ACOUSTICS
A SOUND CAREER
2019

If you want a career that mixes people, science and engineering, then head to the world of acoustics

Produced by the Institute of Acoustics

Institute of Acoustics

Cirrus Research plc

Listening to the World

SINCE 1970

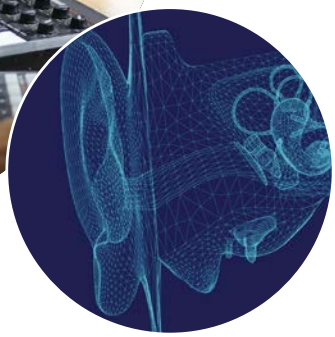
Sold in more than 70
countries across the world

Changed noise
measurement with the invention of the doseBadge wireless noise dosimeter

Institute of Acoustics
founding sponsor since 1974

8500+
Optimus Sound Level Meters sold since 2010

For More Information Visit:
cirrusresearch.co.uk



Contents

04 A career in acoustics offers challenges, excitement, flexibility and rewards

08 Apprenticeships

10 A career that suits your skills

12 Career advancement

14 Build your own career

18 Designing better products

19 #ExploreAcoustics

20 The inventiveness of noise and vibration engineers

22 Electroacoustics – sound equipment and systems design

26 Careers in audiology

28 Charlie's inspiration

30 How the IOA supports student members

Contacts

Publisher
Juliet Loiselle

Editor:
Nicky Rogers
Email: nickyr@warnersgroup.co.uk
Tel: 01778 391128

Advertising:
Dennis Baylis MIOA
Email: dennis.baylis@ioa.org.uk
Tel: 00 33 (0)5 62 70 99 25

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

Edited, designed and printed by:
Warners Group Publications
The Maltings
West Street
Bourne
Lincs
PE10 9PH

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

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

The Institute of Acoustics does not necessarily endorse the products or the claims made by the advertisers in *Acoustics - a Sound Career* or on literature inserted therein.

Welcome to the world of acoustics

Acoustics is involved in just about every aspect of our lives.

'Sound' is a vital component to the quality of our lives, it is how we communicate and it gives us pleasure. **'Noise'**, on the other hand, can irritate us, makes us feel stressed and stops us sleeping. The World Health Organization says that excessive noise seriously harms human health and interferes with people's daily activities at school, work, home and during leisure time. It can cause adverse cardiovascular and psychophysiological effects, reduce performance and provoke changes in social behaviour.

Make a difference

The fascinating science of acoustics is about improving the quality of our lives and making a positive difference to people. From enabling people to hear each other in busy places, designing loudspeakers and microphones, working on speech recognition systems, liaising with architects on the acoustics of theatres and auditoria, helping with the medical applications of ultrasonics, understanding the effects on whales and dolphins of the sound of human activity in the oceans, acoustics offers diverse ways to make your contribution count.

We have created this guide to show you what a career in acoustics can offer you. If you want a career that is varied and challenging, and where you can make a positive and tangible difference to people's lives, consider a career in acoustics.

It makes sound sense.

Allan Chesney
Chief Executive, Institute of Acoustics

Produced by the Institute of Acoustics

Institute of Acoustics

A career in acoustics offers challenges, excitement, flexibility and rewards

Acoustics is the interdisciplinary science that deals with the study of all mechanical waves in gases, liquids and solids, including vibration, sound, ultrasound and infrasound.

Many people think that acoustics is strictly musical or architectural in nature. While acoustics does include the study of musical instruments and architectural spaces, it also covers a vast range of topics including noise control, SONAR for submarine navigation, ultrasounds for medical imaging, thermoacoustic refrigeration, seismology, bioacoustics and electroacoustic communication. Something for every skill set!

The acousticians profiled on these pages come from very different backgrounds and took very different routes to the industry. It demonstrates the incredibly diverse nature of acoustics.

Beth Paxton, Apex Acoustics

"I studied maths at university and after graduating I didn't have a clue what career to go into. Before I got my current job I was working as a maths coach in a secondary school. My favourite course at university included a section on sound waves, so I looked for related jobs and applied speculatively to several acoustics consultancies.

"I studied for the Institute of Acoustics' graduate entry Diploma in Acoustics and Noise Control by distance learning during my first year working as an acoustic consultant, which meant studying the course notes at home and attending tutorials once or twice a month. I enjoyed the breadth of material that the course covered in a fairly short space of time. It gave a good overview of the different areas of acoustics as well as covering the calculations, standards and guidance that I use every day.

"Being numerate and comfortable using equations is a must for working in acoustics, but beyond that, my degree covered lots of things that are relevant to my work and understanding of acoustics.

"The most useful transferable skill I've taken from my job as a maths coach is practice at explaining tricky concepts clearly and patiently to people, so being able to communicate clearly is really important."

James Stokes

"When I left the University of Manchester with a Master's Degree in physics and French, I knew I wanted to combine my love of music and sound with something technical and applicable to my degree – since I came across acoustics I haven't looked back!

"Because of the inherent connection between music and acoustics, I have found that many of my workmates have previously worked or studied in live music, audio engineering or even music performance – but because acoustics fits predominantly into the construction industry, other academic backgrounds in architecture, engineering or mathematics for example can be a great starting point for a career in this field.

"I can certainly say that it is the variety of projects that keeps things interesting for me – from multi-million pound concert halls to soundproofing nightclubs, every project I'm involved with has its own unique problems and limitations and the challenge of creating a successful, workable design is an ever-changing and exhilarating task. It is also extremely satisfying to visit a completed building that you have helped to design."

Dan Rowe

"I really enjoy the breadth and depth of subjects that a career in acoustic engineering has allowed me to explore. In my field of underwater acoustics, acoustic engineering bridges the subjects of mechanical, electrical, fluid dynamics and materials engineering and never fails to throw up a diverse range of interesting problems to solve. It encourages you to have an open mind and think outside the box. There are not many industries where one day you can be working on cutting edge science and R&D with universities and other industrial collaborators, then soon after, get your hands dirty testing the final system that your developed technology has fed into."

Saif Bunni

"I have been a musician since I was very young and have always been fascinated in how sound moves all around us. So after studying sound design as an undergraduate, I decided to expand my scientific knowledge about the subject by pursuing a Masters in acoustics at the University of Salford. Since then, I have been working at WSP mainly measuring and assessing vibration caused by trains, machines or people for major environmental projects around the UK and in Europe.

"I enjoy both the practical and technical aspects of this field and I am fascinated by how vibration turns into noise and how it can affect people and buildings – especially in congested cities."

Rob Bungay

"I chose acoustic engineering as a career because of my interest in the work it requires and the good employment prospects – there are far fewer acoustic engineers than in the older engineering disciplines such as civil and mechanical engineering.

"My work is extremely varied and as it involves my personal interest in music, along with the broad thinking required to complete work, my career is very rewarding. For example, I recently worked on a multi-bed intensive care ward where patients and visitors were complaining about the intrusive noise made by the alarms from bedside monitors. To understand and try to reduce these causes of complaints, among other things I installed sound level meters throughout the room to record noise levels during the day and night, and used acoustic models of the space to assess changes within the room. After analysis, I could offer various recommendations to rectify the issue – all distinctly individual from each other, as acoustics can be affected by nearly everything!"

Tom Galikowski

"I first became interested in acoustics while studying HND Audio and Video Systems at University of Salford. In my teenage years I was fortunate to work in Polish Radio and was fascinated with recording studios and audio equipment used in the process of making programmes, so I decided to pursue a career in audio production.

"However, life quickly confirmed my talent (or lack thereof) and I realised a career in recording studios was not for me. Luckily, one of the modules, Acoustic Principles, turned the topic into the most interesting story. It was an introduction to basics of acoustic building design and included examples from BBC and Granada studios. I was hooked.

"I liked the combination of sound, engineering and architecture. Following completion of my HND course I studied for a Bachelor's degree in Acoustics in Salford. I completed my student placement with Bickerdike Allen Partners (BAP) the company I have been with ever since, and graduated in 2010.

"While working at BAP I became interested in vibration control and pursued a Master's degree in Structural Engineering at South Bank University. This allowed me to work on some interesting projects including the British Museum extension and the Royal Opera House refurbishment.

"What I like about acoustics is the blend of science, engineering and creativity. I enjoy combining research, gadgets and creative thinking to solve problems presented by acoustic phenomena (such as structure-borne noise or ways of protecting delicate objects from damage)."

George Taylor

"I have been working with Mason UK for more than three years now and in that time, I have worked on a wide variety of projects. Being in the supply sector of noise and vibration control is really exciting, not only for being responsible for the end product, whether it is a small ceiling hanger or a large structural bearing, but also for being actively involved in design discussions with architects, consultants and engineers. This quite often involves having to overcome complex issues that are common in the acoustic isolation sector, which makes it all the more satisfying when the solution is created."

