations and guidance, there is the possibility of increasing numbers on the Regulation and Assessment of Noise Module by promoting it as ‘stand-alone’ updating. The Committee is also keen to work with groups and branches to support “formal” CPD, where there is a defined syllabus and assessment of learning outcomes. This may include on-line learning and topics for consideration include ‘sustainable acoustics’, new acoustic guidance (e.g. BS 4142:2014, BB93:2014, BS 8233:2014) and devolved guidance (e.g. Scottish and Northern Ireland Building Regulations).

'You’ve Been Banned’ presentations in schools continue using demonstration equipment purchased in 2012. Also, through Acoustics Ambassadors on the Committee, opportunities for promotion of acoustics to school children continue to be monitored and pursued including local Big Bang fairs. Education Committee supported Council’s decision to participate in the Edinburgh International Science Festival in 2017 and is considering exhibiting in the national Big Bang Fair 2020.

Simon Kahn resigned as Chair of the Committee at the March 2017 meeting and Bob Peters has been appointed as his replacement; Jonty Stewart has been appointed as Vice Chair. The committee expressed its gratitude to Simon for his outstanding service to the Committee over several years. The Committee welcomed four young members to its ranks at the June meeting.

The year came to an end with a number of promising initiatives including the formation of a STEM sub-committee; support from Council for Kapil Thirwani of Munro Acoustics LLP to promote and develop IOA courses in India; providing assistance with syllabus and learning material for the acoustic apprenticeship scheme; and an initiative led by Alistair Somerville and Scottish Branch to develop a course in acoustics for a school in Edinburgh relating to their school being used as a site for monitoring noise from aircraft using Edinburgh airport.

The Committee continues to be indebted to the support of its members, course tutors and examiners, to the work of the Education Manager Keith Attenborough, supported by Education Administrator Hansi Parmar and other members of office staff.
into the form and structure of reports, thereby creating a more consistent approach.

We continue to offer employers the opportunity for presentations on professional registration and are happy to run webinars and face to face events. This year we ran an event for our near neighbours in AECOM at their St Albans office. The Institute continues to be represented by the Engineering Manager at the Engineering Council Heads of Membership meetings where best practice and emerging issues are discussed between all licensed members.

Medals and Awards Committee
The 2017 awards were made at various meetings during the year.

The Raleigh Medal was awarded to Juan A. Gallego-Juárez at the ICSV24 banquet and the W B Stephens Medal was awarded to Murray Campbell.

The A B Wood Medal 2017 was awarded to Jan Dettmer. The Peter Lord award was shared between RBA Acoustics and Free Field Technologies.

An Honorary Fellowship was awarded to Richard Perkins for his exceptional service to acoustics and the Institute.

Bill McTaggart, Paul Michel, Nicola Stedman-Jones, Brian Hemsworth and Simon Kahn received awards for Services to the Institute. Jeremy Newton will receive his in 2018.

Floyd Toole was awarded the Peter Barnett Memorial Award and Alex Southern the IOA Young Persons Award for Innovation in Acoustical Engineering.

Beth Paxton was presented with an award for the best performance in the IOA’s 2016 Diploma and Alexander Dickschen received the Professor D W Robinson Prize which was awarded at their graduation ceremony at ISVR in July.

Meetings Committee
The Meetings Committee met four times in 2017.

The membership of the Committee has changed slightly since last year’s report. The Chair of the Committee remains as H Notley and C Turner remains as Secretary and Young Member. C Skinner, R Woodward and M Lester continue to be valued members of the team. P Rogers’ input ensures the meetings programme is designed with the aims of the Sustainable Development Task Force in mind at all times and we are also benefitting from his role in the Parliamentary Liaison Group. We were also delighted to welcome ex-President Bridget Shield to join us in a role looking at building greater links with other institutions. We hope to target those organisations with similar aims to our own or those whose members work most closely with our members. Many of our members may also be members of these targeted organisations – examples include RIBA, CIBSE, CIEH and so on.

The Committee presided over the organisation of 10 events covering a wide variety of topics. This was slightly less than in recent years and the reason is that many members of the IOA, including committee members, were involved in the highly successful ICSV24. The International Congress of Sound and Vibration was held in London this year and special thanks are due, as always, to Linda Canty for her fantastic efforts in coordinating the local and international organising committees, resulting in an event which was thoroughly enjoyed by over 1000 delegates from around the globe. This event replaced our annual conference, but we will be back in April with Acoustics 2018 in Cardiff celebrating the relaunch of the Welsh Branch.

In addition to ICSV there were 7 single-day meetings/workshops and a two-day event; the annual Reproduced Sound conference, this year held in Nottingham. The feedback from the events’ questionnaires in general continues to be very favourable and many of the proposals for future meeting topics are passed to the relevant specialist group. A further one-day meeting saw the launch of the UK Acoustics Network, for which an EPSRC grant has been awarded. The vision of the UKAN is to bring together the internationally leading, but disparate, UK acoustics research community, to promote acoustics in the UK both nationally and internationally and to provide a coherent single point of access to acoustics research for industry and governmental agencies.

The financial performance of meetings has continued to be closely monitored and we continue to review performances and learn from our experiences so that deficits may be minimised in the future and events continue to generate a moderate surplus. This year the Committee saw a surplus of around £26k, about £14k of this was due to ICSV, leaving £12k associated with our more traditional format of events. Additionally, the Committee made progress on its aims to develop the digital meetings strategy and increase communication between the centre, the specialist groups and the regional branches. A demonstration of the equipment available to enhance digital capabilities at meetings was presented at our annual strategic planning meeting to representatives from Regional Branches and Strategic Groups. This equipment is already available to all Branches and we plan to extend its use to the specialist groups in due course.

Membership Committee
The committee met four times during 2017 under the chairmanship of Paul Freeborn.

Mike Breslin was invited to join the Committee and he accepted. Having served two terms of three years as Committee Chair Paul Freeborn stood down and Paul Shields was appointed by Council to the position.

After the revision of the Institute’s Code of Conduct last year to ensure it complied with guidance from the Engineering Council, additional guidance was published by the Engineering Council requiring further small revisions which are in the process of being drafted for approval by Council.

The CPD sub-committee continued its work through the year meeting twice to assess member’s CPD and to provide constructive advice where needed. Further work was undertaken in support of the provision of maintenance CPD guidance for members whose career position required them to maintain their current level of knowledge. Presentations on CPD were given at ‘The Art of Being a Consultant’ event and ICSV24.

At the request of Council the Committee drafted Terms of Reference (TORs) for a Professional Standards Subcommittee with a remit to raise standards of work by identifying areas in need of improvement and then assisting to provide resources such as informative articles, presentations or conferences to help raise standards. The TORs were approved by Council and the Subcommittee was convened with David Trew accepting the post of Chair. Two members of the Association of...
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Noise Consultants were invited to join the Committee and the Committee held its inaugural meeting.

One Code of Conduct complaint was referred to the Committee which was held in abeyance as it was the subject of an active planning application.

During the year 300 membership applications were assessed by the Committee; slightly less than the previous year. Of these 299 were elected to membership of various grades, representing a small decrease on the previous year’s figures. Current membership of the Institute now stands at just over 3,000 members.

The Membership Committee would like to thank Paul Freeborn for his excellent service as Chair over the last six years, and we thank him for agreeing to remain on the Committee.

The Committee would also like to thank Chantel Sankey who has done an outstanding job at running Membership and CPD.

Publications Committee
Acoustics Bulletin and Acoustics Update continue to provide a high standard of technical content, reporting news and details of the Institute’s meetings and affairs. The editor of the Acoustics Bulletin, Charles Ellis, retired in September 2017 but continued as Bulletin editor to facilitate a handover with the November/December 2017 issue being his last one. The editing and printing is now being undertaken by Warner Group led by Juliet Loiselle. Allan Chesney shortlisted and interviewed companies for the new appointment, supported and overseen by the Publications Committee. The handover has also been overseen by the Publications Committee. Feedback is being gathered for the January/February 2018 Acoustics Bulletin.

During 2017 the Publications Committee finalised a strategy plan that details the major objectives of the Committee. The Committee has continued to review the Acoustics Update, proceedings, style and format and advertising income.

The Committee has continued to increase the IOA’s social media presence and encourage recording videos of talks and presentations, to be uploaded to the IOA’s YouTube channel. An electronic calendar has been produced which can be accessed by the Institute website. Some of these 299 were elected to membership of various grades, representing a small decrease on the previous year’s figures. Current membership of the Institute now stands at just over 3,000 members.

The following developments are planned for 2018:
- developing the relationship with Warner Group and making improvements to the Acoustics Bulletin.
- during the year the Committee has been joined by Lisa Greenhalgh. A further two individuals have expressed interest and are joining on a trial basis. Bob Walker and Matthew Cassidy have stepped down from the Committee. Adam Lawrence has stepped down as Chair but has remained on the Committee as Vice Chair. Daniel Goodhand has been elected as the new Chair.

Thanks are due to all Committee members for volunteering their time and enthusiasm throughout the year: Matthew Cassidy, Scott Castle, Daniel Goodhand, James Hill, Adam Lawrence, Mike Lotinga, Jordan Mayes, Chris Middleton, Seth Roberts, Lisa Greenhalgh and Bob Walker. Special thanks are due to Charles Ellis for his work as editor for the past seven years. Special thanks are due to Bob Walker for his 11 years of service on the Committee.

Thanks are also due to IOA Office, Allan Chesney and Dennis Baylis. Lastly, thanks to everyone who contributes to the Bulletin and other publications with meeting reports, technical contributions, letters, book reviews, blog posts and everything else.

Research Co-ordination Committee
In 2017 meetings of the Research Coordination Committee (RCC) were held in May and November at the Defra offices in London. Professor Abigail Bristow is the Chair of the Committee, Professor Kirill Horoshenkov is the Secretary.

The main 2017 achievement of the Committee was the EPSRC-funded UK Acoustics Network (www.acoustics.ac.uk). The network (UKAN) grant is led by Professor Kirill Horoshenkov (University of Sheffield) and Professor Richard Craster (Imperial College) with £561,807 (£687,036 in total) in support from EPSRC.

Three years of funding commenced on 6 November 2017. The UKAN was formally launched on 27 November. The Launch Event held in the Royal Society in London was attended by approximately 150 delegates. The UKAN is focused on acoustics and pursues two main aims: (i) transfer new experimental techniques, models and scientific insights; (ii) promote mobility between universities, industry and other non-academic beneficiaries. The UKAN complements the acoustics-related activities led by the IOA. The current membership is 172 members with a balance between academia and industry.

In late 2017 the RCC organised the process and submission of nominations for REF2021 to enhance the chances of academics with an acoustics expertise serving on the panels.

These and other actions are detailed in meeting notes submitted to the IOA in a timely fashion following meetings and in the Committee Reports.

Building Acoustics Group
The focus of 2017 was to make ICSV24 in London the best it could possibly be. It was our ‘Olympics’ and a chance to show the rest of the world that the UK is at the forefront of acoustics in all fields of acoustics. It was the best attended ICSV conference ever and there were 41 papers given on Building Acoustics from members of the IOA. I would like to thank everyone in the Building Acoustics Group and Institute of Acoustics who contributed to this success.
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Much work has been done on standards and guidance documents throughout the year. These include:

- Pro PG
- BS EN ISO 12354 parts 1, 2, 3, 4 & 5
- BS EN ISO 16283 parts 1 & 2
- EN 15657 which relates to noise from building equipment
- EN 14336 which concerns noise from waste pipes
- ISO/DIS 19488 'Acoustic Classification of Dwellings'
- ISO 16283-1 'Field measurement of sound insulation in buildings and of building elements'
- Good practice guide on the control of noise from places of entertainment
- CIBSE Guide B4

We would like to thank Christina Higgins for being part of the Committee and wish her well with her new challenge in Canada. We would also like to thank Mike Wood who stepped down as our Young Member (mainly because he was no longer young) and to welcome Beth Paxton for joining the Committee as our new Young Member. Rory Sullivan also stepped down from the Committee after a long stint – we thank him for all of his efforts over the years.

The programme for the Annual IOA Conference ‘Acoustics 2018’ in Cardiff on 23 and 24 April is almost complete with a full complement of Building Acoustics abstracts accepted. We are looking forward to meeting old friends and making new ones.

We are also hoping to organize a one-day conference with the Environmental Noise Group on Entertainment Noise which will hopefully take place in September 2018. Also a possible one-day meeting on open plan office acoustics.

Electroacoustics Group
The main activity of the Electroacoustics Group during 2017 was the organisation of the annual Reproduced Sound conference. This year, the conference was held in Nottingham at the Nottingham Conference Centre on 21-23 November, with the nearby Crowne Plaza as the conference hotel. The organisation of the conference was once again very much a team effort, with tasks evenly spread amongst the EAG committee members. The conference was well attended with 94 registered delegates and the committee agreed that it was a success overall. The Peter Barnett Memorial Award for 2017 was awarded at the conference to Floyd Toole; unfortunately, Dr Toole could not attend in person and the conference began with a presentation of his talk, “Loudspeakers and Rooms: 50 Years of Research”, by committee member Glenn Leembruggen. Delegates were treated to a coach trip to the University of Derby on the Tuesday evening prior to the conference, with workshops on Numerical Methods and 1970s Recording, and an after-dinner presentation on Binaural Theatre supplementing the programme of presentations during the conference. A small number of delegates also visited George Green’s Mill on the Friday morning. The conference is moving venue again for 2018 to Bristol. The committee met on three other occasions during 2017. In January, the committee carried out a review of RS2016 and drafted the call for papers for RS2017, the abstracts were reviewed and the programme mapped out in June and the details of the conference were finalised in September.

Environmental Noise Group
The continuing growth in air travel and airport expansion plans to support this, led to growing interest in aviation noise in 2017, and in May the Environmental Noise Group held a workshop to debate the issues. The meeting, entitled Aviation Noise: Key Developments, was held at the Royal Society in London; a diverse range of delegates attended comprising acousticians, local authorities, the CAA and community representatives.

On 22 June 2017 the IOA launched ProPG Planning and Noise: Professional Practice Guidance on Planning & Noise - New Residential Development, at the Hyatt Regency Hotel, Birmingham. The event was run twice, once in the morning and again in the afternoon, due to demand. It drew to a close two and a half years of work by the committee comprising eight IOA members working with representatives from the Chartered Institute of Environmental Health and the Association of Noise Consultants. The ProPG was sponsored by the IOA and the ANC and represents a major contribution from the IOA to planning and noise in the UK; we hope it will be used by our members for years to come. The ProPG went on to win the top Noise Abatement Society 2017 John Connell Award, presented by the Parliamentary Under Secretary of State for Defra Thérèse Coffey in the House of Commons on 31 October 2017.

Measurement and Instrumentation Group
During 2017, the Group has organised one one-day meeting. This was entitled Sound Transport Modelling and was the group’s first foray into modelling applications, organised by a new committee member, Giles Parker. The meeting, in Manchester, was well attended, with 70 delegates, generating a useful surplus.