Taylor Cooper

"I went to university knowing exactly what I wanted to do. I enjoyed learning, I studied hard and got good grades. Like all young, new graduates I was excited to start my career and utilise my degree, which was in psychology, sociology and child development.

"You read that correctly. I am an acoustic engineer, and I have a degree in psychology. So just because you go to university knowing exactly what you want to do doesn't mean you know exactly what you will end up doing!

"I started working in acoustics purely by accident. I moved from the USA to England in 2012 and I ended up at a small acoustics company who took a chance on an American psychology major that didn't even know that this industry existed.

"What I enjoy most about working in acoustics is being involved in multi-disciplinary projects. Acoustics is just one aspect of a new or changing infrastructure and, I really like working with other specialists to help create the best possible outcome.

"Being an acoustic engineer means undertaking surveys, computer modelling and reports, but having an unconventional degree has actually helped me branch out in my role as well. I am project manager for several bespoke acoustics projects, which means I am responsible for budgets, deliverables and everything behind the scenes. Every project in acoustics, whether it's from a technical perspective or a project management perspective, has new goals to achieve and new challenges to overcome!"

'Acoustics is one of the most diverse and rewarding careers I could have imagined.'

Andy Parkin

"I have a very musical background and have always loved physics; acoustics is the physics of sound so they go well together.

"I took maths and physics at A Level and when I was looking at universities (1993) the main places to study acoustics were Salford and Southampton. Salford had a reputation for being audio-based and being a northern musician and hi fi enthusiast, Salford seemed the most appropriate choice for me.

"The Salford course included lectures on maths, electronics, acoustics theory, acoustics research, audio design and lots of practicals in laboratories and in the field.

"On graduation (BEng with Honours in Electroacoustics) I worked for R W Gregory in Birmingham, where I was the sole acoustician in a 200-strong building services consultancy. Noise surveys are the staple of any acoustician's life and every project requires a survey, this may involve sitting in a car overnight with a sound level meter on a tripod next to the car, taking reverberation time measurements in a performance hall, measuring speech intelligibility of PA systems in airports and football stadia etc, in order to carry out calculations, modelling and reports.

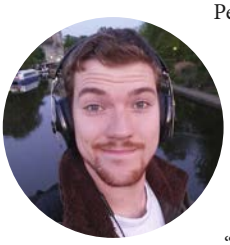
"In 2010 I joined Cundall to set up an acoustics team for them.

"Acoustics is one of the most diverse and rewarding careers I could have imagined. Having the opportunity to positively influence people's lives and the built environment, where no two days are the same – what's not to like?"

Where acoustics can take you

Loudspeaker designer, Chris Spear

"Loudspeaker design is a dark magic to most people. Very few fully understand the science behind the scenes, but everybody can enjoy what pours out of a well-designed system. People these days want nothing but the best; the most minute details revealed, the effortless recreation of their favourite instrument passage, bringing films to life with more precision and scale than the largest of cinemas – all from products smaller and more sophisticated than ever imagined.



"Loudspeaker design means working on the cutting edge of acoustics, electronics and digital signal processing to bring people's thrills to life, and that's what makes it such a rewarding career."

Claire Parsons from Westminster City Council

"Local authorities offer opportunities in environmental acoustics in roles such as environmental health officers or scientific officers. The work is varied and interesting and provides a good mix of office and site-based work.

"No two days are the same as it's impossible to predict what the next case might bring. The work could range from investigating complaints about noise from loud house parties, assisting construction site developers with managing their environmental impacts or providing comments on a planning application to ensure the development is in a suitable location from a noise perspective.

"Other tasks can include monitoring noise from large concert events, or providing advice on new roads or railway lines. Many officers will attend court or planning inquiries to provide evidence in the cases they are dealing with. The work includes a broad mix of people, technical and legal skills.

"There are various routes to get into local authority noise work and these include undertaking an environmental health qualification such as a degree in environmental health or a regulatory compliance officer apprenticeship, or by working as an environmental enforcement officer or equivalent. Many local authority noise officers undertake specific qualifications in noise and acoustics such as the IOA Diploma in Acoustics and Noise Control or the IOA Certificate in Environmental Noise Measurement.

"Career opportunities include progressing within local government to senior officer or team leader and beyond, or moving to other sectors such as academia or environmental consultancy."

'No two days are the same as it's impossible to predict what the next case might bring.'

Career that sounds just right

For some, acoustics wasn't the first choice of career. There are many scientific disciplines that lead in that direction though that wouldn't immediately spring to mind, such as geography. Acoustic consultant, Sarah Whydle, explains her route:

Sarah Whydle

"I'm a principal acoustic consultant and came to acoustics through a bit of an unusual route, I studied geography at the University of Leeds and then joined a small environmental consultancy to support WSP undertaking the environmental monitoring on the Olympic Park during its construction.

"I tried my hand at dust and ground and surface water monitoring but it was noise and vibration that took my fancy. WSP offered me a job following completion of the Olympic Park contract, and I went on to study for the IOA Diploma in Acoustics and Noise Control, which was fantastic and really well-suited to developing my career in acoustic consultancy.

"I sometimes wonder how I ended up in the niche world of acoustics, but it's an exciting place to be especially if you are a creative thinker with good communication skills, enjoy working outside (there's always a survey to do), an opportunity to work on big place-changing projects (e.g. the Shard, HS2, Crossrail), and collaborating with others in a design team to find a solution that makes a building have a comfortable acoustic character that sounds just right."

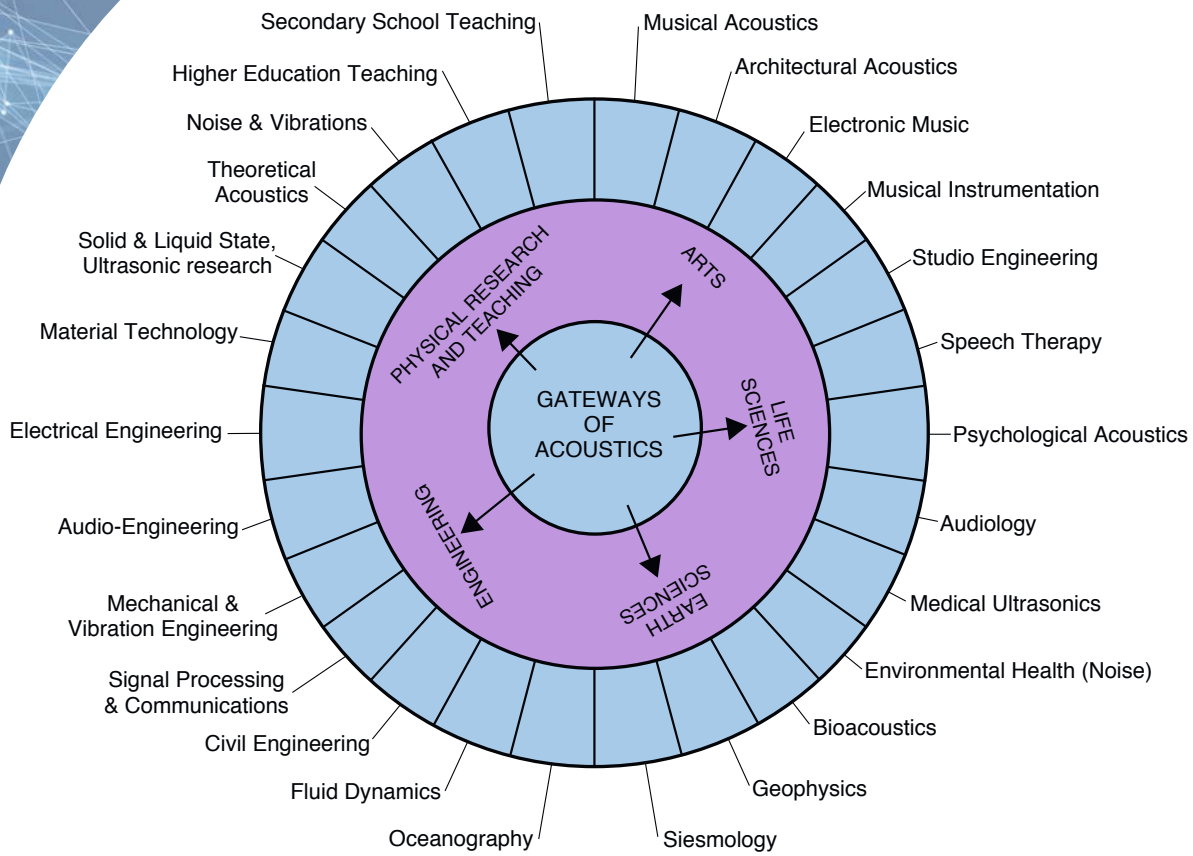
Ellen Harrison

When thinking about what to study at university, Ellen Harrison, now principal acoustic consultant at WSP, took inspiration from a simple diagram like the one on page 7 and says that it was instrumental in her choosing to follow a career in acoustics:

"A similar image was given to me as a potential student at an open day at Southampton University and it illustrated the wide range of career options available to me, if I decided to study acoustical engineering at university.

"I was originally drawn to engineering when studying maths and physics at school, because I enjoyed the problem-solving nature of the work. I wasn't sure which career to follow at first, but the open day really sparked my interest and the wheel demonstrated the range of career possibilities available to me.

"I've been working in architectural acoustics at WSP, a multi-disciplinary engineering consultancy for nearly 10 years now and I love my career. I have worked on a large variety of projects including hospitals, schools and residential developments, helping to assess and control sound and vibration, to provide acoustically comfortable environments for staff, patients and residents. I would highly recommend considering acoustics as a career!"



The future of acoustics

As we have shown, acoustics is an industry occupied by people from a range of educational backgrounds including physics, architecture, engineering, environmental science and music. This means that it attracts a vast range of interesting people, from bedroom DJs to environmentalists, from DIY coders to festival organisers. Robert Marriner, acoustic engineer at WSP continues:

Acoustics is an industry that continuously looks outside of its own field for solutions and inspiration, constantly seeing acoustics as an integrated part of each project and of society. That, in turn, helps us to find creative solutions for our clients and to design a world that is ready for the future.

Climate change and specifically, the actions that societies need to take to reverse it, will change the way we all live. However, those actions are also set to change the way we think about sound, particularly in urban environments. With a move away from private cars, towards walking, cycling and public transport, and the electrification of the remaining road vehicles, town centres have the potential to become a lot quieter than we are used to at the moment. If we're designing buildings based on today's noise levels, could they have eerily quiet interiors in the future? Could apartments that aren't allowed balconies because today's noise levels are too high, be missing out on sought-after private amenity space further down the line?

Drone noise

Of course, that's ignoring other theories which say that things will get louder, not quieter, because everything will be delivered by drone. Companies interested in using drones are already researching the impact they could have, and developing their expertise.

Drones are already being used, not just by internet giants, but also by engineers, to survey large swathes of land, some even using artificial intelligence to identify certain geological features or the condition of man-made structures. Similar applications could be found in acoustics, but there's one big problem as far as noise measurements are concerned – they're just too noisy... at least for now.

Technological advances

But drones are just one piece of the 21st century technology jigsaw. Back in the office, computer processing power is already opening up opportunities for running bigger, better and more complex noise models simultaneously, as well as improving the accuracy of our work. Technology helps us to design buildings that are resilient to vibration and can be built over rail lines, and even paving the way for virtual reality applications which are revolutionising the way we talk about acoustics to clients, designers and the public.

Being such a niche industry, this technology won't arrive overnight. A lot of software development is done in-house by the people who use it, because it's too small a market for big software developers to target. That means users get what they want, and there's a huge potential for creatively-minded acousticians who can weave a solid understanding of acoustic theory with existing software and emerging technologies.

Inspiration and innovation

Technology and environmental sustainability are set to change the sound environment in which we live, and the creative acoustician of the future will simultaneously embrace these as sources of societal change and tools of the trade.

The future of acoustics promises exciting challenges that will inspire people with a wide range of skills to think creatively and generate innovative solutions. Who knows – you may have acoustics-related skills that our field hasn't even begun to look for yet.

Apprenticeships

Our understanding of the impacts of good acoustic design, particularly in respect to health and wellbeing, are better than they have ever been

Acoustics technician apprenticeship ready to make some noise!

We are delighted to announce that approval has been received for the Acoustics Technician Apprenticeship, representing a fresh approach in introducing new people to the acoustics industry.

Acoustics, sound and vibration are becoming more prevalent in many areas of our lives, the impact of which is being seen in how it is discussed both in the media and in professional circles. Our understanding of the impacts of good acoustic design, particularly in respect to health and wellbeing, are better than they have ever been. As a result, the industry currently faces a long-term challenge of offering expertise to this growing need, and the Acoustics Apprentice Trailblazer Group hopes that this scheme is a positive step in realising a sustainable response to the challenge.

What is an apprenticeship

An apprenticeship is a real job, with real experience, a salary and most importantly a chance to train while you work. You are treated like anyone else in an employer's organisation. Key to this approach is complimentary experience and education, enabling apprentices to put into practice what they learn and, in turn, learn from their experiences.

The Trailblazer Group, formed of representatives from industry, have taken care to establish an apprenticeship standard that seeks to include the vast array of different professional streams included in acoustics. The standard and subsequent assessment plan, developed in conjunction with the IOA, aims to establish a course which will form a robust foundation for apprentices to apply acoustic principles to their day-to-day work.

How it works

An apprentice is an employee, and will be expected to contribute to the services provided by an employing organisation, whilst simultaneously spending at least 20% of their time in off the job training, typically at a college or similar place. Over the course of two-years, the apprentice will be expected to compile a portfolio of work to demonstrate a wide range of learning, producing a project report, culminating in a presentation of the project and discussion of the portfolio with an approved panel of judges. In doing so, the apprentice will be equipped with the tools to achieve technical excellence in their chosen field, all the while having built a solid foundation of actual work experiences.

What's in it for you?

The apprenticeship will provide formal training and experience, culminating in the award of a qualification to take the apprentice forward to a formal degree, degree apprenticeship or other alternative employer based training routes. The apprentice will also have the opportunity to apply for TechIOA status with the Institute of Acoustics and EngTech accreditation with the Engineering Council. Above all, the apprentice will have compiled a portfolio of actual experience in the acoustics industry, valuable for both them and their employer.

The apprenticeship is expected to be ready in time for the September 2020 intake. Launch events will be taking place in the meantime.

Your next step

If you know anybody who would be interested in a career in acoustics, please contact apprenticeships@theanc.co.uk or visit www.instituteforapprenticeships.org/apprenticeship-standards/acoustics-technician/

MASON UK LTD

Vibration Control Products
& Acoustic Floor Systems

Vibration Control Engineering

Problems with acoustics are very often the result of ground and structure borne sources travelling through a structure and manifesting themselves as noise. This could be as a result of plant equipment and associated pipework, loud audible sources, impact from leisure activities or nearby railway sources. Mason UK has decades of experience of working with the acoustic consultant to resolve these and many other engineering problems.

Royal Opera House Linbury refurbishment project ►

The key is to separate the noisy structure or vibration source by means of isolating plant equipment and services, floating box-in-box structure or full building isolation. Choosing the correct isolator to separate and support and separate can have a significant effect on isolation performance, lifespan and cost to the client. We are always happy to work with the design team to support a project and reach the most efficient solution. We have a broad range of expertise and can help with not only the acoustic but structural and architectural challenges as well as supporting the contractor on site.

◄ Building core isolation against tube vibration, London

Carrying out the work on site is one of the most important aspects. A good design can be easily compromised by poor installation or a lack of care by other trades. We take pride in taking a project from initial sketches to successful completion. Designing a solution is only part of our work, experience shows the importance of providing good advice to all involved on a project.

The success of projects shown on this page are 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.

▲ Vacuum system isolation, Ford Research Centre

ABOUT MASON

A world leader in noise & vibration control products for over fifty years setting the standard for consultants & architects. In addition to a complete range of mounts, our floating floors, walls & suspended ceilings provide total acoustic isolation.

TYPICAL APPLICATIONS:

• Music Rooms • Night Clubs • Plant Rooms • Recording Studios • Bowling Alleys • Building Isolation
• Cinemas • Gymansia • Microscopes • M+E Isolation • Suspended Ceilings • Industrial

www.masonuk.co.uk

+44 (0)1252 716610 info@masonuk.co.uk 6 Abbey Business Park, Monks Walk, Farnham, Surrey GU9 8HT

A career that suits your skills

The specialist field of acoustics mixes people, science and engineering; it impacts everyone's lives, health and wellbeing. It makes a difference to society and how we live, so if you're looking for a fascinating career in which you can exploit your maths and science skills then you should explore the diverse world of acoustics.

Acoustics is all around you – in the voices of your friends and family, in the music you listen to and in the car you drive. Everywhere.

Professional acousticians work in a huge variety of fields – from the design of a recording studio or smart phone audio apps to environmental and workplace noise measurement and control, and from the assessment of wind farm nuisance to car and jet engine design, to name just a few.