Chair support was provided by the Chairman to the ICSV24 Conference in London in July.

Initially planned for Autumn 2017, the next one-day meeting will be held in Northampton on 14th March this year, entitled Sound Power Workshop: Theory & Applications, organised by Ian Campbell. Some excellent speakers from education and industry are lined up, and the workshop format in the afternoon will provide plenty of discussion on this complex topic. This draws on our experience with previous live workshops.

The group will also provide a day of papers and live demonstrations at the Institute’s Annual Conference in Cardiff, based on our successful Instrumentation Corner series.

Over the past year, the Group’s committee members have continued to contribute to Instrumentation Corner in the Bulletin (51 issues to date); this has produced some interesting discussions and articles, and these are scheduled to continue for the coming year.

One of the committee meetings this year was scheduled to take place in Scarborough, and clashes of diaries meant that it had to be held remotely, using conferencing software. In fact, this worked surprisingly well and gave us useful experience for future meetings. Although never a substitute for the real thing, it does make it easier for our more remote committee members.

Thanks go to all members of the committee for the active roles they take in all aspects of the Group’s activities.
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Musical Acoustics Group
The Group has continued to make progress and November saw the fifth consecutive annual one-day meeting and AGM. This time it was held at Nottingham Conference Centre and fielded a very strong programme focusing on some important aspects of musical acoustics. Earlier in the year, the Group also contributed to a stimulating day of musical acoustics presentations at the 24th International Congress on Sound and Vibration held in London in July. It was most evident that the subjects discussed at the two meetings once again helped to dispel the views of some members outside the Group that musical acoustics is not simply an ‘interest subject’. The diversity of the papers presented would certainly benefit many acousticians who have little direct interest in the musical aspects of acoustics. Such topics as shock wave generation, vibroacoustics, hearing issues and acoustic analysis using high speed photography are core to modern acoustics.

The management committee of the Group has been active with regular meetings using internet conferencing facilities so there is no travel involved. At the AGM, Chris Turner and David Howard stepped down. However, Sara Rubio from Sustainable Acoustics was elected to the committee. After 7 years, Mike Wright will be stepping down as Chair at the 2018 AGM but intends to seek election as an ordinary committee member. At the same time, Dr Stephen Dance has offered stand for election as Chair thus ensuring that the Group will continue to build on its recent efforts.

The Group expects to be represented at Acoustics 2018 and plans are in hand for the sixth annual meeting in September 2018.

Noise and Vibration Engineering Group
Two full committee meetings were held during the year, plus a number of sub-group meetings to focus on planning for particular events. Unfortunately, the work commitments of individuals and conflicting events (from other organisations and from ICSV) prevented any stand-alone meetings actually taking place in 2017. However, after a period of transition on the committee, planning for a number future events is progressing well. The first commitment for 2018 is a full-day session for the spring conference. Other events planned for the coming 12 months include one-day sessions on ‘Sustainable Engineering Design’, ‘Quiet Design’ for noise at work, and automotive NVH (Noise Vibration and Harshness).

Parliamentary Liaison Group
The Parliamentary Liaison Group, formed following a Council mandate in 2016 to focus on the Institute’s interface with decision makers at Parliamentary level, has had a busy year.

Attendance at the Parliamentary Scientific Committee meetings by the Chair, and others delegated by him, has ensured that acoustics gets a mention whenever appropriate. The main business has been creating a strategic response to emerging government activity, including the Defra 25-year Environment Plan and the All Party Parliamentary Group for Healthy Homes and Buildings. For the latter, evidence was given to the Select Committee and questions asked within the evidence sessions to highlight the importance of acoustics in healthy buildings. Defra were invited to an IOA meeting on the topic of BREXIT, where a response was provided to the consultation and a further briefing also given. In relation to BREXIT the group made recommendations to IOA Executive upon an initial direction of travel for a strategic response by the IOA, and have recommended the formation of a working group to execute a two-part response. This includes an initial informative to the Department responsible, followed by a more in-depth look at legislation relevant to acoustics. This will be ongoing work for the working group over 2018-19, ending with recommendations to Government.

Physical Acoustics Group
This is an opportunity to formally thank our small team for the efforts ‘off stage’ in raising the profile of Physical Acoustics within the wider membership and beyond. In 2017, we had a huge response to the Physical Acoustics session of ICSV24 in London, where we reached hundreds of acousticians from many countries around the world.

However, there is still a great need for growth of Physical Acoustics and the impact it makes with the IOA membership and the broader acoustics community. Generally, the practising acoustician still remains unaware of how strategically-led Research and Development in Physical Acoustics is able to provide insight for improving all of our products, predictions, measurement and processes. We collectively need to question why we turn the handle of our well-known process without inquiring why we perform predictions, measurements and analyses in the ways we do.

We as a group continue to communicate with our sister organisation ‘The Institute of Physics’ and their Physical Acoustics Group, where we share ideas to avoid clashes and duplications of effort, in providing a more comprehensive programme of events than a single institute could possibly achieve on its own.

The recent launch of the UK Acoustics Network is seen as an excellent and timely vehicle to spread the word for Physical Acoustics, where we look forward to an increase in impetus for research, collaboration and visibility in the subject that lies fundamentally beneath all we do daily as practising acousticians. Our mandate is that curiosity-driven research in physical acoustics is the prerequisite for all future exploitable technologies for our profession, whatever our fields of acoustics may be.

In 2018, we plan again to run a one-day session at a major conference, this time for: Acoustics 2018 in Cardiff. Furthermore, we intend to plan our own one-day meeting for 2018. This progress is encouraging, as it underpins the necessity for a place where Physical Acoustics can be developed, leading to the sustained future of this specialist group.

We would welcome any proposals for collaboration with other special interest groups and regional branches that would like to know more about: noise source generation mechanisms; transfer of acoustic energy through various media; specialist materials used in acoustics; novel noise reduction mechanisms, or other aspects of the science and technology that relates to the prediction, measurement and analysis of sound or vibration. Would you, your group, or your branch want to know more about Physical Acoustics? Would you as an IOA member be interested in joining the PAG committee? If so, please get in touch with us via the IOA webpage.
Senior Members’ Group
The Senior Members’ Group has held just one meeting this year, on 6 April 2017, at St Peter’s House, Victoria Street, St Albans. The Chairman Ralph Weston, who has held this position since 2011, said that he wished to retire (although remaining on the committee) and, following a suggestion from Graham Parry VP G&B, it was agreed that he should be succeeded by Mike Sugitiera. Following election of the committee, a Vote of Thanks for Ralph for his work as Chairman was carried, and he was presented with an engraved tankard.

Immediately following the AGM, Dr Gurmail Paddan of the Institute of Naval Medicine gave an excellent talk on the work of the Institute and, in particular, of the Noise and Vibration Section of which he was Head.

A committee meeting held on 23 May, partly at IOA St Albans and with additional attendance by telephone link, confirmed Mike Sugiura as Chairman and also discussed possibilities for future meetings (although no meetings have yet been held). Other committee business has been carried out by email.

Senior Members have given support to the IOA CPD programme.

Speech and Hearing Group
The Speech & Hearing Group hosted two events in 2017. The first, given in May, was a talk by Dr. Richard Barham (of Acoustic Sensor Networks, and formerly of the NPL) entitled Development of the next generation of ear simulators for use in modern hearing assessment. The other was a talk, jointly hosted by the London Branch, entitled An investigation into the effect of acoustics on vocal strain of opera singers and given by Dr. Gizem Okten of WSP Group in September. The former talk accompanied the group’s AGM, at which all committee members who were due for re-election were duly reappointed. A meeting on Audiology for Acousticians has been scheduled for March 2018, along with contributions to the Institute’s Acoustics 2018 conference in April.

During 2017, Pippa Wilson and Dr. Evelyn Abberton chose to stand down from the committee – in Evelyn’s case this was after 10 years of dedicated service to the group. There are vacancies for two ordinary members of the committee, and nominations are currently being sought.

The group committee met three times (in March, May and September) during 2017. The Group continues to liaise with other professional bodies (such as the British Standards Institute, the Royal College of Speech & Language Therapists and the British Society of Audiology) and also other specialist groups (including the Building Acoustics Group and Musical Acoustics Group) and local branches of the Institute regarding topics of mutual interest. Joint meetings in collaboration with some of these are being planned for the future.
Underwater Acoustics Group
Over the past year, the Underwater Acoustics Group Committee has been undertaking the planning of a number of conferences or sessions at conferences, including:
- Chaired sessions at Oceanexpo 2017.
- Organised sessions at Acoustics 2017 in Boston.
- Organised a session at ICSV 2017.
- Organised sessions at UAC 2017.
- Planning an IOA SAR and SAS conference in Sept 2018.
- Planning an IOA bioacoustics conference in Loughborough.

Several members of the committee are on the ISO TC43 SC3 sub-committee, including working groups WG1, 2 and 3 which are developing new ISO Standards relating to underwater sound.

Education Committee suggested that the IOA Diploma is extended to include underwater acoustics and a workshop is to be run with external stakeholders, led by the UAG, to discuss the options.

Overall, the UAG has had another successful year, although an important issue that requires attention is trying to increase the interest in the AB Wood medal amongst European candidates.

Young Members’ Group
The Young Members’ Group committee meets quarterly with three meetings by telecom and one meeting in person. In 2017 we had a face-to-face meeting in December across two locations (London and Manchester), although a number of participants chose to dial in to the meetings instead.

The YMG was pleased to be invited to contribute to the Institution of Engineering and Technology’s vision for the future. Young members of Professional Engineering Institutes came together to discuss the future of engineering institutions and how to build links between engineering network across professional institutions.

Members of the IOA, including some young members, managed a stall at the Edinburgh International Science Festival. The training received by volunteers included the type of language to use when speaking to students and how to become more enthusiastic when explaining our work. The acoustics stand used six iPads with microphones and headphones to show the acoustics behind ‘Rockband’. Volunteers also answered questions about their careers in acoustics.

Young members of the IOA’s Southern Branch helped to host an event with the University of Southampton’s ISVR. The event was also provided via weblink to members of the North West Branch who congregated at the University of Salford. The topic was ‘Interesting Acoustic Activities’ comprising a series of short presentations from students.

As with many of the IOA Groups, the YMG provided two sessions at ICSV24 in London with help from the European Acoustics Association Young Acousticians’ Network. Young delegates of the conference were invited to attend a technical session that aimed to provide useful and interesting information for acousticians at the start of their career. Following this session the YMG hosted a social event aimed at young members held at The Admiralty in Trafalgar Square. An ice-breaker activity based on the Radio 4 game ‘Just a Minute’ was hosted by Jayanthiny from YAN which successfully lightened the crowd and an enjoyable evening of drinks, nibbles and chatting followed.

The third Inter-Professional Networking Event in London was bigger than ever with Engineers and Architects from ten professional bodies attending. The event used the same format as previously with participants playing ‘networking bingo’, i.e. seeking out as many individuals as possible that fit the descriptions on the bingo card. Drinks and nibbles were provided.

To promote the IOA to students we gave a presentation at the University of Southampton about the benefits of IOA membership and Chartership. Unfortunately we were unable to fulfil the previous ambition of presenting to students at more universities but this task remains a key aim and progress has been made to deliver it.

Other events hosted by the YMG included a pub quiz in London, presentations from students to the South West Branch and a joint event with Bristol City College at which Lewis Bush presented his research into tracing number stations and covert transmissions between intelligence agencies.

YMG members also regularly contribute to the IOA Blog which can be found on the IOA website. Recent posts include Draft excluders, part 1: what makes a good report? and Things that go bump in the night….

In 2018 the YMG will be putting on ‘The Art of Being a Consultant’ in Southampton and will be hosting a session at Acoustics 2018. We are also hoping to hold a number of social events throughout the year, details of which will be provided on the Events page of the IOA website.

Branches
Central Branch
After previous more active years, both 2016 and 2017 were relatively quiet due primarily to other commitments restricting the available time to organise meetings.

The four meetings in 2016 were: The Acoustics of Stringed Instruments by Bernard Richardson; ANC Sound Insulation Issues by Russell Richardson; Pro PG Draft Consultation by David Trew; and The Mysteries Of Groundborne Noise And Vibration by Rupert Thornely- Taylor. In 2017 there were only three meetings: Let’s Get the Part E Started by Peter Turner; BS4142: 2014 Objective & Reference Methods for Tonal and Vibration by Rupert Thornely- Taylor. In 2017 there were only three meetings: Let’s Get the Part E Started by Peter Turner; BS4142: 2014 Objective & Reference Methods for Tonal and Vibration by Rupert Thornely- Taylor. In 2017 there were only three meetings: Let’s Get the Part E Started by Peter Turner; BS4142: 2014 Objective & Reference Methods for Tonal and Vibration by Rupert Thornely- Taylor. In 2017 there were only three meetings: Let’s Get the Part E Started by Peter Turner; BS4142: 2014 Objective & Reference Methods for Tonal and Vibration by Rupert Thornely- Taylor. In 2017 there were only three meetings: Let’s Get the Part E Started by Peter Turner; BS4142: 2014 Objective & Reference Methods for Tonal and Vibration by Rupert Thornely- Taylor. Yet in 2018 the IOA may be increasing communication through IOA HQ to encourage new, existing and budding members from this region to attend the meetings.

Other events hosted by the YMG included a pub quiz in London, presentations from students to the South West Branch and a joint event with Bristol City College at which Lewis Bush presented his research into tracing number stations and covert transmissions between intelligence agencies.

Eastern Branch
We had fewer meetings in 2017 than in previous years to focus on key topics, but meetings have been well attended and highly interesting. Attendance has remained at the 2015 and 2016 levels but there are so many IOA members in this region that we would like to see more peers and colleagues come out to support the branch and perhaps learn from our guest speakers in 2018.

We will be increasing communication through IOA HQ to encourage new, existing and budding members from this region to attend the meetings.
Photographs showcase some of our recent projects where all acoustic products were supplied and installed by Acoustic GRG Products Ltd.

With an impressive portfolio of projects for some of the UK’s most prestigious buildings as well as 25 years’ experience in acoustics, we are the obvious choice for everything acoustic.

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What’s so special about this colour table?

8% of men and 0.4% of women see the significance of the plot above. It uses a colour table created so that people with colour vision deficiency can accurately interpret simulation results. And that’s a beautiful thing.

The Cividis colour table, courtesy of Pacific Northwest National Laboratory, is available in the COMSOL Multiphysics® software for simulating designs, devices, and processes in all fields of engineering, manufacturing, and scientific research.

comsol.blog/cividis
Institute Affairs

Branch Secretary, Hugo Cass, has kept this branch going for the past two years, but is now stepping down. We thank him sincerely for all the work he has done.