Flexible entry requirements

To work as a recording engineer, higher education qualifications are increasingly expected. If you have, or expect to get, A Levels or an equivalent qualification, such as a BTEC Level 3 National in a relevant subject, you could apply for a degree course. Some courses may require certain A Level subjects such as maths, science or music. For the Tonmeister[1] sandwich degree in music and sound recording at the University of Surrey, normally you need high A Level grades in maths, music and physics and a grade 7 standard in musical performance is desirable.

There are relevant HNC/D and foundation degree courses. These are work-related programmes that normally take two years full time or longer on a part-time basis. Joint Audio Media Education Support (JAMES) accredits relevant courses at around 25 universities and colleges on behalf of organisations such as the Association of Professional Recording Services (APRS), Music Producers Guild (MPG), UK Screen Association, Music Managers' Forum (MMF) and PLASA (a membership body for suppliers of technologies and services to the industry).

Acoustic degrees

For a place on the Southampton Acoustical Engineering courses (and the Acoustics with Music degree course also available at Southampton) you'll need A grades in maths and physics at A Level.

(While there is a lesser entry requirement at Salford (grade C in A Level maths), the mathematical content of their course is equally demanding.)

While graduates from these courses often have successful careers in acoustics-related consultancy, it is possible to practice as an acoustics consultant without needing the level of maths required on these courses.

The IOA Diploma in Acoustics and Noise Control

Those with a degree in engineering or science already can do a postgraduate degree programme in acoustics or study for the Institute of Acoustics' (IOA) Diploma in Acoustics and Noise Control. This requires completion of four modules (general principles of acoustics, laboratory and two specialisms chosen from building acoustics, environmental noise, regulation and assessment of noise and noise and vibration control engineering) and a project. This is the internationally-leading specialist qualification for the professional practitioner in acoustics. In the UK, successful completion of Diploma modules is recognised by the Universities of Derby, Leeds Beckett, London South Bank and Solent for advanced standing towards their acoustically-related MSc courses.

Diploma candidates study the Diploma programme either through part-time study (typically through day-release) at an IOA-accredited higher education institution (HEI) or through tutored distance learning (DL) depending on individual circumstances. The pattern of study over the year is similar to that of the day-release programme used by many accredited centres. However, DL candidates are required to attend four days of laboratory schools.

Although the normal entry requirement to the IOA Diploma is a relevant degree, the IOA aims for the Diploma to be as accessible as possible and accepts entrants with little more than GCSE-equivalent mathematics and physics, supported by relevant professional experience. In this regard, its entrance requirements are more flexible than those for the courses at Salford and Southampton.

You could be assessing wind farm nuisance...

...or measuring workplace noise

'Acoustics is all around you!'

Qualities you'll need for a career in acoustics

- **An aptitude for maths and science**
- **Creativity in your approach to solving problems**
- **Curiosity about music, speech and other sounds and how they work**
- **Good written and verbal skills.**

A Moodle-based online classroom on the IOA website gives distance learning candidates access to the resources that normally, would be available only to Centre-based candidates through their HEI library, and enables them to join the tutorials online.

STEM Ambassadorship

Being an acoustician also gives you plenty of ways to get involved in encouraging more young people into the industry.

Teachers and students are really keen to talk to industry professionals that work in STEM (Science, Technology, Engineering and Maths) careers. This can result in acousticians being involved in a wide variety of activities from mentoring and tutoring through to careers and science fairs and school talks and workshops.

The largest organisation that supports individuals that volunteer in school is STEM Learning, the owners of the STEM Ambassadors programme. It is also possible to volunteer through your local education business partnership and other organisations, such as the Royal Institution. You could even contact your old school, your children's school or the nearest school and offer to help.

Not only is working with young people very rewarding and enjoyable, it can also give you some new opportunities to develop presentation and networking skills. Given the shortage of professionals in the industry, the organisation that you work for may be willing to offer you some time to volunteer.

The IOA has a STEM committee that promotes and organises these activities in the acoustics industry.

Ross Latue

"An avid passion for music and science led me to in the direction of acoustics as a potential career.

"I first heard about the post graduate IOA Diploma through careers discussions with my course leader after doing a variety of acoustics modules at university. The IOA course is excellent at equipping its students with the necessary skills needed to work as a consultant; each and every day working within acoustics I apply the knowledge, skills and experience that I gained on the course. The course is particularly good at covering key information about current legislation and guidance – which we constantly refer to as acousticians.

"Just one year into my career and I have been involved in a vast range of projects, from providing suitable mitigation for noise impacting upon a small barn conversion to providing acoustic design advice for a new university building. A cliché but very true, no two projects are ever the same!"

Phil Hainsworth

"Although my undergraduate degree specialised more in audio system electronics for live events, it was the modules in room acoustics and noise control that I found the most interesting.

"During my final year of university, I attended the IOA 'Art of Being a Consultant' conference, which encouraged me to pursue a career as an acoustic consultant. So following my undergraduate degree, I studied the IOA post graduate Diploma in Acoustics and Noise Control at the University of Derby.

"The IOA Diploma gave me all the theoretical background in acoustics and vibration needed for a career in acoustic consultancy, including some of my first practical acoustic measurement experience in the laboratory module.

"The IOA Diploma also counted toward the taught element of the University of Derby MSc in Applied Acoustics, which has set me on the standard route to chartership with the IOA. I thoroughly enjoy my career as a senior acoustician at Atkins, having worked on some of the most exciting large infrastructure projects in the UK and Middle East, and attribute a large part of my underlying theoretical acoustics knowledge to the quality and content of the IOA Diploma."

Reference: 1 A tonmeister is a person who creates recordings or broadcasts of music who is both deeply musically trained (in 'classical' and non-classical genres) and also who has a detailed theoretical and practical knowledge of virtually all aspects of sound recording, music mixing and mastering.

Upgrading your career with Engineering Council registration

The IOA is licensed by the Engineering Council to register members as professional engineers.

Through the IOA Engineering Division, suitably qualified and experienced engineers may gain this internationally-recognised award. For Chartered Engineer (CEng) and Incorporated Engineer (IEng) registration, there are two routes:

- The standard route for those holding an accredited engineering degree; and
- The individual route for those holding degrees in related subjects such as physics, or unaccredited engineering degree, or who are submitting work experience in lieu of qualifications.

Because of the nature of the acoustical engineering profession, the Institute recognises that some members seeking CEng or IEng registration will need guidance and assistance in developing the evidence to demonstrate that they satisfy both the educational and the professional development requirements. If you need advice or more information, email the IOA at **acousticsengineering@ioa.org.uk**

Step up

Whether you are an engineering apprentice, studying engineering at college or university, or recently graduated, professional registration will be an important future step on your career ladder.

The first stage in becoming registered is to join a professional engineering institution such as the IOA. There are many advantages to joining while still studying, and these institutions offer resources that might help you in your studies, such as libraries, journals, specialist interest groups, networking opportunities and careers advice.

Professionally registered status shows employers that you have (and are) committed to maintaining and enhancing the knowledge, skills and competence required to meet the engineering and technological needs of today. The prestige of your title will improve your CV and may lead to wider employment options, career progression and promotion.

Professional registration also shows employers, peers and the pubic that you have spent a number of years developing your skills, knowledge and understanding in your field and have clearly demonstrated your competence and commitment.

Rachel Bennett

Rachel studied for her BSc (Hons) in Music Technology & Audio Systems at the University of Huddersfield, and completed her MSc in Environmental Acoustics at the University of Salford, in 2011.

Because CEng registration is a recognised standard across all engineering disciplines, qualification had been a goal of hers for a few years and she was encouraged by her employer.

Rachel said: "I started preparing evidence for CEng registration a few years ago, I have always been encouraged to keep a CPD record at work, and it is also a requirement of IOA membership, so this was the most straightforward piece of evidence to compile.

"I also had to provide an initial professional development report, which expanded the relevant areas of my MSc studies and CPD whilst at work.

"I found that writing the professional review interview (PRI) report took the most time – selecting a variety of projects to cover the different UK SPEC criteria, describing them in the required way, it took considerable time and numerous revisions.

"I was supported by the IOA through the process, they reviewed my evidence and provided feedback until they felt it was suitable for submission. Finding time to compile and revise all the evidence and prepare for the interview, along with work and family life, proved challenging.

"The interview mainly focused on the PRI report and I was asked questions to clarify my statements, expand on them, and to make sure that all the relevant criteria had been covered. I was also given the opportunity to discuss CPD and other aspects of work I am involved in, such as STEM outreach.

"The IOA was especially helpful in arranging an interview so that I had the opportunity to complete the process before my own personal deadline – I was due to have a baby at the end of January! I was very glad of this otherwise I would have had to postpone and re-visit the application after 12 months of maternity leave."

Looking to the future, she said: "I hope that being chartered will provide extra confidence in my work to clients and my employer. This will be especially important when bidding for new projects.

"It will also be a welcome boost to my confidence when I return to work after maternity leave.

"CEng registration has not necessarily always been 'expected' of acoustic consultants as much as it is of other engineering disciplines, however, I think this is starting to change."

Will Kerr

Having excelled in maths and music at school, Will Kerr felt that he was in a prime position to start a career in acoustics by studying at the ISVR at the University of Southampton. Fast forward four years, including a summer placement at Hoare Lea and collection of MEng in Acoustical Engineering, Will was offered a graduate position at Mott MacDonald and he has worked there ever since as part of their acoustics team.

He has worked on major road and rail infrastructure schemes – gaining valuable experience in environmental noise. His most notable contributions have included improving efficiencies in modelling, and presenting a paper on the subject in Japan.

Will said: "It took me a while to understand how to present my evidence for my CEng qualification, but fortunately, I had some great support.

"I would say to anyone going through the CEng process that they should make sure they have a mentor who understands exactly what is needed to present the evidence to demonstrate that they satisfy the educational and professional development requirements."

More Engineering Council information www.engc.org.uk

Engineering Council

Acoustic measurement and instrumentation offers a career with immense variety

John Shelton, Chair of the IOA Measurement and Instrumentation Group, asked members of his group why they chose a career in this specific field of acoustics.

The older members, who started their careers when acoustics was not really a 'thing', were originally electronic engineers with a mechanical bias, who were designated by their employers to take on the responsibility of doing noise and vibration measurements, as no-one else could or would do it!

This led to one member ending up having a successful career in instrument sales, another spearheading the development of new acoustic measurement products and another, heading up an instrumentation company.

Younger members have more commonly come from a local authority, or an acoustics education and now are involved in instrumentation development, sales and standardisation, with a strong focus on applications.

Take your pick

The beauty of acoustics is that it covers many fields, which can include automotive, aerospace, electroacoustics, R&D, environmental, telecom, etc and while there are specialist groups in the IOA which address each of these fields, no single other group has a toe in them all, so the acoustic measurement and instrumentation area allows a lot of variety in careers. For example, in any given week, you could be at a building acoustics laboratory measuring insulation, measuring noise and vibration in the latest secret car prototype, measuring the human vibration in a military tank, or measuring the performance of hi-fi headphones.

How to specialise

It's fair to say that most graduates from acoustics courses tend to gravitate towards a career as an acoustic consultant, it's a great career in which you can end up heading your own consultancy. But if you like variety, another good place to start is in sales or development of instrumentation and all the instrumentation manufacturers are looking for well qualified people.

Another area is to work in an acoustic laboratory, for example, taking measurements on new machine prototypes. One of my first jobs was measuring the noise from a prototype leisure hovercraft – I spent many happy hours driving it around Portsmouth harbour in the name of development!

An interest in 'gizmology' also helps, I've always enjoyed tinkering with software and computers, as well as any kind of noise and vibration measurement, and I am always looking for different ways of characterising noise and vibration parameters to allow us to better understand the world around us.

So, for measurement and instrumentation, the buzzwords are variety, curiosity and a desire to make the best measurement possible, while understanding the limitations and possible errors.

The above project is the stunning new Michelin Star restaurant, HIDE by LustedGreen Architects. 20mm of SonaSpray fcx was applied in two bespoke whites to feature curved ceilings on both the ground & first floors. SonaSpray controls reverberation, creating a relaxed & enjoyable atmosphere within a space.

Architectural Acoustic Finishes

- Oscar Acoustics have been in business for over 40 years.
- From specification to installation, everything is kept in-house.
- Oscar Acoustics has the greatest number of installation teams.
- Uniquely, our products design enables easy & invisible repair within reason.
- We have BIM objects for every product available from the national BIM Library.
- All our products achieve M1 certification for emissions; the best classification available.
- Made from eco-friendly recycled materials contributing to LEED, SKA, WELL, BREEAM & more.

Photo by Andrew Meredith

NBS Plus · riba product selector · NBS National BIM Library · RIBA CPD Providers Network

OSCAR acoustics

PENGUIN
RECRUITMENT

PENGUIN RECRUITMENT IS A MULTI-DISCIPLINED ENGINEERING AND ENVIRONMENTAL RECRUITMENT CONSULTANCY ESTABLISHED IN 2004.

WE OFFER NATIONWIDE AND INTERNATIONAL JOB OPPORTUNITIES FOR ANYONE LOOKING TO KICK START THEIR CAREER IN ACOUSTICS.

With extensive knowledge is the Acoustics and Air Quality Industry, we are proud to offer an energetic can-do approach whilst providing a friendly, professional and knowledgeable service at all times.

We can find you a role in various areas of acoustics including:

SPECIALIST SKILLS SECTORS INCLUDE:

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

YOU CAN BE STARTING IN A ROLE SUCH AS...

- Graduate Acoustic Consultant
- Assistant Acoustic Engineer
- Trainee Noise and Vibration Engineer
- Sound Insulation Tester
- Account Manager and Business Development Executive
- Technical Support Engineer
- Calibration Technician

Interested in finding out more about our current Acoustic job opportunities?
Please do not hesitate to contact Amir Gharaati or Jenny Lyne on 01792 365 000,
or email acoustics@penguinrecruitment.co.uk

WWW.PENGUINRECRUITMENT.CO.UK

(Recruitment Manager – RPS Group)

"I have worked closely with Penguin Recruitment over the last few years and have always been impressed by their ability to understand and assist with our varied requirements. The Consultants are very knowledgeable in their specific areas and only forward CV's that are relevant to our business."

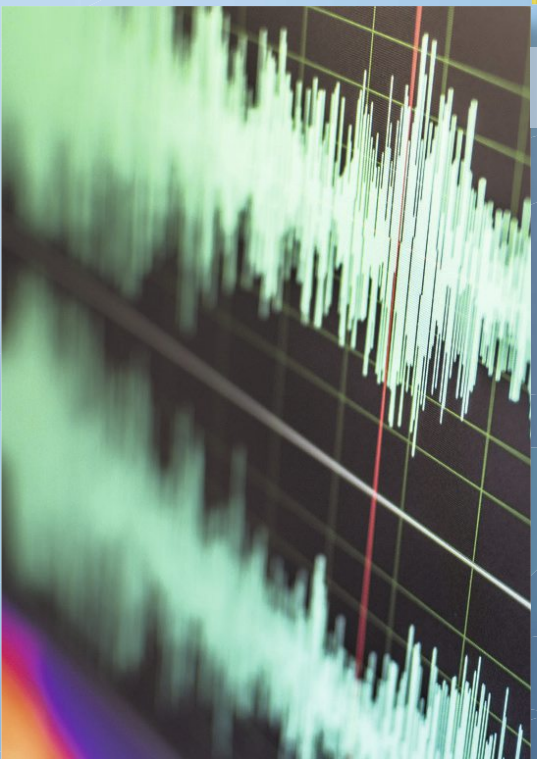
STEVE MITCHELL
(Partner – Environmental Resource Management)

"Penguin Recruitment have always provided an efficient and timely service, with their detailed market knowledge of the acoustics industry, they continue to support the ERM Acoustics Team's expansion plans by providing high quality candidates."

ALEXANDRA GORRINGE
(Environmental Engineer – Hoare Lea)

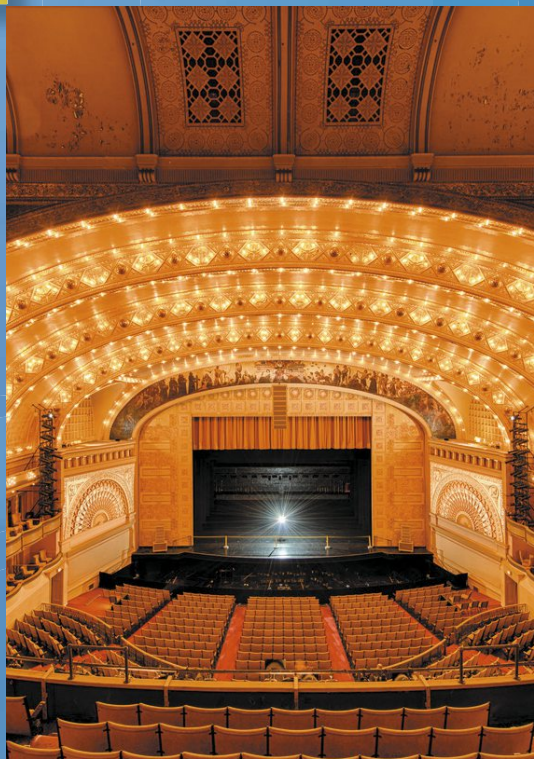
"After a year working at a consultancy with limited opportunities for skill and career development, I was grateful to be approached by a talented consultant from Penguin Recruitment.