In 2018 we seek to achieve greater involvement from a more coordinated committee and hope to arrange more meetings for our members. We already have two talks planned for 2018 as well as a field trip! (More information to follow.)

The DVD issued by the IOA, ‘In pursuit of silence’ explores our relationship with silence and how noise affects our lives and we would be happy to stage a ‘movie night’ meeting.

A social event and day conference is on the cards for 2018 and we will keep branch members informed via IOA communication.

Irish Branch
The Branch AGM was held at the Ventac Facility in Blessington, Co Wicklow, on 5 July 2017, and was followed by a demonstration of an Acoustic Camera System given by Mark Simms and colleagues at Ventac.

The Branch Committee also provided input to the Irish Draft National Planning Framework 2040, on behalf of the Irish Branch of the Institute of Acoustics.

It is planned to have a greater number of meetings this year. Any suggestions from the branch membership will be gratefully received.

London Branch
The London Branch has had its most active year to date, including 10 evening meetings, a one-day conference, a sound insulation workshop and our annual evening event.

As usual we endeavoured to showcase an array of topics regarding general issues within acoustics, noise and vibration as well as new and sustainable technologies that concern us as acousticians.

The year commenced with Peter Turner from Assured Acoustics giving a talk titled Let’s Get the Part E Started. This was a topical subject with a presentation to invoke ideas and discussion for changes to Approved Document E. In February we had a presentation on psycho-acoustics for open plan offices. Dr Nigel Osland from Workplace Unlimited gave an interesting account of an alternative psycho-acoustics approach to acoustics, then Paul Shields from AECOM gave a summary talk on preparing CPD.

The third talk of the year in March was given by Nikhil Mistry. This was very different and presented research into the enhanced target detection and classification using two-pulse sonar methods. In April, Panos Economou from PEMARD opened our minds with an integrated approach to acoustics which irrespective of where sound propagation takes place, and with the use of surface impedance, image source method and sound pressure summation, these phenomena can be taken into account to calculate room modes and atmospheric refraction etc. The next talk was given by Mike Breslin from ANV Measurement systems who set up a fascinating experiment for attendees to make a subjective assessment of tonal and impact noise and to compare the responses to objective methods (BS4142). Interestingly, Mike came back again in December to present the results completed at five IOA branch meetings with an opportunity to rate the samples again.

In June David Hiller described the recent experience of addressing noise issues in relation to a planning application for two proposed shale gas exploration sites in Lancashire that were intended to investigate the viability of hydraulic fracturing, commonly known as ‘fracking’.

The final session for summer included presentations of three projects from students from South Bank University. The autumn term started with an presentation by Gizem Okten of WSP covering an investigation into the effect of acoustics on vocal strain of opera singers. Later in September a workshop dealing with sound insulation was arranged at the impressive BRE facilities. In October the evening meeting was on the subject of Do performance musicians need basic acoustic education? by Luis Gomez-Agustina.

The one-day conference was held in November on the topic of ‘Noise Management and Assessment of Crossrail: Outcome and Lessons’. The conference was organised by the IOA London Branch in conjunction with Crossrail and held at the Royal Society, and was concluded by a presentation of the Services to the Institute award to our long-standing secretary Nicola Stedman-Jones. The conference was followed by our evening annual event at The Admiralty in Central London.

Midlands Branch
The Midlands Branch had another successful year in 2017 with 12 monthly evening meetings with an average attendance of 25.

The meetings included talks on a wide range of topics including psycho-acoustics, sound recording and avatar therapy as well as a range of environmental and building acoustics topics.

We started the year with an excellent presentation by Nigel Osland of Workplace Unlimited who talked about alternative approaches to addressing open plan office acoustics taking into account personalities, roles and tasks. This was followed in February by an informative and interactive talk by Mike Breslin of ANV, investigating how the objective methods of BS 4142 compare with professional opinion. Other highlights included a talk by Mark Huckvale from the Speech, Hearing and Phonetic Sciences department at UCL. Mark gave a fascinating talk, describing the development of an avatar therapy system which can be used to alleviate the symptoms experienced by people who hear voices, a common problem experienced by many sufferers of schizophrenia. In November, David Hiller of Arup presented on ‘Lancashire Shale Gas Exploration’ at a very well attended meeting at Derby University and in December, for its Christmas lecture, the Branch hosted Jim Griffths of Vanguardia, who gave a very engaging talk on ‘Acoustic Design for Stadia & Venues’. CPD certificates were provided at all meetings.

We thank the various venues that provided the meeting facilities and refreshments and those who have supported the Branch again this year.

At the branch AGM held in December 2017, longstanding Chair, Paul Shields, stood down from the role but remains on the committee as an Ordinary Member. The committee, on behalf of the Midlands Branch membership, would like to thank Paul for his commitment and contribution to the Branch over the past ten years as Chair. Fiona Rogerson was elected as the new Chair of the branch, leaving the Secretary role vacant. Post AGM, Fiona Devine agreed to take on this role. Aglaia Foteinou was elected as an Ordinary Member,
having previously been a co-opted member and Philip Hainsworth was co-opted onto the committee, taking on the role of bulletin editorial contact.

North West Branch
The North West Branch has undergone significant change in the last year. Adam Thomas was elected as Branch Chair at our AGM in March, and Naomi Tansey was elected as Branch Secretary. We would like to offer extended thanks to Peter Sacre for running the North West Branch for an extended period and also for giving a smooth handover. We also offer warm thanks to Peter Hargreaves who kept the branch running through a challenging period. Both have now retired from the committee and we wish them well for the future.

The new Chair’s goals are to improve communications between us all, increase the number of meetings and CPD opportunities for our membership and to use modern video conferencing technology to reach more members.

The number of meetings has significantly increased with a total of 10 events including one half-day meeting titled Infrastructure Acoustics which was held at the University of Salford.

During our half day meeting on infrastructure acoustics at the University of Salford, we successfully created a live video link to a simultaneous half-day meeting hosted by the Southern Branch at the oceanographic centre in Southampton. As well as streaming our talk to their audience, we were able to hold a good Q&A session between the groups. Our thanks in particular go to Matthew Simpson from Southern Branch for working with us to make this goal a success. We look forward to more opportunities to connect with Branches across the UK.

We have been trialling both video recording and streaming evening meetings using different AV resources including YouTube. We welcome the IOA’s commitment to these technologies by investing in the AV equipment suitable for these purposes and look forward to using it in 2018 with the aim of it becoming standard procedure for all meetings.

We have aimed at providing a diverse programme this year but a core concentration has been on meetings around large-scale infrastructure projects. We extend huge thanks to the speakers who have provided our talks.

Additional changes to the committee include the resignation of Dave Logan and Paul Freeborn. Dave has served as an active committee member for a long time, and been particularly supportive during the transition of the Chair and Secretary roles. We wish them both well and thank them for their contributions.

We welcome Chris Youdale as Young Member Representative, and Prof David Waddington from the University of Salford.

Scottish Branch
This year has been a fairly busy one for the branch, with a mixture of activities taking place: including:

Edinburgh International Science Festival – IOA spreads acoustics message among Scots schoolchildren.
A 13-strong team of IOA volunteers took part in an education project entitled Careers Hive which aimed to spread ‘the acoustics message’ to thousands of secondary pupils in Scotland and open the eyes of 11 to 14 year olds to the wealth of opportunities available to those who opt for STEM subjects when choosing what to study.

AGM, Radio Broadcast Studios, SoundLab and Virtual Reality
The branch AGM, held at Arup Glasgow in October, was attended by 29 members and was followed by demonstrations of SoundLab Lite and Virtual Reality in the Arup office and a tour of Global Media radio studios.

After the visits we gathered again for the presentation of a Distinguished Service Award to Bill McTaggart for his outstanding contribution to the life of the Institute of Acoustics. Bill’s service and commitment to our Institute has been significant. He is most widely known for his knowledge and expertise in noise and vibration instrumentation and software. However, his many years’ experience in the measurement, monitoring and analysis of noise and vibration meant that he was much in demand as an educator, trainer and presenter.

Before heading off for a social gathering and meal there was just enough time to recognise the birthday of probably our most senior (and still active) member, Andy Watson by celebrating his 81st birthday on the day of our meeting!

South West Branch
The South West branch hosted six events during 2017. In January a joint screening of In Pursuit of Silence was held for IOA members and University of West of England film students at UWE’s Bristol campus.

Mike Breslin of ANV visited the SW branch in March to discuss BS 4142: 2014 – How do the Results of the Objective and Reference Methods for Tonal and Impulsive Noise compare to your Professional Opinion?

Paige Hodsman of Ecpophon presented to the branch in May on psychoacoustics – An Alternative Approach to Solving Office Noise. An information pack of papers and resources was also provided to attendees.

In July the branch celebrated World Listening Day with a sound walk around Sylvia Crow’s landmark Cumberland Basin scheme. The branch summer social followed.

At the Young Members’ Group talks, three employees of Mach Acoustics presented, one on work at Mach and two on their university final year projects. The year was rounded off in November with a joint meeting at City of Bristol College, where writer and photographer Lewis Bush presented on his research into the Shadow of the State.

Once again we enter a new year with a strong list of planned events and we look forward to another year of fascinating talks, unusual site visits and some occasional acoustics.

Southern Branch
The February meeting last year saw a joint presentation by expert witnesses Dr. Andy McKenzie (Hayes McKenzie) and Ed Clarke (Clarke Saunders) who had represented Lancashire County Council and the Roseacre Action Group respectively in the Lancashire Shale Gas Extraction Inquiry.

March’s joint event with the Audio Engineering Society’s Southern Region [entitled ‘The Virtual Singing Studio’] was closely followed in early April by an informative legal perspective on ‘Clay Target Shooting’ and a specific case.
that our presenter, Lionel Fynn of Laceys Solicitors, had been working on for around 10 years or so.

At the end of June, the ANV team led by Mike Breslin tried out their audio presentation on BS4142 character penalties to the Southern Branch.

Undoubtedly, the stand out event in the Southern Branch’s calendar was the free half-day event which we held in October. Returning to the National Oceanography Centre in Southampton two years after the successful IOA40 event, Southern Branch Committee led by the tireless efforts of Matt Simpson (Baker Consultants) provided a fantastic event entitled Interesting Acoustics.

Solent were again our host in December for a showing of This is Spinal Tap in Dolby Atmos with Southern Branch Committee Member and AES Southern Region Chair Dr Chris Barlow offering a chronology of the loudness of rock bands over the last 50 years. As ever, this was a great way to finish off a busy year.

We have a programme of events for 2018, including an update on the current issues in Groundborne Noise and Vibration from Rupert Thornely-Taylor. In 2018 we will also try to issue a pilot of the IOA/CIEH local initiative Code of Practice of Noise & Vibration Reports which has made some progress in 2017. We are also planning another half day event for branch members in the autumn.

Yorkshire and North East Branch
The branch met three times during 2017. In June we were delighted to receive a presentation by Mike Breslin, a Director at ANV Measurement Systems. He discussed aspects of BS4142:2014 focusing on the difference in results from assessing tonality subjectively and objectively.

In August we had a very informative presentation by Daniel Elford, Chief Technology Officer at Sonobex Limited. The presentation focused on the abatement of noise through the use of acoustic metamaterial-based technologies.

In November we had a presentation by Dr Paige Hodsman who is the concept developer for offices in the UK and Ireland for Saint-Gobain Ecophon. As well as her friendly approach she delivered a thought-provoking look at psychoacoustics in the office work environment.

Our meetings have been a wonderful opportunity to meet and get to know members of our branch. They have been particularly useful by broadening our understanding of the areas of acoustics we may not regularly encounter as part of our specialism. Looking at the vibrant nature of our meetings, we know that they are valued and appreciated.

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### Statistic and Information Tables

**TABLE 1: Membership**

<table>
<thead>
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<th>Grade</th>
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<tr>
<td>Fellow</td>
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<td>Member</td>
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<td>Sponsor</td>
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**TABLE 2: Group membership**

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<thead>
<tr>
<th>Group</th>
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<tbody>
<tr>
<td>Building Acoustics</td>
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<tr>
<td>Electroacoustics</td>
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<td>Environmental Noise</td>
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<td>Measurement &amp; Instrumentation</td>
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<td>Musical Acoustics</td>
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<td>Noise and Vibration Engineering</td>
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<td>1323</td>
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<tr>
<td>Physical Acoustics</td>
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<td>339</td>
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<tr>
<td>Senior Members</td>
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<td>128</td>
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<td>Speech &amp; Hearing</td>
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<td>310</td>
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<tr>
<td>Underwater Acoustics</td>
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<td>291</td>
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<tr>
<td>Young Members</td>
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**TABLE 3: Branch membership**

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<th>Branch</th>
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<tr>
<td>Central</td>
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<td>Eastern</td>
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<td>Irish</td>
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<td>London</td>
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<td>Midlands</td>
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<td>South West</td>
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<td>Southern</td>
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<td>Welsh</td>
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<td>Yorks and North East</td>
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<td>266</td>
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**TABLE 4: Details of employment**

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<tr>
<th>Group</th>
<th>2016</th>
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</tr>
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<tr>
<td>Yorks and North East</td>
<td>257</td>
<td>266</td>
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</table>

**TABLE 5: EVENTS AND ATTENDANCE IN 2017**

<table>
<thead>
<tr>
<th>Topics, Date &amp; Venue</th>
<th>Attendance</th>
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<tbody>
<tr>
<td>The Art of Being a Consultant 22 February, London</td>
<td>50</td>
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<tr>
<td>Sound Transport Modelling 14 March, Manchester</td>
<td>70</td>
</tr>
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Eastern Branch Presentations review

By Jody Blacklock, IOA Eastern Branch Secretary

Protecting music venues and the ‘Agent of Change’ principle
Presented by Kieran Gayler of Sharps Gayler LLP and Alex Mann of Music Venue Trust.

With a full audience from the IOA Eastern Branch, Kieran and Alex provided us with a very interesting presentation on the hot topic of music venues and the importance of protecting long-standing musical institutions from a variety of planning issues. Important to note though, this topic applies to music venues as well as industrial or commercial properties.

The ‘Agent of Change’ simply requires “the person or business making the change must also take responsibility for managing the impact of that change”. This is covered by paragraph 123 of the current National Planning Policy Framework (NPPF) – stating that new developments resulting in a change of use should not place “unreasonable restrictions” on the existing businesses. This is also broadly covered by the General Development Procedure Order (GDPO) where it states that ‘prior approval’ from noise impacts from commercial premises to future occupiers is required.

There has been a lot of coverage about the long-standing battle about noise from the Ministry of Sound venue and the proposal for new residential tower accommodation being constructed at a distance of only 40m from the venue. This presentation provided a very useful insight into the problems faced by the small grass-roots music venues (GMV), right through to larger venues.

During recent surveys, a staggering 27% of the GMVs surveyed, stated that they have been affected by noise complaints and 22% have been affected by nearby planning developments.