After the initial phone call, Amir was able to gain a clear understanding of my current experience, my career goals and my salary expectations, all whilst lending a sympathetic ear."

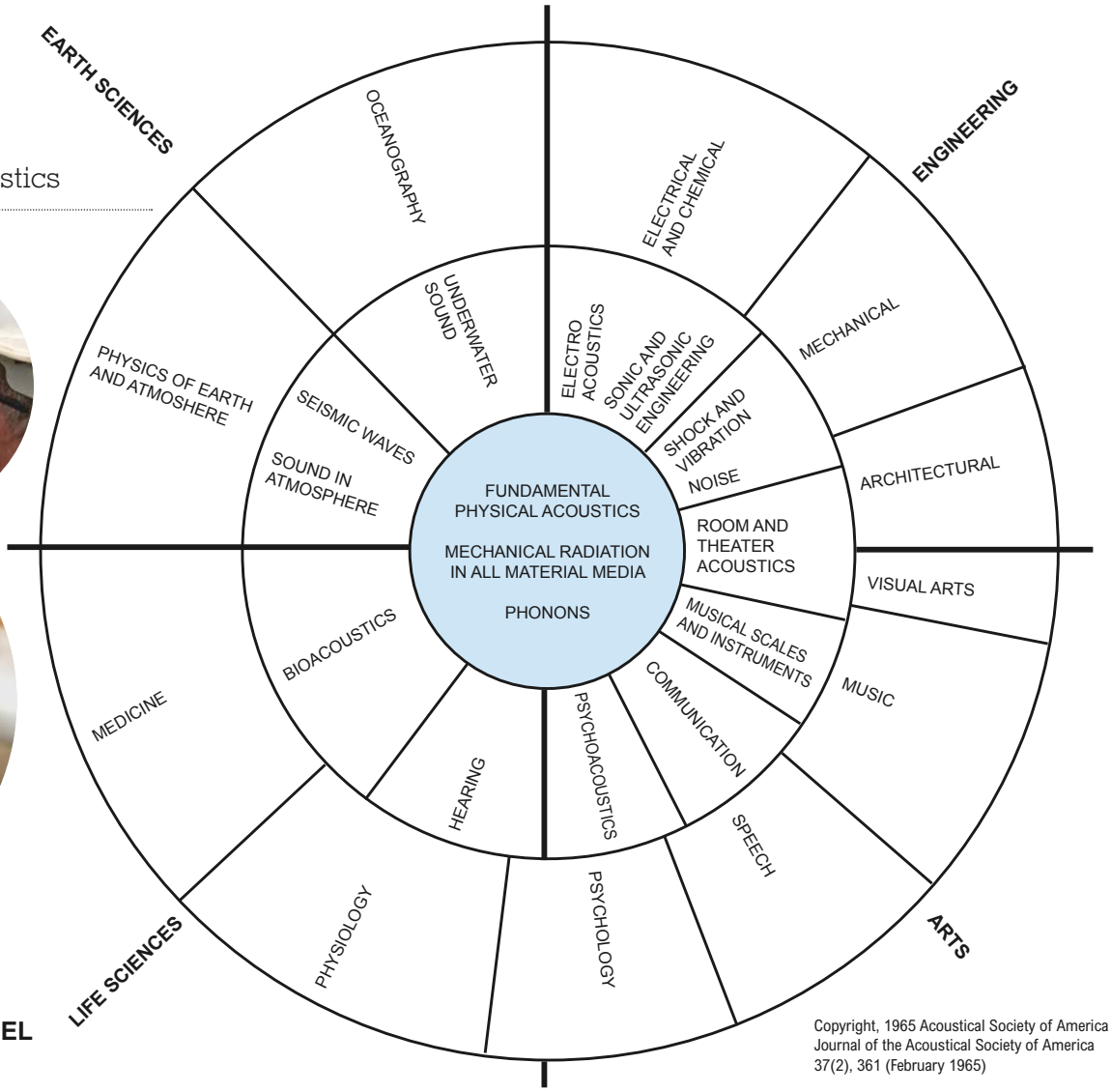


FRASER ALEXANDER
(Director - IAC Acoustics)

"We have worked consistently with Penguin Recruitment, and I've been impressed by the detailed vetting process they carry out, which ensures that only the best candidates hit my desk! They listen to our requirements and are quick to make things happen, maintaining professionalism throughout the entire recruitment process."



Physical acoustics



LINDSAY'S WHEEL OF ACOUSTICS

Copyright, 1965 Acoustical Society of America
Journal of the Acoustical Society of America
37(2), 361 (February 1965)

Designing better products

The way sound propagates, scatters, attenuates and interacts with structures and measurement equipment should concern us all – physical acoustics is the fundamental science that underpins the acoustics we work with every day.

Having a basic knowledge of physical acoustics enables us to make better decisions, design better products, make better measurements and write more accurate reports.

The study of physical acoustics is also developing new ways of interpreting acoustical data including medical ultrasound and imaging, the use of advanced materials for sound absorbers and noise barriers, and many more applications for now and in the future.

Most employers will expect you to have a degree in:

- **Acoustics**
- **Maths**
- **Physics, or**
- **Engineering.**

You could also do a degree in music technology or environmental science then take further training, like the IOA Diploma in Acoustics and Noise Control.

Your day-to-day duties could include:

- **Carrying out noise assessments on buildings to make sure they meet building regulations**
- **Checking noise levels are within legal limits**
- **Testing how changes to a building's design affects sound levels and quality**
- **Using computers to find ways of reducing machinery noise and vibration in the workplace**
- **Giving specialist advice in legal cases**
- **Exploring how sound vibrations affect machinery and structures**
- **Designing and working with recording studio and broadcast sound equipment**
- **Designing medical equipment (like ultrasound) to help doctors diagnose and treat patients**
- **Producing reports, sharing your findings and making recommendations for action.**

'The study of physical acoustics is also developing new ways of interpreting acoustical data.'

#ExploreAcoustics sounds out career choices in acoustics

Which career is all about sound, yet few have heard of it?

The answer is acoustics – and now there's the chance to hear much more about it following the launch of an initiative from the Association of Noise Consultants (ANC), designed to attract more students into the industry.

The ANC's '#ExploreAcoustics' initiative demonstrates the wide range of opportunities available to students interested in a career in science, technology, engineering and mathematics (STEM). It includes video interviews and in-depth case studies featuring students, graduates, professionals and academics in the industry.

There's also a brochure, full of facts about careers and study routes into the industry, with QR codes for additional content.

ANC is the professional body representing consultants in acoustics, noise and vibration in the UK – and many of their members are reporting a shortage of graduates.

ANC chair, Dan Saunders, said: "There are few other careers that can offer the financial rewards, opportunities for travel and such diverse work opportunities than acoustics.

"Roles in the industry include openings in architectural and building acoustics, environmental noise, product design, cinema sound, even sonar and ultrasound."

As well as the graduate route, an apprenticeship is being developed, to give another option to work in the sector.

Keep in touch with all the information, including apprenticeships, at the #ExploreAcoustics site at **www.association-of-noise-consultants.co.uk/explore-acoustics**

Dan added: "It's a great industry to be in and we hope **#ExploreAcoustics** gives an insight into the many opportunities offered."

The inventiveness of noise and vibration engineers

The entitlement to be free from adverse noise and vibration could be considered as a basic human right.

We travel in aircraft, trains, cars and ships, our factories are filled with the machines that produce consumer goods and industrial products, homes have vacuum cleaners, washing machines and fridges. We expect that our vehicles and the equipment we use will be quiet and unobtrusive and that the workers producing them will not suffer harm. We expect that their manufacture and use will not disturb our sleep or leisure.

Noise and vibration control can involve increased weight, loss of operational efficiency and higher costs, all of which affects the sustainability of products. Hence a large engineering design effort is invested to reduce the unwanted noise and vibration without these negative impacts.

So given the rightful drive for sustainable engineering solutions, how can noise and vibration engineers contribute? The answer is not always obvious. Opportunities become apparent when the entire lifecycle of an engineering programme is considered; the best noise and vibration solutions are those that are invisible to the consumer of the technology. Take the car for example; the basic principles of car design remain the same now as they were 40 years ago, but to put the vehicles of the 1970s in context, it was only just becoming common that heaters were a standard item rather than a luxury add-on and most mass-market cars were utilitarian and noisy.

Can cars be too quiet?

Since then, we have developed much more complex noise-reduction strategies for cars. The main structures are now studied in the early phases of design to minimise acoustic impact on the passengers. Damping and absorption materials located in the most effective places have resulted in quiet and comfortable vehicles. In a similar way to crash modelling, the dynamics of the bodyshell and power train can be studied and optimised in detail by computer modelling.

Some of the changes in vehicle design have offered great challenges to quiet and comfortable products. A challenge that continues today is the downsizing of engines, often coupled with intensive pressure to improve fuel economy, so that the weight penalty of noise control treatments becomes more significant. In the other direction we see a growth in the adoption of various forms of hybrid systems. Although the use of electric motors is usually viewed as a noise reduction route, the results in many cases are a new set of challenges presented by the gear drives and other mechanisms that are required.

Most of the acoustic advances in car design have been achieved through improvements in our understanding that have led to better engineering designs, but the future has to include a **reverse** of what we have been trying to achieve for many years – **generation** of external vehicle noise. It will soon be a requirement that hybrid cars broadcast some kind of noise signal to allow those nearby to be aware that the vehicle is active and moving.

"Electric cars need invented engine noise to ensure pedestrian safety."

Noise and vibration engineers specialise in:

- **Engineering noise control**
- **Vibration control**
- **Assessment and control of workplace noise and vibration**
- **Noise, vibration, and harshness sound quality assessments**
- **Low noise design**
- **Noise source mechanisms**
- **Measurement methods for source identification**
- **Noise and vibration prediction methods.**

They are likely to have other related interests such as: vibro-acoustics, underwater acoustics, aero-acoustics, the physical effect of noise on humans, measurement methods and standards, noise or vibration induced fatigue, engineering design methods, etc.

Noise and vibration engineers often work closely with people outside the field of acoustics (mechanical, marine or aeronautical engineers, designers and architects, safety officers, etc).

CHALLENGE

The e-sound challenge
What sort of noise would you 'invent' for an electric or hybrid car to satisfy the driver and to alert pedestrians? Would you replicate the sound of a combustion engine? Or would you go for an entirely different noise that people would have to learn?

How the IOA can help your industrial noise career

The IOA Noise and Vibration Engineering Group comprises members of the Institute with a particular interest in assessment and control of noise and vibration. The aim of the group is to provide a forum for members to exchange information and discuss developments within this general field of interest, including engineering methods for noise and vibration control, workplace noise or NVH assessment, low noise design, source identification methods, source mechanisms and prediction methods.

Sound equipment and systems design

Electroacoustics is a branch of acoustics which is concerned with the development and use of devices such as speakers, headphones and microphones that convert electrical signals into sound or visa-versa.

Electroacoustic devices are found in a wide range of applications, ranging from the microphone and speakers in a mobile phone through to televisions and railway station announcement systems and the giant stacks of loudspeakers at outdoor rock concerts.

The number of applications is rising all the time with new technologies, such as the control of noise in cars, requiring specialised speakers and microphones.

The range of careers in electroacoustics is equally wide and includes:

- **Sound system design**
- **Manufacture**
- **Sales and installation**
- **Development**
- **Design and manufacture of microphones and speakers, and**
- **Research into novel devices and applications.**

Industries that require electroacoustic technology include:

- **Entertainment**
- **Television**
- **Radio and live performance**
- **Communications:**
  - Mobile phones
  - Public address
- **Emergency announcements**
- **Alarms**
- **Automotive:**
  - In-car-entertainment
  - Noise vibration and harshness and
  - Driver information.
- **Musical instruments:**
  - Guitars and
  - Electronic keyboards.

The range of careers in electroacoustics is wide and includes the design and manufacture of microphones

‘Industries that require electroacoustic technology include radio and live performance.’

How the IOA can help your electroacoustics career

Joining a professional body such as the IOA is a great way to make some useful contacts, give yourself the best professional opportunities and make an impact on your career.

Its Electroacoustics Group is the home for specialists in all aspects of sound equipment and sound systems design. The group holds an annual conference, called Reproduced Sound, usually in late November. **http://reproducedsound.co.uk/**

Reproduced Sound meetings cover topics such as loudspeaker and microphone design, multi-channel audio, speech intelligibility and leaks into the Noise at Work Act as it pertains to the entertainments industry.

Akustik+sylomer® by getzner

Manufacturing **solutions** for architectural acoustics and vibration problems **since 1969**.

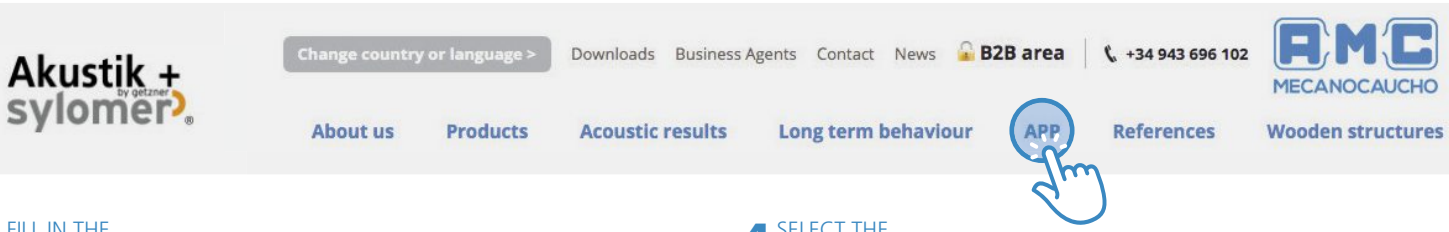
AMC MECANOCAUCHO UK

Download the full catalogue here:

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

1 ENTER IN **OUR WEB APP**

Enter www.akustik.com and click the App button.

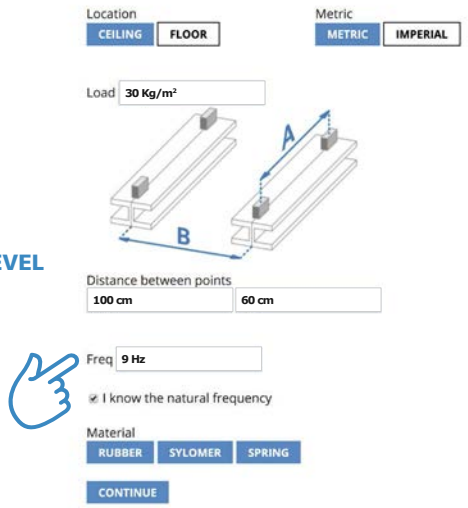


2 FILL IN THE **INPUT DATA**

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

3 SELECT THE **PERFORMANCE LEVEL**

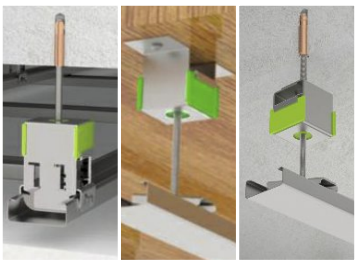
Introduce the natural frequency that you require. If you ignore this value you can select if your preference is high isolation or cost effectiveness. You can also select if the elastic material is rubber, Sylomer or spring.



4 SELECT THE **INSTALLATION TYPE**

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

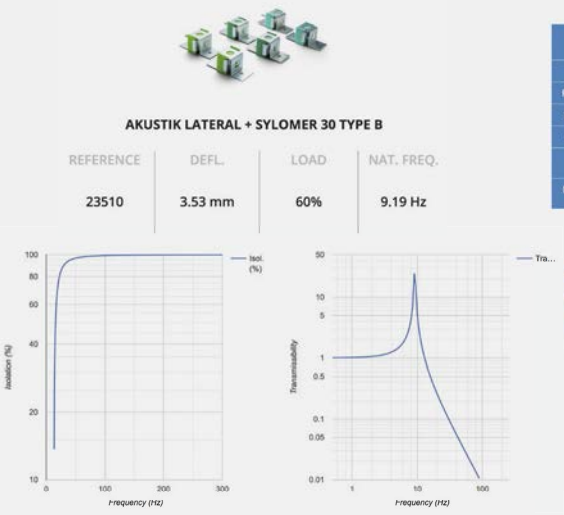
Finally select the hanger that suits best.



Straight to profile | Straight to slab | Between threaded rods

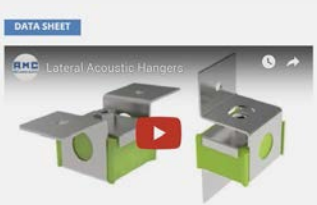
5 OBTAIN **RESULTS**

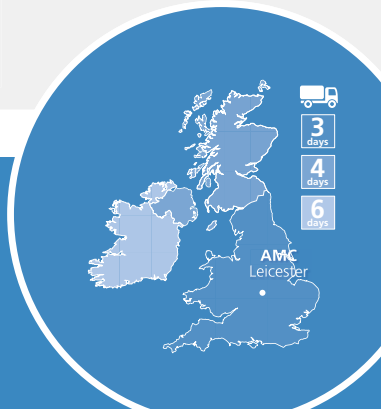
This will lead you to a page where you will be able to check the isolation level. On this page you will be able to receive the complete vibration isolation level, data sheet, installation video or even request a quotation/offer.