Following a very successful lobbying campaign by the Music Venue Trust, the Agent of Change has been agreed to be included into:

• The Planning Policy Wales;
• The Scottish Government has agreed to support the Agent of Change in the Scottish planning process; and
• It has been included in the draft version of the UK NPPF which is currently out for consultation.

Within the draft NPPF, paragraph 180 refers to the Agent of Change, but the Eastern Branch audience was generally in agreement that the wording needs to be tightened up in order to strengthen the standing.

A great debate was held to discuss the next steps to protect these venues. The outcome was simple: Developers and acoustic consultants need to work with the venues, with a far more transparent process at the planning stage. Steps need to be taken to ensure that noise effects to future occupiers are minimised, but this could also be through the developers assisting with improving the soundproofing of the venues and not just bolstering the façades overlooking the venues. More often than not, the cost of treating the noise at source could be far less than treating the entire façade of a building, although this could be unfeasible in practice.

Engineering Division

By Blane Judd, Engineering Manager

The Engineering Division continues to provide support for members who wish to join the growing number of engineers professionally registered with the Engineering Council. We are still maintaining our target of double figures and the increased volume of enquiries is providing a pipeline of applications going forward. Professional registration at CEng or IEng is featuring more prominently in the expectations of employers and, as a result, is continuing to grow in recognition. Employers and their customers look to professional registration as a way to demonstrate to society and the rest of the engineering community that you operate at the level of professional competence and ethics expected in today’s society.

The team here at the IOA are dedicated to providing the necessary levels of support to assist members like you, through the process. We are lucky to have a dedicated group of volunteers on Engineering Committee who are willing to give candidates a steer on draft submissions. The guidance documentation that we have been trialling is well received by applicants for registration. We are now concentrating on improved guidance for those who do not hold exemplifying qualifications and so are demonstrating academic attainment through experiential learning or technical reports.

Interviews in June

Our next round of interviews will take place in June 2018 in London. We hold a number of interview events through the year, depending on the number of candidates we have coming forward for registration. There are a number of candidates we are working with to prepare their paperwork in time for the next set of interviews. We can offer face-to-face interviews or by video link. If you are interested in taking the next step to becoming a professionally registered engineer, contact us on acousticsengineering@ioa.org.uk

Acoustics Bulletin May/June 2018
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:
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- Procter & Gamble
- Swiss Re
- Mobil Exxon HQ
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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
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- Automated amplifier changeover
Requirements for academic qualifications
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 masters degree was required or an ordinary degree for IEng.

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
2. Individual route, which requires further preparatory work from you before submitting evidence of your competence. Remember, we are here to help you get through the process and advice and support is offered to every candidate personally.

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.

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 you are working as a professional engineer in acoustics.

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

The opportunity is there and we are ready to support you through it, so that you can become one of almost 225,000 registrants that hold International professional recognition.

Below are profiles of two of the recent successful candidates.

• Colin O'Connor is a Principal Engineer with AECOM and has worked in acoustics for over 10 years, primarily focused on environmental acoustics, construction noise and vibration, and Environmental Impact Assessment (EIA) for residential, office, industrial and mixed-use developments. He has also been involved on a number of highway schemes, oil and gas projects, underwater sound and marine ecology assessments, and building acoustics and architectural projects. He graduated in 2006 with a bachelor's degree in acoustical engineering from the University of Southampton and registered as a chartered environmentalist in 2017. He is a STEMNET ambassador and volunteers for acoustics-related events with primary and secondary schools.

• Louise Morris, Senior Acoustician, Infrastructure UK and Europe Engineering, Design and Project Management Atkins Global says: "After graduating from the University of Reading with a BSc in mathematics, I began my career in acoustics at the Transport Research Laboratory and immediately became involved in a number of interesting research projects. In 2012, I joined Atkins (a member of the SNC-Lavalin Group), where I am a Senior Acoustician. Working for a multidisciplinary consultancy has allowed me to gain considerable experience in acoustic modelling and environmental assessments, broaden my technical expertise, and to develop an international career."

To increase the depth of my technical knowledge, I completed the IOA diploma in acoustics and noise Control at Nescot College and an MSc in applied acoustics at the University of Derby. I continue to build on this by attending IOA evening meetings as a commitment to learning and continuing professional development. "Achieving chartership status has been a long-term career aspiration and it is a privilege to have been awarded this level of professional recognition. Preparing for professional registration has helped me to proactively identify areas to focus on for career development and improve in these areas. I pursued chartership through the individual route with support from the IOA and my employer throughout the application process."
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A Journey South by Chris Watson
At the first Midlands Branch evening meeting of the year in January, Chris Watson, world-famous field recordist, composer and BAFTA winner, engaged his audience by describing ‘A Journey South’.

Chris has captured sounds of the environment worldwide, from animals on land to sounds from the deep ocean and his work has been included in BBC wildlife documentaries with Sir David Attenborough.

His presentation was an immersive journey to the places he had heard and captured on location, introducing us to the previously unheard sounds of a coral reef, the laugh of the hippopotamus at sunset, the creaking of an iceberg recorded from within and the rich sound of the deep ocean recorded with hydrophones.

Chris described the story of Captain Robert Falcon Scott’s ill-fated journey in Antarctica and the South Pole through a combination of sounds and pictures. We witnessed the ‘silence’ of the frozen world while Chris was filming this expedition journey.

We heard the talk of the whales, we met the curious penguins that approached ‘us’ to explore the strangers in the South Pole and we listened to the conversation of the seals. In this immersive presentation we ‘felt’ the cold air and heard the sound of Captain Scott’s steps across the polar ice.

The meeting was held in the Performance Hub of the Black Box Theatre at the University of Wolverhampton. Thanks to the combination of its great acoustics and the high-end quadrophonic playback system provided by PMC, the acoustic quality of the event was outstanding and appropriate to present the remarkable work and sounds that Chris had captured.

At the end of this audio visual journey, Chris had a lively discussion with the audience about the recording techniques and equipment he uses and the challenges of field recording wildlife and nature. Sincere thanks to Chris for sharing his experience with us and to the University of Wolverhampton and PMC for helping to organise this meeting.
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The M&I Group held the most recent of its series of meetings under the banner of ‘Sound Power, theory and applications’ having a strong practical element. The venue gave plenty of space for demonstrations, unfortunately due to the weather the outdoor locations at the club were not conducive to standing about waving sound level meters. However, the two large indoor spaces allowed delegates to gain experience of both sound pressure and sound intensity methods of sound power determinations.

Basic theory and standards tutorial
The sessions started with a tutorial on the basic theory and standards relating to sound intensity given by Dr Bob Peters. This was followed by Simon Scott from the Environment Agency on the regulatory drivers for sound power statements that was extended by a wealth of practical information on both good and not so good practice in the use of sound power in noise permitting applications to the Department of the Environment. This included some very valuable information on the use of the determination of when a source is a true point source, as this is a common cause of errors when field measurements of sound pressure are used to determine sound power.

The emphasis of the meeting then moved on from the basic principles and regulatory drivers to the detail of the methods. The use of PV probes to determine the sound vector component directly was discussed by Dani Fernandez Comesana of MicroFlown and showed how this could be used in beamforming applications to determine and rank sound sources in complex machines. Moving on to the standardised methods of determination of power from sound intensity measurements, Erlend Fasting of Norsonic discussed new developments in the calibration and post processing of signals from p-p probes to minimise the need to change spacers and to maximise the dynamic capability of the instruments. This work results in simplification of the determination of sound power where there is significant steady state background noise and or where ideal acoustic conditions do not exist.

Laboratory methods of sound power determinations were covered in detail by Rebecca Hogg of BSRIA, the theory is quite straightforward but the practical interpretations of the Standards requirements often present considerable problems when designing the measurement project. The provision of the necessary services to allow the machine under test to be run at the required speeds and loads specified by the client always has acoustically relevant points to be considered. Maintaining the required test environment and shielding mechanically necessary but acoustically irrelevant sources present many problems.

Finally, of course, is the actual physical size of the source to be tested, these machines can be both very large and very small. In the latter case, they are also very quiet and hence background noise is a real problem, when for example testing CD drives etc. Having considered the methods of getting the basic data that is used to determine the sound power rating of a source there were two sessions covering specialised applications of this information.

Experience at Rolls Royce Marine in the use of sound power information to chart the propagation of noise through the complex structure of ships was given by Mike Swanwick. This was followed by Mehregan Bagherpour, who showed the methods used by Changan Automotive to source rank power train noise emissions using beam forming methods.

Practical sessions
Practical sessions allowed the delegates to witness sound power determinations based on sound pressure and sound intensity methods. Sound pressure tests ranged from simple site measurements, that used both estimated and measured room correction data to complex free field multi-channel methods. Sound intensity derived results were demonstrated using both scanning and single point measurements with p-p probes.
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In both cases, no room corrections were needed and scenarios with and without background noise were shown. In all cases, there were examples of dedicated software packages that produced results to the BS EN ISO 3740 or BS EN ISO 9614 Sound Power Measurement Standards.

The ensuing discussion covered many technical points and also reviewed the basic drivers for the determination of sound power ratings. These are both legislative and consumer-driven with the users of the rating data being consumers needing to make the ‘quiet’ choice and acoustic professionals who will use the data to determine sound exposure resulting from operation of the source on site.

The consumer’s choice is purely based on the number to guide a subjective assessment. However, for the acoustic professional, their predictions and ultimate client satisfaction is totally dependent on the input number being accurate and relevant.

- Does the number relate to the way the machine will be run on site or just to some reference condition?
- Does the uncertainty information relate to just one prototype tested or does it include variation expected during ensuing production?

We are all used to the fact that those testing sound insulation are independently certified as competent and that the instrumentation used is independently certified as conforming to standards, but who certifies that sound power ratings are correctly supported by a meaningful technical file? So, should the acoustic professional be asking these questions of the suppliers, as it does not appear that anyone else is doing it?

Demonstration of multi-channel sound pressure methods

Southern Branch

‘Interesting Acoustics’

On 18 October 2017, the IOA Southern Branch alongside the Institute of Sound and Vibration Research (ISVR) held a half-day conference at the National Oceanography Centre (NoC) in Southampton entitled ‘Interesting Acoustics’.

IOA members both locally and from afar gathered to see what is interesting, unique and even innovative about acoustics.

The six presenters and keynote speaker in Southampton brought mix of topics on the day. Paul White, the keynote speaker, started off the event with his presentation on ‘Using acoustics to identify tawny owls’.

Presentation topics included measuring the hearing risk of young people, sound levels and exposures from a rifle, acoustic sources from far-field beamforming, measuring jet engine combustion noise, just to name a few.

The presentations weren’t the only interesting aspect of the day. The NoC kindly gave the attendees a glimpse into the work that they do and an introduction into the world of oceanography by providing a tour of the robotics lab.

The NoC also provided great video and streaming opportunities which allowed a live link-up with the IOA North West (NW) Branch. The NW Branch was also holding an event that day and the attendees in Southampton were able to watch and listen in on presentations on HS2.

At the end of the day, two presenters were chosen and awarded engraved tuning forks for their interesting presentations.

The Best Presentation Award (sponsored by Brüel & Kjær) was given to Lawrence Yule for his presentation entitled: ‘Investigating how predictions of reverberation time can be affected by incorrect absorption coefficient assumptions’.

The Best Content Award (sponsored by PC Environmental) was given to Chaitanya Paruchuri for his presentation entitled: ‘Reduction of fan broadband noise’.

A big thank you to all those who attended, as well as to the IOA Southern Branch committee organisers, ISVR, and to the event’s sponsors Brüel & Kjær, PC Environmental, and NTi Audio.

The mysteries of ground borne noise & AGM – Southern Branch

On Wednesday 21 February, the Southern Branch went back to Winchester’s Guildhall for a memorable evening with Rupert Thornely-Taylor, who gave a presentation about groundborne noise and vibration.

This was the presentation he originally made for the reception of his Rayleigh medal, albeit slightly updated. The meeting was
so well attended that we ran out of biscuits! And members had the chance of debating the topic afterwards at the pub and at a local curry house.

The meeting was preceded by a quick AGM, in which Taylor Cooper from Mott MacDonald was elected as the Southern Branch Young Member, after Alex Foster’s departure from the country last winter, and Sebastian Woodhams from Sustainable Acoustics was elected to Branch committee member. There were no other changes to Committee at this AGM.

Thanks to everyone that made the effort to attend the event, especially to Rupert for sharing his knowledge with us. Hope to see you at the next one!

Paul White with his presentation on using acoustics to identify tawny owls

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The future is here. Everything is smarter, faster and more efficient. We now live in ‘smart cities’ driven by data and algorithms. Machines now learn so that we don’t have to. While these thoughts could be applied to most fields, the interest in using some of these concepts and recently developed tools has been growing in acoustics where the phrase ‘smart cities’ has been used as a catch-all for sensing projects that might involve some of the following:

- distributed arrays of sensors;
- low-cost sensors;
- mini-PCs;
- semi-permanent deployments;
- machine listening;
- data fusion; and
- cloud computing.

What is exciting is how fast everything is now developing. These ideas are no longer confined to universities and research laboratories, but are gaining traction with both traditional instrumentation manufacturers and agile start-ups.

This growing area of acoustics was covered by John Shelton in the March/April 2016 issue of Acoustics Bulletin, where some of the history, as well as thoughts on measurement quality and calibration were shared. This article will describe some of the developments and research that has occurred since, and add some further thoughts on data quality and standardisation.

**Key things happening now**

The amount of work in this area has increased dramatically over the past two years. There are now many more projects occurring than could be mentioned in a single article. Here just a few of the bigger research projects will be mentioned but it should be remembered that there is much more out there.

1. Two of the larger university-led research projects were briefly mentioned in the previous article. The first is the Life DYNAMAP project, which is a collaborative EU project looking at adding temporal data to traffic noise maps generated under the European Noise Directive. The project has been very successful with the core aims achieved and demonstrated on their website (www.life-dynamap.eu). The monitoring systems deployed consisted of embedded computers connected to a cloud database. The monitors were located close to roads with the microphones mounted on the end of a short arm. The researchers conducting this project are now looking at more complex algorithms, such as their Anomalous Noise Event Detection (ANED) algorithm [1].

2. The second of these projects is Sounds Of New York City (SONYC), which is being run by the Center for Urban Science Progress (CUSP) at New York University. This project has successfully deployed a number of systems based on digital MEMS microphones and low-cost embedded computers. One of the key aims of this project is to develop machine listening algorithms, which requires a large amount of annotated data. To fulfill this need, the group has generated several annotated sound source databases, which are available for anyone to use for research, and they continue to do research in crowd sourcing sound scene annotations. One of the key outcomes of the project so far is the ability to use the machine listening algorithms to tie noise complaints to measured data within the trial area and grade the impacts [2].
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Beyond these two examples there are many projects developing uses of smart city tools for acoustic measurements. Many of these are exploring the use of mobile phones as monitors, such as the work in the SP4UM project [3] and in the Vitoria-Citi-Sense project (https://vitoria.citi-sense.eu/default.aspx)

Rapid developments have been made by noise monitoring equipment manufacturers. Many have realised the value of providing an array of tools, which can be used to form a bespoke system that is provided as a service. This is a key change of business model from the traditional concept of selling sound level meters, but if done correctly, will certainly mean the current players will be able to pay the mortgage. In addition, a number of these systems are multi-modal with sensors for dust and air-quality included. Not only is this more efficient, but it feeds directly into some of the academic research ideas exploring the dependency between different measurands.

There is also an increasing number of start-ups and SMEs working in various aspects of smart city acoustics. These include companies that are developing new sensors systems and ways of deploying sensors, new companies and established consultancies working on new noise data analytics and companies working on how all this data can be tied to the experience of living in a city and used to improve planning. One example of the latter is Tranquil City (https://tranquility.co.uk/) who aim to make citizens interact with cities in ways which make cities quieter and less polluted. One of their innovations is the tranquil pavement, an interactive map showing the combination of noise and air quality data using a simple rating systems. (See Figure 2.)

Thoughts on instrumentation and standardisation for noise measurements in smart cities

When it comes to selecting instrumentation, there are many options in use with varying performance characteristics and prices. This is true both of the sensors and the processing hardware. It is important to find the best one for a particular use. The philosophy taken in a lot of cases is that the trends in the data are the important feature rather than absolute levels. This allows the use of instrumentation that hasn’t been through the type approval process, either for costs or technical reasons, giving a lot of flexibility.

While this opens up many more options and helps get projects off the ground there are some dangers in this. Poor quality data will always lead to weaker outcomes. When using mobile phones as measurement instruments, the risk of errors caused by orientation, user interference and unseen hardware differences is high. Conversely, a common thread in all of the most successful projects is that some attention has been given to the performance and mounting of the measurement equipment. In most of these cases, the instrument designers have aimed to meet many of the performance specifications from the appropriate sound level meter standards (IEC 61672 & ANSI S1.4).

It is unlikely that many of the instruments will go through the type approval process due to the costs and time involved and due to their modular nature. The current standards do not adequately describe these new systems either. Some sensor types simply cannot be put through the current testing protocols meaning that the costs for type approval will be even higher. What is needed, is a new standard or a new category within the current standards that allows for the modular nature of these systems and a streamlined approach to approve at least the basic performance claims. Without addressing these issues many terabytes of data could generated by different projects without any possibility of inter-comparison. A new working group (WG24) of the IEC Technical Committee 29 (Electroacoustics) entitled ‘Modular instrumentation for acoustic measurement’ was convened by Mr Jes Sørensen last September to examine some of these issues.

Data accuracy

It is clear that ‘smart city’ ideas are changing the way noise monitoring and urban acoustics is being carried out, and these ideas are no longer confined to research groups. The immediate challenges for researchers, manufacturers and data users are:
- how data accuracy in mass data can be addressed;
- how new sensing approaches fit in with the more ‘precise’ traditional monitoring and how this will feed into planning and compliance;
- how to find and present meaningful outcomes from huge datasets; and
- what the dangers are of leaving the hard work to computers.

It will also be interesting to see how combining acoustic data with data from other types of sensor (air quality, traffic, light pollution, energy use, etc.) as well as human centric data, such as health effects and user experience, will give new insights.

References

2. Mydlarz C., Shamoon C. and Bello J. P., Noise monitoring and enforcement in New York City using a remote acoustic sensor network, InterNoise 2017, Hong Kong 27-30 August 2017
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The Institute has been saddened to hear of the passing of John Seller MIOA, a well-known figure in the world of acoustics, who was responsible for training many hundreds of environmental health practitioners (EHPs) and acousticians during his 30-year teaching career at Tottenham Technical College and South Bank University.

After leaving teaching, John became the Director of Environmental Consultancy at BRE, before establishing his own acoustics consultancy in 2006.

John was a big man and a big character, with a courageous and enthusiastic approach to life. He achieved a great deal despite the many obstacles set in his path. He was born in Bath, Somerset, before the end of WW2, in early 1945. By the age of three, he had succumbed to bouts of TB and polio, and went on to try out every other possible childhood illness, so by the age of 18, he had missed many months of school but still easily managed to excel at A-Level subjects such as maths, further maths, physics and chemistry.

Later, John obtained a joint degree in maths and physics as well as an MSc in Acoustics from Chelsea College. John’s MSc dissertation was entitled: ‘Noise – its perception and various procedures for calculating loudness and annoyance’. However, John was dyslexic and throughout his life the written word and passing English language exams in particular, always presented a huge challenge for him.

John met Juliet at Chelsea College, and they were married in 1971. This proved a very fruitful relationship that produced a wonderful, large family, consisting of (at the time of going to press) seven children, 13 grandchildren and one great-granddaughter. The latest addition, Tristan John Seller, was born only a few days after John’s untimely death.

John’s working life began in 1969, at Tottenham Technical College, where he eventually rose to be in charge of postgraduate training in Applied Acoustics until 1991. Between 1991 and 1996, John was director for the MSc course in Environmental Acoustics at South Bank University. Over the course of his 30-year teaching career, John was responsible for training, inspiring and supporting many hundreds of currently practising EHPs and acousticians and his passion for acoustics will live on through the day-to-day work of all these professionals, many of them, current or past members of the IOA.

Alongside his teaching work, John was heavily involved in the tennis world as an umpire, eventually umpiring at Wimbledon. In 1985, when computers were still in their infancy, he wrote a programme to control the deployment of line judges and umpires around the Wimbledon courts, which later formed the basis for the Players’ Order of Play programme.

This was followed by an 11 year period with the Building Research Establishment in Garston (BRE), where he initially led the acoustics team and eventually became Director of Environmental Consultancy. This was probably John’s happiest workplace; he wrote or contributed to many technical standards on building acoustics and often attended committee meetings internationally. We can still remember his first day at BRE, when he warned us that working with him would be a roller coaster ride – full of ups and downs and twists and turns, but always a
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lot of fun! John was true to his word, and under his management the (recently privatised) BRE acoustics team grew in numbers, and had a significant influence on acoustic consultancy in the UK with the revision of the Building Regulations guidance in Approved Document E that underpinned the acoustic design of all new dwellings in England and Wales, writing Building Bulletin 93 guidance on school acoustics, and carrying out the National Noise Incidence Study. During the latter, John took two members of staff with him to Northern Ireland in a white, unmarked van to drive back and forth between fairly tense areas of town, putting out sound level meters to measure environmental noise.

John volunteered to knock on all the doors that had been randomly sampled and, incredibly politely, asked if we could leave equipment in their front garden for 24 hours. No-one declined his request, even after the large black box with a mast that looked like an RPG launcher, had been padlocked into position. When we returned to the hotel one evening it was swarming with police as we had just missed an unannounced visit from the President of the USA. John also arranged the purchase and delivery of the front half of a decommissioned wide-bodied commercial aircraft (ex-South African Airlines) to BRE, after all, he would argue, why should BRE research on acoustics and ventilation be restricted only to buildings?

At BRE John gave his staff the space and responsibility that they needed to excel in their areas of strength and he always cared deeply about the wellbeing of the staff he worked closely with. He would organise occasional team building outings for us, including on one memorable occasion, a whole day out at sea on his motor boat. We can still recall John being seriously reprimanded by the harbour master for speeding!

Since the early 1980s, John was working on British, European and International Standards Committees on a range of subjects including building acoustics, environmental noise and his particular specialism of noise from shooting ranges. He also chaired the BSI committee EH/1/6 on building acoustics during the rewrite of the ISO standards on laboratory sound insulation measurements. John was always interested in the measurement and rating of environmental noise and he was involved in producing the case studies that featured in the 1997 version of BS4142.

He has long been recognised as a national expert in clay target shooting noise and he also contributed to the professional guidance document that was being produced by the CIEH at around this time. John’s other publications included two editions of the Society of Environmental Engineers Handbook, 1982 and 1985. This handbook provided comprehensive technical reference information for all practising environmental engineers.

After finishing work at BRE aged 61, John set up his own small acoustics consultancy business and after a year or two, was doing more work than he could comfortably handle. As a freelance consultant, John responded to many acoustical problems on demand. These included noise from clay target shoots, improving acoustic design of buildings and many projects related to reducing noise from recycling plants.

Then came the first signs that his health was declining in the form of a slight stroke in 2010, followed by a heart attack in 2012. John continued to work over this difficult period, including speaking at occasional IOA conferences. During summer 2017, while undertaking some renovation work on an inherited house, he fainted on the stairs and fell backwards. He was taken to nearby Addenbrooke’s Hospital in Cambridge, where he remained for 10 days. There he was diagnosed with lung fibrosis, the underlying cause of his heart problems and it was this lung disease that was eventually to prove fatal.

Little is known about lung fibrosis, except that it arises from old scar tissue within the lung. Research into the disease has started, particularly at Cambridge University. Hopefully, with more recognition of the disease it will become possible to diagnose it earlier and maybe find a cure.

John will be greatly missed by all those close to him and by his many work colleagues. He will always be warmly remembered by his many former students who learned so much from a big character, who was always willing to share his knowledge and enthusiasm for the fascinating world of acoustics.
After an initial floating floor installation in 1997, Mason UK joined up again with the Royal Opera House to assist in the design and supply of acoustic isolation solutions. The “Open-Up” project undertook a substantial refurbishment which included the Piaza and Linbury Theatre which went under a major redesign with a brand new seating structure being constructed on top of the existing Mason Floating Floor.

In addition to the main auditorium, a new waterproofed floating floor was required in the lift pit. The floor was designed and supplied by Mason UK along with a bespoke column baseplate design which enabled the existing lift columns to be preloaded onto the floor. The bearings were selected to satisfy the 12Hz acoustic requirement as well as the high loading and emergency conditions that are common with lift design.

The Royal Opera House project is typical of how Mason UK are able to not only provide high quality acoustic solutions, but also able to assist in the design and installation of complex, bespoke arrangements.

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Institute Affairs

One hundred and ninety five successful applications approved by Council

There were 72 successful applications approved by the Membership Committee on 2 November 2017. 55 of them were either new or re-instated – the rest were upgrades.

MIOA
James Blakeley
Martin Chan
Ben Claridge
Caroline Cooper
Sam Dainton
Arvind Deivasagamani
Camilla Fletcher
Wai Kit Fung
David Johnston
Leo Keyzerstol
Jane Lili-James
Graeme Littleford
Ana Luisa Maldonado
Harry Moraitis
Nick Priddle
Zoe Richardson
Ashley Shepherd
Anna Starbuck
Conor Ticker
Romeo Tormelpey
Mateusz Tuura

AMIOA
Andrea Cicero
Rapolas Daugintis
Peter Dunlop
Michael Fort
Adam Fox
Marie Guethier
Billy Jakes
Artem Khodor
Joseph Lucy
Nicole Linter
Joan Lungu Tranole
Aedan Mansfield
Jonathan Munns
Andrew Nesbitt
Alex Nicolaou
Oliver Packman
Sam Revie
Harry Russell-Lees
Cameron Salisbury
Elizabeth Samphier
Neha Sharma
James Shaw
Zachary Simmons
Murray Smith
Jamie Spary
Michael Symmonds
Edgar Szovak
Douglas Tilbury
James Whiddett-Turne
Sam Williams

TechIOA
Toby Artwood
Kerrie Baggs
Neil Caldwell
Ross Chamberlain
Arinis Evis Egbasou

Affiliate
Akeel Ahmed
Rashid Alsaad
John Paul Collier
Lisa Lavia
Scott McLean
Matthew Meredith
Timothy Potter
Sophie Reyland
Adam Turner

Sponsor
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Noise Abatement Society

For March, Council had 124 applicants, 123 were successful and, of those, 81 were new or re-instated applicants.

MIOA Cont.
Kenneth Kam
Jonathan Kay
James Large
Michael Leibfleder
Ashley Leiper
Victor Lindstrom
Richard Masey
Darren McGrath
Andrew Mosley
Peter Mumford
Jack Neumann
Adam Page
Benjamin Phillips
Ashley Punter
Rolins Roy
Sara Rubio
Jim Smith
Michael Smith
Gerald Stewart
Vince Taylor
Kristoffer Tsimontas
Simon Waddell
Grant Waters
Josh Wilson
Sam Zokay

AMIOA
Giorgio Agostini
Harry Bartley
Salomon Baumberg
Duncan Beaumont
Stephanie Berwar
Lorenzo Bonoldi
Gareth Bowman
Thomas Brooks
Emily Brown
Nick Bruce
Claire Byrne
Raushidh Carpenter
Henry Cook
David Coon
James Cousins
Ill Crawford
Nicholas Crawford
James Curtis
Robdan Davyd
Benjamin Dixon
Guilio Dolcetti
Richard Dyson
Jamie Easton
William Fairman
Thomas Farmer
Matthew Gascogne
Bruce Greener
Simon Goddard
Daniel Hagan
Richard Harris
Charlotte Hennessy
Alex Higgins
Stephen Joy
Maksims Jelovenko

AMIOA Cont.
Simon Jennings
Michael Jephcott
Ceri Jones
Martyn Ladlow
Nicholas Lum
Sanju Mathew Thomas
Witold Mazur
Joe McCall
James Meconi
Edmund Murphy
Jameson Munyuki
Nicholas Myrskoug
Dilan Neumann
Josephine Nixon
Lawrence Norman
Davide Pascarella
Ben Pearce
Matthew Podesta
James Reading
Gwyn Richards
Matthew Richards
Nicholas Rutton
Bari Shannagam
Samuel Shapley
Jeremy Skellern
Tracey Stevenson
Samuel Sumner
Alan Tan
Guillermo Tomac
Scott Tunnah
Dion Wall
Peter Wheeler
Shanti Wiusiewsaka

TechIOA
Bilal Ahmed
Martyn Chambers
David Cross
Adam Hooper-Jones
Michael Jenkins
Haroon Latif
Duncan Taylor
Denise Zahra
Matej Zak

Affiliate
Charlotte Birch
Chris Wong

Sponsor
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Nova Acoustics Ltd

Please turn to page 65 for some Membership Committee news.
Another building on ye olde Knightriders Street, gets the Selectaglaze treatment

The City & Guilds Group helps people, organisations and economies develop their skills for growth. Granted a Royal Charter in 1900 by Queen Victoria, The Princess Royal is the Group’s current President, who took over from her father The Duke of Edinburgh in 2011. The businesses provide a broad and imaginative range of products and services; corporate learning, on-the-job development and skills recognition around the world.

The Grade II Listed Head Office is situated in Smithfields, London with St Bartholomews Hospital directly opposite (another building which Selectaglaze has worked in).

Whitbread’s Premier Inn recently acquired a section of the City & Guilds Group’s Head Office and is currently constructing a new hotel next door. With heavy plant machinery adjacent to the offices, the noise pollution was rising and becoming increasingly disruptive.

The company approached Selectaglaze for a cost effective window upgrade to all floors of their Head Office which overlooked the building site. This was to ensure a more amenable working environment, thus achieving a high level of noise attenuation. Furthermore, secondary glazing is generally accepted for use in Listed Buildings, as it is a reversible adaptation.

A total of 51 units were installed, a wide range of products were combined for the specification, including; Series 42 fixed lights, Series 45 and 41 casements, Series 10 and 15 horizontal sliding units, all designed to suit the existing primary glazing. All units were a matt grey finish which complemented the existing windows and the frames were glazed with 6.8mm laminate ‘A’ rated safety glass.

Employees at the City & Guilds Group have been very impressed with the level of sound attenuation received and it has made the working environment across all the office floors far more peaceful.

“We were very happy with the installation and quality of the products supplied by Selectaglaze. There was little supervision required from our part, the workmanship was excellent and they left the site in an immaculate condition”.

Established in 1966 and a Royal Warrant holder since 2004; Selectaglaze is the leading specialist in the design, manufacture and installation of secondary glazing.

For further information, please contact Selectaglaze on 01727 83727, email: enquiries@selectaglaze.co.uk or visit: www.selectaglaze.co.uk
On 22 November 2017, the University of Salford held an evening to celebrate the 60th anniversary of the opening of the acoustics department.

The celebration consisted of a series of welcome speeches and two panel sessions, bringing a balance between reveling in the past and aspirations for the future. In addition to these sessions, exhibitions hosted by the department's friends in industry and young researchers, as well as scheduled tours of the acoustics laboratory, brought an extra sense of community, partnership and sparkle to the event. The evening concluded with more fun in the form of live bands and an improvised musical jam session at The Old Pint Pot.

Head of the Acoustics Research Group, Professor David Waddington, opened the event by introducing welcome speeches from esteemed figures from within the University and the acoustics community. One of the highlights of the welcome speeches came from Salford graduate, Vicky Stewart, representing the IOA Council, she spoke about the number of people from Salford who are IOA members, paraphrasing the Beach Boys by saying: "Salford, God only knows what IOA would do without you."

Another highlight came from Jack Harvie-Clark of the Association of Noise Consultants (ANC), who thanked Salford for providing the graduates that consultancies need to make their businesses successful.

Panel sessions

Following the welcome speeches, the two panel sessions, chaired by former IOA President, Professor Trevor Cox, began. The first panel session, named 'Secrets and Confessions: Tales from the Past' featured talks from past IOA President Geoff Kerry, the Environment Agency’s Tony Clayton; current North-West Branch Chair, Adam Thomas; former Salford lecturer, Dr Paul Darlington and current Salford researcher, Professor Yiu Lam.

Although another special invited guest, Anne Budd, couldn't be present, Trevor opened the session by reading out what Anne had said about being a Salford student in the 1990s.

Geoff Kerry gave an informative, historical speech, talking everyone in the room through a whirlwind history of Salford acoustics – from 60 years ago when acoustics was seen as the 'Cinderella of physics'; quoting founder of Salford Acoustics, Peter Lord, as: "shining a bright light in a dark tunnel", and describing the locations and moves that the department went through before settling in the current site in Newton Building. Of course, Geoff had his own presentation, which really brought the history alive.

Next, Paul Darlington spoke of his experience of teaching musical acoustics at Salford, starting in 1990. He likened the introduction of audio modules into acoustics to the gunpowder plot, finishing his speech with the association between Darlington and electronics in Salford acoustics – not talking about himself, but referencing the inimitable Roger Darlington, who was in the audience. Tony Clayton spoke of his experience in the 2000s on the IOA Diploma, before Adam Thomas spoke of his experiences on the Masters course. This session concluded with Yiu Lam, who reminisced about the wine and cheese parties since he joined Salford Acoustics in 1988, affirming that these have remained in his memory the most – this really drove home the community and friendliness that gives Salford its charm.

The great and the good from the world of acoustics

A short break gave guests the opportunity to speak to and catch up with old friends, to visit the display stands, refill their wine glasses and eat the nibbles kindly provided. This seemed to invigorate all of the guests and following that social recharge, everyone was ready for the second panel session: 'Futures and Promises: Visions for the Future'. This panel had a choice selection of the great and the good from the world of acoustics; Education Manager for the IOA, Professor Keith Attenborough; Chair of the ANC, Jack Harvie-Clark; Associate Dean of Teaching for Salford, Professor Bill Davies; Lead of the UK Acoustics Network (UKAN), the University of Sheffield’s Professor Kirill Horoshenkov; Director of the Acoustic Test Laboratories for Salford, Professor Andy Moorhouse; Salford Early Career Researcher, Dr Nikhilesh Patil; and from Arup, the North-West branch’s Naomi Tansey.

Professor Keith Attenborough opened by introducing UKAN and finishing off by stating that "wonderful things start in Salford."
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General News

Next, Professor Kirill Horoshenkov took to the stage. Kirill has worked with Salford since the late 1990s and is currently collaborating on two projects. He informed delegates about UKAN (which was only created in November 2017) and how this new network, designed to bring together specialist interest groups in the ever-growing field of acoustics, was birthed out of an idea from the IOA Research Co-ordination Committee and the event ‘Acoustics Research Challenges in the 21st Century’. From Kirill’s speech, it is apparent that it is envisioned that UKAN will be central to the future of acoustics research and after stating that “Salford has a very important role to play” in this, Kirill closed his speech by asking Salford to continue providing the critical mass of acousticians needed to continue a healthy level of research in the future.

“Write better reports”
Jack Harvie-Clark spoke about what consultancies want from Salford in the future. Affirming that Salford provides educated people to go into the world of consultancy and who understand the principles of acoustics, Jack suggested that students need to be prepared to “write better reports” – not bad to only have only one suggestion for improvement after 60 years!

Bill Davies was up next, talking about the future of teaching in acoustics. Bill’s awareness of the struggle of increasing tuition fees and the turbulent nature of higher education put students in the room at ease. He talked about the rarity of acoustics courses so having Salford (and Southampton) teaching acoustics is extremely valuable.

Andy Moorhouse opened his speech with the future of the Industrial Collaboration Zone (ICZ) at Salford, reminding us all of the scientists and engineers in Salford and Manchester that “were responsible for starting a global revolution which is still being felt today”. With this heritage, he described how Salford was known as being a university that works closely with industry, and that acoustics at Salford has never forgotten its inheritance – and surely it never will as Salford Acoustics continues to work with industry into the future.

Nikhilesh Patil, who recently completed his PhD at Salford, spoke of the aspirations of the research graduate cohort. As a graduate, he spoke of research as “a way to create value” and “maximise the good impact you have on the world” and that this is what really drove those like him. He advised the undergraduates in the room to not rush and that there is no better place than Salford.

Finishing up this final panel session, Naomi Tansey gave a dazzling speech on the future of graduates in the industry. She succinctly spoke of consistent collaboration between Salford researchers and graduates and industry, of STEM and consultancies and most importantly, collaboration with other teams particularly digital audio and IT teams.

After party
After a couple of quick questions, Trevor Cox closed the panel session and all guests were invited to a gig and jam session at The Old Pint Pot, a new venue as the traditional haven of acousticians, The Crescent, has recently closed down. What was promised to be a fun, lively after party certainly didn’t disappoint.

The Blazing Snowman commanded the stage, giving a smooth yet punchy performance, thus encouraging a bit of dancing. After The Blazing Snowmen delivered their faultless performance, the stage became a dedicated open mic/open jam area.

Everyone knows that acousticians understand sound and it turns out that acousticians are also pretty good at making some fantastic tunes! Trevor wowed the crowd with a saxophone piece, as did former star of the acoustics department, Mark Avis. Students, alumni, staff and friends in industry alike were brought together to play music. The drinks flowed, old friends and colleagues chatted with one another and new friends were made late into the night.

A great way to finish a celebration of 60 years of acoustics at Salford. Here’s hoping that we will not have to wait another 60 years for the next celebration.
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Minister for Employability and Training visits Career Hive at The Museum

The Minister for Employability and Training, SNP MSP Jamie Hepburn, visited Careers Hive at the National Museum of Scotland in Edinburgh on 27 February.

Careers Hive was a six-day event organised by Edinburgh International Science Festival. The Minister met pupils from Drummond Community High School who were investigating how sound engineers interpret and modify digital sounds in a range of different environments in Radio Studio – designed and developed by IOA – and learning about the human capacity to solve problems whilst disorientated as they tried the inversion tables, sponsored by OPITO.

Jamie Hepburn said: “The Careers Hive is a fun and interactive way to get young people thinking about the wide range of interesting science, technology, engineering and maths jobs out there, which, if embraced, can help Scotland become a STEM nation.

"By inspiring young people to take an interest in STEM subjects we help ensure our future workforce is well-equipped and supported to make the most of the fast-paced technological changes around us. Through our STEM strategy we want more schools and colleges to work together to bring such challenges to young people."

STEM pathways
The event was designed to showcase the various pathways into STEM subjects (science, technology, engineering and maths) for young people in S1-S3. An interactive learning experience, the Edinburgh International Science Festival team worked with a range of partners in response to the rising tide of young people electing not to continue with STEM subjects, despite the high demand from Scottish companies and organisations for individuals with these skills and knowledge.

On their visit to Careers Hive at the National Museum of Scotland, students were guided by a science communicator as they explored four exhibition zones:

- build and connect;
- design and play;
- heal and feed; and
- energy and environment.

In these zones, through creative and interactive learning students investigated the insulating properties of different materials, the process of developing a phone app, how museum artefacts are conserved, life in a biomedical lab thanks to virtual reality simulations, or the techniques employed in wildlife conservation, among others.

Joan Davidson, Head of Education at Edinburgh International Science Festival, said: "Scotland's economy is shouting out for the next generation of STEM talent, so it's important that we encourage today's young people to engage with these subjects. At Careers Hive we gave them a chance to discover the wide range of career pathways open to them – from the exciting opportunities that exist on their doorstep, to those that could take them across the globe."

Careers Hive in February 2017 attracted over 2,400 students from 38 schools from across Scotland. Activities at the Careers Hive Open Day were drop-in, non-ticketed and free.
Armourcoat’s new Acoustic Plaster System applied to ceilings at The Minster Building in London for architects BuckleyGrayYeoman.
Acoustic Forensics: Investigating a murder with acoustic modelling

Ten years on from a fatal shooting, how can acoustic modelling help a team of architects answer key questions in the ongoing investigation of a high-profile murder?

On 6 April 2006, 21-year-old Halit Yozgat was fatally shot at his family's internet café in Kassel, Germany. His death was the ninth in a series of 10 killings across Germany, targeting mainly migrant communities by the National Socialist Underground (NSU) – a Neo-Nazi group known to the German Intelligence Service between 2000 and 2007.

What was of special interest, was that a domestic intelligence agent, Andreas Temme, was present in the café at the time of the shooting, separated only by an open doorway between the front and rear café areas. Temme initially failed to disclose this to the police but then, after his online activity confirmed that he was in the vicinity at the time of the murder, he claimed to not hear, smell or see anything of the two shots fired.

In the 10 years since the shooting, it was further unearthed that there were huge gaps in the police investigation. Commissioned by the People's Tribunal and working with the families of the victims, independent research agency, Forensic Architecture, based at London's Goldsmiths University, was appointed to help investigate the cold case and it's at this point they approached Anderson Acoustics for help.

Drawing from leaked photos and documents from the scene, Forensic Architecture commissioned a full-scale replica model of the 77m² café to be built in Berlin's House of World Cultures. The internal finish of the reconstructed café replicated the same internal finish so that the model would perform in the same way as the original crime scene. Full tests were carried out from pooling witness logs across desktop and mobile devices, as well as call records and testimonies. This formed a detailed timeline of activity in the café and highlighted the small window of time in which the murder could have taken place – firmly placing Temme in the building.

In addition to further testing and modelling for smell and sight, Anderson Acoustics investigated whether Temme could have failed to hear the shots, as he claimed.

Methodology
Anderson Acoustics was approached fairly late on in the project, approximately a month prior to the full-scale replica café was to be hosted to journalists and academics in Berlin. They were asked to propose a methodology, that would demonstrate whether Temme could in fact hear the gunshots in the front of the café, they were also asked to conduct a representative demonstration in the full-scale replica café for both audience and filming.

They proposed a two-method investigation, firstly they would predict the level difference from the gunshot position to Temme's seated position, using acoustic computer modelling software (CATT Acoustic). This model was to accurately represent, as best possible, the actual Kassel café. Secondly, an acoustic model of the full-scale replica in Berlin would be created to confirm measurements conducted on-site.

Forensic Architecture contracted weapons experts, Armament Research Services (ARES), to record the sound of the gun and ammunition used in the murder. They also...
recorded the sound of the weapon when threaded with both a dry and wet sound suppressor (silencer) to simulate the suppressor used in the crime.

Suppressors work by creating a larger contained space for the pressurised gases created by the gunshot to dissipate and cool, resulting in a reduction in noise level. Fluid can be added to the internal casing of the silencer to further reduce the noise level emitted by the gunshot (wet suppression).

An unsuppressed gunshot was measured at 157 dB L_{peak} and at 140 dB L_{peak} when fitted with a suppressor. When fitted with a wet suppressor the noise level was reduced to 130 dB L_{peak} (all measurements taken were 1m left of the muzzle) As a worst case scenario the lowest result, 130 dB L_{peak} when using a wet suppressor, was used in this study when referring to the known sound level of the firearm.

The initial acoustic model of the actual Kassel café was completed, placing both the gunshot position and Andreas Temme inside. Anderson Acoustics then ran the model to output key initial reflection paths from the source position to the receiver, highlighting which surfaces were of most importance to the specific propagation path. These visualisations were presented to the architect and co-ordinated within the construction package for the full-scale replica in Berlin’s House of World Cultures.

The reconstructed café used lightweight materials and constructions and was not fully enclosed in order to enable audience viewing and documentation of the experiment. This introduced discrepancies/difficulties from acoustic point of view when trying to emulate sound propagation within the actual room, as the sound would escape through the openings. In order to best represent the acoustic condition, they advised the design and contractor team to position reflecting surfaces at key locations around the source and receiver locations in the reconstructed café to best replicate the conditions in the in the actual café at the time of the event.

These key surfaces were determined by the initial modelling completed. In the reconstructed café, they placed a high-decibel loudspeaker at the position of the shooting to see how the sound propagated throughout the space. The internal finishes generally imitated the vast use of highly reflective surfaces through the café, such as brick structures and glazing, but where carpet and soft furnishings were used, it was considered a conservative prediction in terms of sound propagation.

Audio recordings taken of the gunshot measurements were played back in the reconstructed café from the shooter’s position (source) to determine the sound event level at Temme’s proposed location (receiver).

Although the loudspeaker was not able to match the high sound level produced by the gunshot, the level difference between source and receiver positions is considered the main objective, where the possibility of actual firearms being shot was not an option. A computer model of the reconstructed physical model was constructed to imitate the scenarios measured and to validate the computer modelling techniques. The level difference the computer model predicted, between gunshot position and that of the witness, was equivalent to measurements conducted on site in Berlin. The purpose of carrying out this reconstructed acoustic simulation prediction was to ‘ground truth’ the model to real world acoustic measurements, a concept that Eyal Weisman of Forensic Architecture has demonstrated in a range of the projects.

This source level was then input into the accurate Kassel internet café acoustic model indicating an overall level difference of 20 dB between Temme and the shooter. Using this level, a conversion can be derived from the ARES free-field measurement data to result in a noise level of 110 dB L_{peak}—equating to 94–99 dB L_{Amax} in Andreas Temme’s seating position (the relationship between the L_{peak} and L_{Amax} parameters were informed by a detailed study of gunshot measurements undertaken by Seibin Associates INC, highlighted in their report: ‘Environmental Acoustic Assessment for the proposed shooting range sites Grand Traverse County, Michigan, 2005’). Anderson Acoustics translated the L_{peak} result into an L_{Amax} as it is a widely used and understood noise metric and thus more suitable for demonstrating audibility.

Figure 1 shows the sound propagation from the gunshot, as modelled in CATT Acoustic, as included within the Forensic Architecture film produced to present the findings.

Results
The Anderson Acoustics report concluded that the sound level at Temme’s ear position was in the order of 94–99 dB L_{Amax}, similar to the sound of a motorcycle driving past 25 metres away from you. As a result, it is considered highly likely that the sound level caused by the silenced gunshot was audible in Temme’s position factoring in typical ambient noise levels expected in an internet café.

Although this assessment does not take into account the hearing or cognitive capabilities of Temme, as a worst case Anderson Acoustics can assume that Temme was asleep (an unconscious state). The WHO document states that the established threshold for ‘waking up in the night and/or too early in the morning’ is 42 dB L_{Amax} (Table 1 of Executive Summary, Page VIII). This indicates that the noise level produced by the gunshots is over 52–57 dB greater than the level found to cause people to wake up during the night or early morning from sleep.

Anderson Acoustics’ findings, along with those from experts in smell and crime scene investigation, concluded that Temme would have been aware of the incident taking place, therefore putting into question his testimony at the time and reopening the case in the search for the truth.

This case, is being presented alongside others in Forensic Architecture’s portfolio, at an exhibition called Counter Investigations: Forensic Architecture at the Institute of Contemporary Art, London running until 6 May 2018.

To read further updates and see photos from the Yozgat investigation, visit the Forensic Architecture website: http://www.forensic-architecture.org

Grant Waters and Doushiant Mohith
The StoSilent Distance system has been installed in the Garden Museum, which is Britain’s only museum covering the art, history and design of gardens, located at the Church of St Mary-at-Lambeth.

“We specified the StoSilent Distance system for a number of reasons,” explains Alun Jones of Dow Jones Architects. “The building work involved the creation of a cluster of copper-clad pavilions around a cloistered garden area. These house two new educational spaces and a cafeteria and they are connected by a number of covered walkways. These spaces feature concrete floors and floor-to-ceiling glazing, so in order to achieve an acoustic environment with a reverberation time of less than 0.8 seconds, we used a Sto seamless acoustic ceiling. Having used the Sto solution on a previous project we were confident that it would be perfect for the museum, and Sto worked closely with us to create a balanced acoustic system, which would satisfy all the different requirements.”

Positive, balanced acoustics

The StoSilent Distance system provides a modern, clean, monolithic alternative to the standard but limited design options associated with exposed grid and tile systems, or boards with multi-faceted holes or slots. It provides positive, balanced acoustics within buildings, helping architects and designers achieve clean and uncluttered lines. It is ideal for situations where, as with the Garden Museum, these surfaces must be suspended to accommodate services, and where the ceilings were being used as negative plenums for air extraction and movement.

The StoSilent Distance system utilises its own Sto SC400 metal framework, and StoSilent Distance 110 boards. The boards are manufactured from 96% recycled glass and can be integrated with lighting, grills and other M&E considerations. StoSilent boards are permeable, and have a honeycomb-like structure which allows noise and sound to dissipate through a void space and so balance the acoustic environment.

StoSilent Distance is a lightweight system, and unlike exposed grid and soft tile alternatives, the boards will not sag or delaminate. It can be used to create many different design features, including seamless, inclined planes or curves, or sharp and consistent joints. The benefit to the architects and end user is that the system can also be repaired and re-furbished throughout the lifetime of the building, without greatly negating the value of the acoustics, wherever the system has been installed.

Tinted decorative coating

For aesthetic reasons, the architects were also keen to use the same monolithic ceiling throughout each of the new areas at the museum, and wanted this to feature a spray-applied finish with a finely-textured surface. “The StoSilent Décor M finish was the perfect solution for this,” adds Sto’s Technical Consultant for Acoustics, Mike Wallace. “It creates a sound-permeable decorative coating which can be tinted to match a wide range of shades from the StoColor system, and RAL colours can also be achieved, making it a very versatile solution.”

As there were a number of varying roof spaces included in the different areas, there was not one standard installation approach that would suit them all,” adds Lucien Ionce of Intercoustic, an authorised Sto acoustic installer. “Fortunately, the StoSilent Distance system is extremely flexible in terms of installation and this gave us plenty of freedom to meet the various day-to-day challenges which arose during the installation process.”

The Garden Museum

The museum is housed in the Church of St Mary-at-Lambeth, next to the Archbishop of Canterbury’s palace, by the River Thames. After being disused for many years, the church was saved from demolition in 1977, after which it was converted into the UK’s first museum dedicated to the history of gardening.
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Technical Contributions

Jet nozzle conditions for crackle  By J Punekar¹ and E J Avital², F Mottleibi

Abstract
Crackle noise is experimentally investigated for cold underexpanded and overexpanded lab size jets of Mach number MJ=2. The underexpanded jet is found to cause much more significant crackle that the overexpanded jet at the Mach direction quadrant of the far field. This is argued to be associated with the higher acoustic energy emitted by the underexpanded jet at low frequencies. On the other hand, the overexpanded jet shows a fundamental screech tone not seen for the underexpanded jet. Spectral and statistical skewness analysis is given.

Keywords: Supersonic jet, crackle noise, underexpanded nozzle, overexpanded nozzle

1. Introduction
Crackle is an annoying loud sound associated with supersonic jet noise that has recently gained significant interest. It first came into the spotlight in a seminal paper by Ffowcs Williams et al [1] who made sound measurements of the Olympus turbojet engine 593 of Concorde, which showed random crackling noise around the Mach direction, but with no distinct spectral signature. They formed a statistical quantification based on skewness $S$ of the pressure wave form was suggested, determining that crackle happened when $|S|>0.4$ and no crackle occurred for $|S|<0.3$. Crackle of about 148 dB at a distance of about 50 m was reported for hot jets of diameter $D=1.21m$, whether ideally expanded or not ideally expanded jets. Thus, the source of crackle was proposed to be related to shock-lets occurring in the mixing layer. They also argued that crackle already showed non-linear wave steepening near the source and hence it was not caused by non-linear propagation effects but by the source structure. Later, the statistical quantification for crackle was modified by Gee et al [2] who argued that skewness in the pressure derivative also had to be present in order for the sound wave to crackle. This was determined after playing back the waveforms which did not crackle, even though they had high skewness in their pressure but not in skewness of their pressure derivative waveform.

Other lab-based experimental studies by Krothapalli [3] argued that crackle occurs only in hot jets, which was related to 'micro-explosions' occurring due to the mixture of hot gas with cold ambient fluid. Crackle was observed to have a much deeper penetration distance of the near field into the far field than Mach waves, which we believe point to the importance of non-linear propagation [8]. It was argued for supersonic jets with $MJ$ of 2 or higher, where $MJ$ is the jet exit Mach number i.e. normalised by the local speed of sound, crackle can account for at least 30% of the total emitted acoustic power output. Crackle was suppressed by Papamoschou & Debiasi [4] using an eccentric nozzle arrangement, having the inner jet with $MJ=1.5$ and the outer jet with $MJ=1$. Baar et al [5] experimentally researched to find spectral quantification of crackle for unheated jets. Viswanathan et al [6] found that a bevelled nozzle with overexpanded nozzle pressure ratio had a beneficial effect on the flow expansion leading to lower noise along the axis. Mora et al [7] observed crackle for rectangular nozzles when simulating a jet exhausting over airframe surfaces. Martens et al [8] reported that chevrons are beneficial in reducing crackle for high performance tactical aircraft engines.

Most established earlier research has been on the presence of crackle for underexpanded operations of military aircraft for high altitudes. Recently, Punekar et al [9] experimentally observed for small cold underexpanded jet highly skewed waveforms at the farfield quadrant of the Mach direction that also crackled at a supersonic speed of $MJ=2$. Underexpanded jet is a regime where the excess pressure of the jet exhaust expands outwards as the surrounding ambient pressure $p_{amb}$ is less than the nozzle exit static pressure $pe$. The gases deflect from the nozzle centre such that gradual turning of the jet aircraft and acceleration at high altitudes is easily achieved. The underexpanded flow generates an expansion wave at the nozzle exit, followed by a succession of diamond shock cells in the downstream. Our previous results showed that farfield waveforms at the Mach angle direction of 40º crackled strongly when played-back [9]. The waveform was strongly skewed even in its pressure derivative; indicating nonlinear propagation effects and bunching phenomena showing that a cold jet crackle similar to a real engine.
Using Akustik and Akustik+Sylomer® acoustic isolators manufactured by AMC Mecano-caucho, it is possible to optimize the vibration isolation in suspended ceilings, walls and floors. Low natural frequencies between 3-8Hz can be reached even in light systems. The main improvement in the noise isolation is found at low frequency, although the Sylomer isolating material will also provide broadband isolation also at high frequency. As a result, it is possible to obtain high noise isolation ratios without adding mass, as it has been done traditionally. Consequently, these kind of isolators are specially interesting for refurbishment of old buildings but also for those cases where high noise isolation is required.

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Enter www.akustik.com and download detailed information of the complete range of products including technical datasheets, stiffness characteristic curves, natural frequency curves and test results carried out by independent organizations.
2. Objective

Convergent-divergent (con-di) nozzle is the common method to accelerate the exhaust gas from a gas turbine to supersonic speed required to provide thrust for supersonic flight. The purpose of this paper is to further investigate crackle in a non-ideally expanded jet by comparing experimental results between underexpanded as discussed earlier [9] to those of an overexpanded con-di nozzle. An overexpanded exhausting jet is typical during takeoff and low altitudes flight of a fast military jet. In this flow regime, the exit pressure is less than the ambient pressure such that a compression shock cell is formed outside the nozzle exit followed by a succession of diamond cells downstream. These shock cells are rather weak as the pressure difference is not too extreme, although the pressure rises instantaneously across the compression wave at the nozzle exit.

Acoustic measurements were made in the Queen Mary University of London anechoic jet facility for a converging diverging overexpanded nozzle of diameter 3cm for jet exit Mach number $M_J=2$. A short description of the acoustic chamber is shown in Figure 1 and has been described in [9].

3. Farfield acoustic measurements

Acoustic measurements were taken in the farfield and at various polar angles as relative to the downstream direction. In this short paper we concentrate on overexpanded jet and analyse the acoustic radiation in the Mach direction quadrant for the polar angle 40º that had earlier showed enhanced crackle activity for the underexpanded jet of $M_J=2$. The ratio $P_e/P_a$, where $P_e$ is exit pressure and $P_a$ the ambient pressure was 1.3 for underexpanded and 0.35 for overexpanded nozzle.

The power spectral densities for both the underexpanded and overexpanded jets at the far field are shown in Figure 2a for the polar angle of 40º. Similar behaviour is seen in both cases, particularly at high frequencies. However, at low frequencies the underexpanded shows higher power by about 10 dB than the overexpanded jet. This can be explained by the underexpanded jet having higher reservoir pressure $p_0$ than the overexpanded and thus higher potential energy to generate noise. It can also explain that when the measured 40º acoustic noise was played back a louder burst of crackle was heard for the underexpanded than the overexpanded jet, where the latter had an indistinct mixture of crackle type sound masked by other roaring noises. On the other hand, a tonal noise is revealed for the overexpanded jet at a frequency of 3.7KHz that corresponds to the screech fundamental frequency which is 3.69 KHz for underexpanded nozzle [9].

Fig 2b shows the skewness $S$ of the pressure wave form $p$ for both nozzles where the overexpanded nozzle has farfield skewness $|S|$ below 0.2 at 40º indicating crackle is not present. Here, the eddy motion is not yet being subjected to nonlinear distortion in the course of propagation. For underexpanded the skewness $|S|$ has a high value 0.57 at 40º in the farfield having suffered nonlinear distortion generating crackle noise. These results are in agreement with Ffowcs William’s skewness definition for crackle described earlier [1]. One should also note the very high $|S|$ for the underexpanded jet at 80 degrees angle. This is caused by the harmonic of screech, but as discussed earlier, the corresponding skewness derivative was low for that screech component, while at 40 degrees angle it was high, causing the crackle to be heard at the 40 degrees angle.
Figure 2: (a) Spectral contents of farfield crackle characteristics for the underexpanded and overexpanded jet at 40º polar angle and in (b) are the corresponding skewness of the pressure wave from with the polar angle.

4. Conclusions
This investigation has sought to distinguish between crackle characteristics of underexpanded and overexpanded cold supersonic jets of MJ=2 using small model laboratory sized jets. Sound recorded from both jets were played back, where the roar of crackle was much loudly heard from the underexpanded jet whereas overexpanded was masked by other noises. This was associated with a lower acoustic energy at low frequency for the overexpanded jet at the quadrant of the Mach direction and an overall sound pressure reduction due to the presence of shock at the nozzle exit. Also in the same quadrant, the skewness for the overexpanded jet was lower than 0.2 in agreement with Ffowcs Williams’ definition for the onset of crackle where skewness for |S|>0.4. These studies can help to analyse more clearly the non-linear sound wave form effects as expected from supersonic jets that currently are limited to the military, but in the future, will also apply to civil aviation according to future plans of business jets and airliners.

References

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A viola player who suffered a life-changing hearing injury that left him unable to work, or even listen to his own son play, has won a landmark High Court judgment against the Royal Opera House (ROH).

It is the first time a judge has examined the music industry’s legal obligations towards musicians’ hearing in detail. The case was brought by Chris Goldscheider, but it is now having huge implications for the industry and the health and safety of musicians.

UK noise monitoring specialists, Cirrus Research, have been following the case and agrees that the fall-out from the ruling could be seismic for the sector. Cirrus’ James Tingay, who has more than 25 years’ experience in the sector said: “It is the first time that ‘acoustic shock’ has been recognised as a condition, which can be compensated by a court and, not surprisingly, the ROH has said it’s “disappointed” by the judgment and will possibly appeal.

“Acoustic shock is a condition with symptoms including tinnitus, hyperacusis and dizziness that can make even simple tasks extremely painful when you are exposed to just normal everyday sounds.

“The ROH and other orchestras will need to re-assess their health and safety policies and procedures, alongside the protection they currently afford musicians now that the High Court has sent this very clear message that they are not exempt from Noise at Work legislation.”

The story began back on 1 September 2012, when Mr Goldscheider was seated directly in front of the brass section in the orchestra pit at the ROH, for a rehearsal of Wagner’s powerful Die Walkure opera.

During that rehearsal, the noise levels exceeded 130 decibels, equivalent to that of a jet engine. The court heard that his hearing was irreversibly damaged and he now has to wear hearing protectors to carry out everyday tasks such as preparing a meal. Mr Goldscheider left the ROH in July 2014 as a result of his injuries, ending a stellar career.

His condition is particularly hard for him to come to terms with, as he now is unable to listen to his 18-year-old son Ben – a rising star in his own right and outstanding French horn player.

“This case resonates with Cirrus as we work with so many acoustic consultants who are involved in the music and entertainment industries,” James continued. “So much so that we launched a national campaign last year called ‘Noise Changes Lives’ to highlight the impact that noise can have on people in the workplace.

“Sadly, Mr Goldscheider’s case is a classic example of this, where noise has changed his life in every sense; from the day-to-day tasks he now struggles to perform, loss of his livelihood, right down to being unable to hear his own son play. The example could not be starker.”

During the High Court hearing, the ROH argued that acoustic shock does not exist and that if it did, Mr Goldscheider did not have it. ROH countered that he had developed an entirely natural hearing condition, known as Meniere’s disease, at exactly the same time as the
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super-loud, high intensity noise burst behind his right ear.

However, Mrs Justice Nicola Davies took a different view, stating: “I regard the defendant’s contention that Meniere’s disease developed at the rehearsal as stretching the concept of coincidence too far.”

She added: “The reliance upon artistic value implies that statutory health and safety requirements must cede to the needs and wishes of the artistic output of the Opera Company, its managers and conductors. Such a stance is unacceptable. Musicians are entitled to the protection of the law, as is any other worker.”

In a statement, the ROH said the expert medical advice it had consistently received was that long-term hearing damage could not be caused by an isolated incident of exposure to live music.

“Although this judgment is restricted to our obligations as an employer under the Noise Regulations, it has potentially far-reaching implications for the ROH and the wider music industry.

“We do not believe that the Noise Regulations can be applied in an artistic institution in the same manner as in a factory, not least because in the case of the ROH sound is not a by-product of an industrial process but is an essential part of the product itself.”

Damages will be assessed later and could be more than £750,000 in lost earnings alone, according to Acoustic Consultant, Richard Beale, of RB Health and Safety Solutions Ltd.

He said: “There were many alleged breaches of the Noise at Work legislation put forward by the claimant, which were accepted by the Justice and will make serious reading for the industry. I wouldn’t expect to see major changes overnight, but an immediate and sufficient acoustic risk assessment should be top of the list – that was one of the alleged failings put forward by Mr Goldscheider’s legal team.”

The alleged breaches put forward included:

• Failure to make a suitable and sufficient assessment of the risk to the health and safety of the claimant from noise (Regulation 5(1));
• Failure to eliminate, at source, the risk to the claimant’s hearing posed by his noise exposure, or, if that was not reasonably practicable, to reduce that risk to as low as reasonably practicable (Regulation 6(1));
• Although the claimant was likely to be exposed to noise at or above an upper exposure action value (EAV) (namely 85 dB(A)Lepd) or a peak sound pressure of 137 dB(C), failure to reduce his noise exposure to as low a level as reasonably practicable by establishing and implementing a programme of organisational and technical measures, other than the provision of personal hearing protectors (Regulations 6(2));
• Failure to ensure that the claimant was not exposed to noise, which, despite the attenuation afforded by personal hearing protectors, exceeded an exposure limit value (namely 87 dB(A)L epd) or a peak sound pressure of 140 dB(C) (Regulation 6(4));
• As the orchestra pit was in a place where the claimant was likely to be exposed to noise at or above an upper EAV (85 dB(A)Lepd) or peak sound pressure of 137 dB(C), failure to ensure that the orchestra pit was designated a hearing protection zone, demarcated and identified by appropriate signage and the claimant was not to enter without wearing suitable personal hearing protectors (Regulation 7(3));
• Failure to ensure that the hearing protection provided to the claimant was fully and properly used (Regulation 8);
• Failure to provide the claimant with suitable and sufficient information, instruction and training (Regulation 10).

“The list is extensive, and I am certain the ROH will appeal but this case has certainly made the industry sit up and take notice,” said Richard, who has more than 21 years working in the industry.

In the words of Mrs Justice Davies; “the reliance upon artistic value implies that statutory health and safety requirements must cede to the needs and wishes of the artistic output of the Opera Company, its managers and conductors. Such a stance is unacceptable. Musicians are entitled to the protection of the law, as is any other worker.”

The judge also said the Foundation was in breach of a number of Control of Noise at Work Regulations, and that it was this noise that had led to Mr Goldscheider’s hearing problems.

She said: “Had the Foundation complied with its statutory duty, Mr Goldscheider would not have been exposed to the level of noise he endured.

“As an employer, you have a duty under the Noise at Work Regulations which extends to performers, musicians, front of house and rear of house staff.”

This has not changed; however, the ruling will likely ensure that the industry employers review their policies and procedures. The ROH also claimed ‘contributory negligence’. But while the judge acknowledged that Mr Goldscheider could have left the area at any time, the nature of the injury meant that he would have suffered the damage before he was able to leave.
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Visitors to the Institute of Acoustics’ ACOUSTIC 2018 conference, on 23 and 24 April in Cardiff, will get a first-hand demonstration of Brüel & Kjær’s new, user-centric sound and vibration analysis software, BK Connect™.

Designed around the needs and tasks of engineers, BK Connect’s platform is suitable for use across industries such as aerospace, automotive, medical and more. BK Connect fully integrates with Brüel & Kjær’s LAN-XI acquisition hardware. Together, they provide a comprehensive set of tools for measurements and data processing, with the flexibility to simplify the work process. It melds seamlessly into tailored workflows, over a wide range of engineering scenarios – from repetitive, standardised testing, to complex troubleshooting investigations.

The company’s acoustic camera – a complete kit for real-time noise source identification and data recording – will also be on display during the show. Designed to be up and running in 20 seconds, this tool makes it easy for engineers to identify and measure non-stationary noise events in areas such as aircraft cabins, cargo bays and passenger vehicles.

According to the HSE, despite more than a decade of legislation, millions of workers in the UK are still being exposed to high noise levels and a similar number to vibration, which can lead to noise induced hearing loss (NIHL) and hand-arm vibration syndrome (HAVS) respectively.

Recognising this, Essel Acoustics is a newly-founded specialist consultancy with the expert skills and relevant experience in occupational noise, and both hand arm and whole body vibration assessments and control. NIHL accounts for 75% of occupational health insurance claims and HAVS has become the most commonly reported issue under RIDDOR.

Worryingly, workers in certain sectors such as ‘greenspace management’ risk both noise and vibration exposure. Fines in excess of £100K are not uncommon for health surveillance failings and reputational damage can ensue.

Essel’s aim is to create a safer and more productive working environment. Owner, Satish Lakhiani has had more than 20 years’ experience in noise and vibration control as a design engineer of military hearing protection and as a consultant with a leading International consultancy. He holds an MSc in Applied Acoustics and is a full member of the IOA.

For more information visit www.esselacoustics.com
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Noise monitoring specialists, Cirrus Research, have added a new noise at work awareness course to their training programme.

The course is aimed at health and safety personnel who need a basic understanding of the noise regulations, but it is also suitable for those who are new to noise assessments and could also serve as a useful revision for people who have not been involved in this area for some time.

The new noise at work awareness course will debut at York Racecourse on Thursday 10 May.

The course covers general health and workplace safety and the risks posed by noise to hearing. It also looks at the duties and responsibilities outlined in the Control of Noise at Work Regulations (2005), covering both employers and employees.

To ensure a rounded training experience, there is also a practical session on noise measurement and control, coupled with a hands-on element where actual measurements are taken and analysed by the delegates.

Other areas covered include:
- Noise theory – what is sound?
- The dangers of noise.
- How noise is measured and what terminology is used.
- Techniques for noise measurement.
- How to use sound level meters / dosimeters.
- Carrying out a noise assessment.
- How to record and report your findings.
- Implementing noise control measures – how to reduce and control the risks.

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Guide to reverberation control

Cass Allen have put together a short (but sweet) guide to reverberation treatment options for rooms.

The guide is aimed at developers and architects and sets out a number of common treatments along with their pros and cons.

These treatments are used to prevent excessive reverberation and are often required to achieve acoustic specifications or regulations. In particular, reverberation treatments are required for the following development types:

- Corridors in residential developments to comply with Building Regulations Part E;
- Teaching rooms in schools to comply with BB93 (as required by Building Regulations Part E);
- Rooms within medical or healthcare facilities to comply with HTM08-01; and
- Office workspaces (particularly open-plan workspaces) to achieve good quality work environments.

The amount and type of treatment will vary depending on the size and use of the room. In many cases, the location of the material is also very important.

The performance of acoustic treatments is graded based on the amount of sound they absorb. The best absorbers are Class A (almost total absorption), however, Class B and C absorbers are also very effective.

For more information visit http://www.cassallen.co.uk/guide-reverberation-control
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Membership Committee news

Paul Shields (right) taking over from Paul Freeborn (left) as Membership Committee Chair.

Paul Freeborn was presented with a card and gift as a token of appreciation for all his hard work over the past six years.
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ound and vibration instrumentation, software and sensors specialist, AcSoft Sound & Vibration, is now offering the AC100 AcoustiCAM® from SINUS Messtechnik GmbH. The portable, low cost and easy-to-use acoustic camera has been designed to quickly identify and find the precise location of sound sources.

Aimed at standalone applications, the affordable AcoustiCAM has a multi microphone array that uses beam forming techniques to overlay an acoustic image onto a visual image that allows the operator to see sound sources. It is ideal for the sound analysis of complex objects and often reveals issues where conventional measurement methods using single microphones have difficulty.

Because of its high performance, simple operation and cost-effectiveness, the compact AC100 is suitable for a range of applications in research and production, including localisation and separation of sound sources to reduce noise emitted by vehicles, machinery, household appliances and electric tools.

It can also be used for source analysis for acoustic design of wind tunnel models, acoustic vehicle tests, quality assurance, predictive machine maintenance and acoustic optimisation of product.

Due to its state-of-the-art microphones in MEMS technology with integrated AD converters and 51.2 KHz sampling rate, together with integrated measurement data processing electronics in the latest DSP technology, the AC100 is affordable for a wide range of users.

The complete integration in the array with only one USB interface for data and power supply, allows for convenient mobile use with any windows PC.

The AC100 is a compact and easy to use acoustic camera for standalone applications. Users just connect the USB cable, install and start the BeamformX software to make measurements and visualisations simply and rapidly.

The AC100 is supplied either as pure hardware and Windows driver for custom development or bundled with the BeamformX application software from OptiNav. BeamformX uses an advanced new robust functional beamforming algorithm.

Compared to conventional beamforming methods, it works faster, has a higher dynamic range and can resolve more details spatially and temporally. The stored raw data can also be used in post processing with the SAMURAI software from SINUS Messtechnik.

The AcoustiCAM AF 7001 beamforming software ensures precise localisation and separation of sound sources. Any sound situation can be measured with a single measurement along any scanning surface as a coloured, two-dimensional absolute sound pressure distribution.

For the visualisation of the sound situation, the localisation result can be stored and displayed with an overlaid photograph of the object to be examined.

In addition to the AC100 acoustic camera, AcSoft is offering the Tornado multi-channel system for both stationary and mobile applications. This is an excellent platform for data acquisition with conventional microphone arrays and for the beamforming calculation with its high performance PC.

A number of different array geometries with detachable ¼” ICP microphones optimised for various applications are available. Each set of 16 microphone signals is connected to the inputs of the Tornado system securely and quickly by means of highly flexible multi-core cables with MDR connectors. This solution also allows use with customer-specific arrays.

The fan less design and the three-way power supply with AC, DC and battery are key features. Up to four Apollo PCI Express cards with 64 channels in total can be installed. In addition, eight slow channels are available.

For more information visit www.acsoft.co.uk

Modernised Calibration Labs at ANV

NV is pleased to announce the refurbishment of the calibration labs based at their head office in Milton Keynes. ANV commissioned purpose-built, custom-designed benches and shelving to provide an efficient, comfortable and modern laboratory environment.

“The new labs reflect our professional calibration service” explains Operations Manager, Kiran Mistry, adding “It’s our wide range of UK-based calibration services, rapid turnaround and competitive prices, provided by our friendly team of experts that has made our calibration service so popular and successful.”

ANV provide UKAS accredited and traceable calibration of all major manufacturers’ sound level meters (including filters and reverberation time), sound calibrators and tapping machines. ANV also provide traceable calibration of microphones, accelerometers, vibration meters (including groundborne vibration PPV and VDV meters) and vibration calibrators.

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Liverpool Central Library - Liverpool
Acoustic plaster

This advert is a general guide and specific technical advice is recommended before proceeding with any transaction. Full technical information available from your local office.

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- Automatic identification of tones and impulses in time history
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New offices for Clement Acoustics

Clement Acoustics have recently moved their London head office to new premises in order to support their rapidly expanding business. Situated in leafy Balham, south London, the newly refurbished offices provide an attractive, flexible work environment for the growing London team.

Referring to the move, Director John Smethurst said: “We are really pleased with our new offices. As well as more comfortably accommodating our current staff the new premises will provide us with the space to welcome further talent into our team, supporting our growth for years to come.”

Clement Acoustics had been at their previous London location in Shepherds Bush since the company was founded in 2012 and opened their second office in Manchester in early 2014.

Xavier Babington joins AECOM

AECOM is very pleased to announce the recent appointment of electro-acoustics specialist, Xavier Babington, to its growing electro-acoustics team. Xavier is well-known in the industry for his extensive experience and fastidious approach to the design, modelling and commissioning of public address and voice alarm systems. With approximately 14 years consultancy experience including many international projects covering rail and metro, education, stadia and a particular acquaintance with airport terminals in the UK and overseas, Xavier will be a key member of the team and mentor to junior staff. Jim Smith, AECOM’s Electro-Acoustic Global Lead, acknowledges the valued contribution Xavier has already made since his appointment in January and is looking forward to the prospect of him assisting in the development of the electro-acoustics team and project portfolio.
Committee meetings 2018

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