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

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





Bipin J Mistry BSc
Technical Sales Manager

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

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

Texaa®

textiles, acoustics, architecture

Product Vibrasto stretched acoustic material for walls and ceilings
Fire resistant Europe (SBI) B-s1,d0 equivalent Class 0
Sound absorption Class A to D
Resistant Dust and soil repellent coating, high mechanical resistance
Cleaning Vacuum cleaning
Guarantee 10 years

Allende Concert Hall, Mons-en-Barœul, France
Architects: Dominique Coulon & associates
Photo: Eugeni Pons

texaa.co.uk

Careers in audiology

If you like a challenge and enjoy working with people of all ages then audiology may well be the career for you.

Audiology is a challenging and expanding field involving the study of hearing and balance. The British Academy of Audiology states that audiology professionals perform a wide range of activities, which include the assessment and rehabilitation of people of all ages with hearing loss or balance disorders.

Audiologists can work in a variety of settings including hospitals, private practice, research and development and with instrumentation ranging from audiometric measurement equipment to sophisticated signal processing hearing aids.

New and exciting opportunities exist in this fast-evolving and varied discipline. Individuals with an interest in acoustics, biological sciences, psychology, physics, and electronics, as well as speech and language development, may find that audiology has a lot to offer them.

There are also opportunities for those with an interest in signal analysis and signal processing, particularly in diagnostic instrumentation and hearing aids.

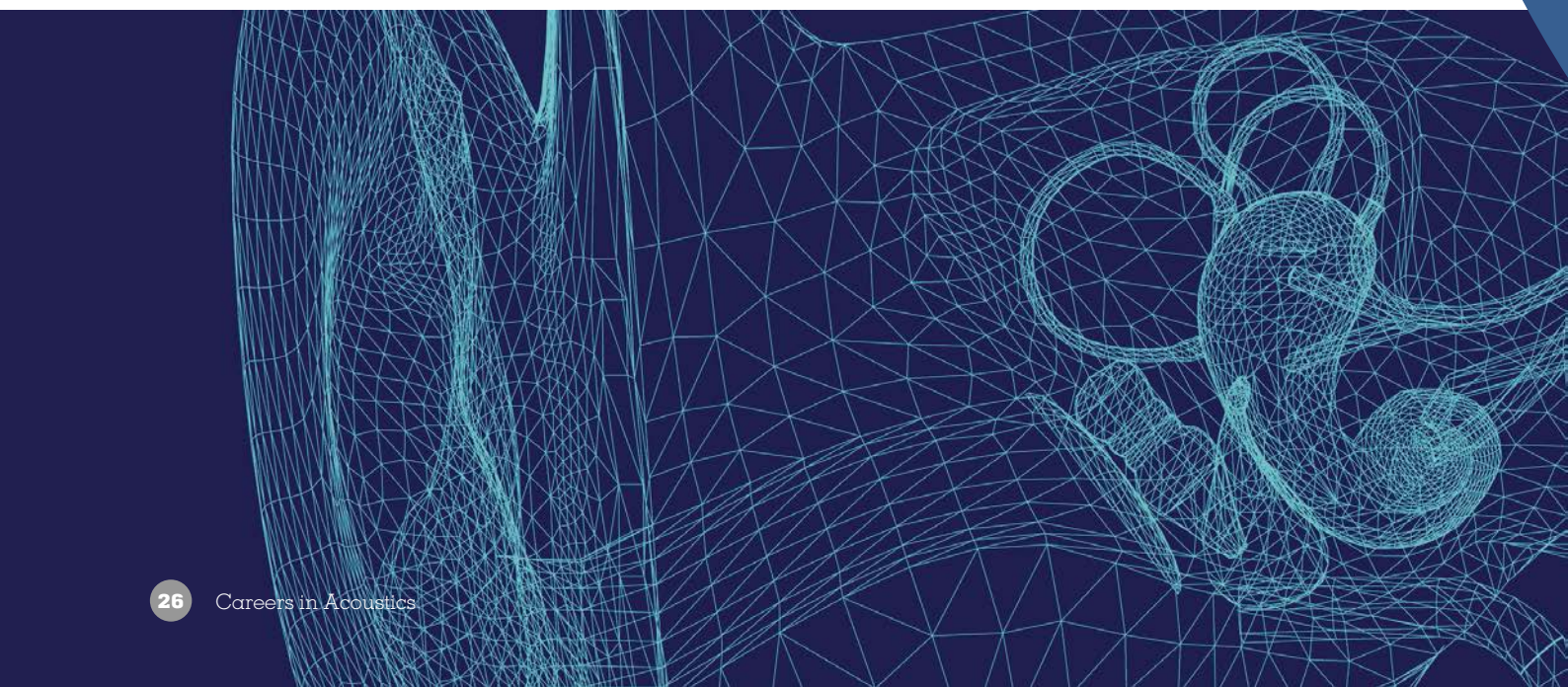
Many audiologists work in multidisciplinary teams, frequently liaising with medical, education and research professionals.

Qualities of an audiologist

If you can tick these boxes, a career in audiology could be right up your street:

- ☐ **Ability to communicate well with all types of people**
- ☐ **Good problem solving skills**
- ☐ **Ability to work as part of a team**
- ☐ **A caring and understanding attitude**
- ☐ **Good manual dexterity; and**
- ☐ **Analytical skills.**

In addition you should have evidence of ability to effectively work with people of all ages, particularly elderly people and young children.



‘New and exciting opportunities exist in this fast-evolving and varied discipline.’

How the IOA can help your audiology career

The IOA Speech and Hearing Group provides a forum for members with an interest in acoustic aspects of speech and hearing. These include speech intelligibility, perception and production, hearing protection, audiology, assistive and other technologies for speech and hearing, and speech and language therapy.

The Speech and Hearing Group committee organises meetings to raise awareness of the subject and advancing technical development through the sharing of knowledge and experience. The group acts as a point of contact for individuals and organisations from all backgrounds that share the common interest, and welcomes their involvement.

Charlie and his fourth-year group design team

Southampton sounds special

Charlie House, PhD student at the Institute of Sound and Vibration Research, University of Southampton, describes how he was blown away by his first visit to his university open day – it eventually led to his proudest achievement. So far, that is…

At a University of Southampton open day, I was shown an awesome 3D-audio demonstration, which generated the most immersive sound experience I had ever experienced – it made me feel like a plane was flying directly over my head, or a person was whispering in my ear.

As a 17-year-old, the idea that engineers could control sound to deceive the senses in this way was fascinating and is ultimately why I decided to study acoustics at the University's Institute of Sound and Vibration Research (ISVR).

The best part of my course was the year-long fourth-year group design project, the pinnacle of the degree, which gave me the chance to use all the skills that I developed throughout my time at university; including everything from acoustic theory to project management.

Collaborative effort

My team chose to design and build a loudspeaker array for cars that would be able to generate separate 3D-audio for both the driver and the front passenger simultaneously. This would allow the passenger to watch a film with virtual surround sound, while at the same time, the driver could listen to sat-nav directions or parking sensors without being distracted.

We developed the hardware and the software ourselves, working closely with the University's manufacturing technicians who machined the complicated aluminium structure; designed so that the array didn't intrude too far into the vehicle cabin.

For the concept to work, the loudspeaker array needed to simultaneously generate four beams of sound, one to each of the two listener's ears. We achieved this using a bank of filters, which forced the acoustic energy from each loudspeaker to cancel out at each of the listeners' ears, leaving only the single desired signal.

We tested the array with a pair of dummy head microphones within the University's largest anechoic chamber to measure its performance in a variety of conditions, before finally testing it in a car.

Achievements

Looking back on the project, the exhilaration we all felt when we finally heard the array working made all the sleepless nights worth it and it is one of my proudest achievements.

I'm now doing postgraduate research with the ISVR, investigating methods to use loudspeakers, microphones and computers to change and control sounds within our everyday lives; making engines seem quieter for example.

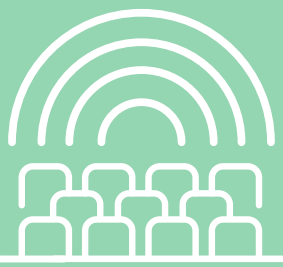
Above: The team project to design and build a loudspeaker array for cars

Below: Beam pattern in the car

UNIVERSITY OF Southampton

Groom the vroom

The sound a car makes is never a coincidence; the acoustics are extensively designed and tested before a model even goes into production. Our graduates in the automotive industry use computer modelling and experiments on prototypes to design and tune a car's acoustic properties.



Bring the house down

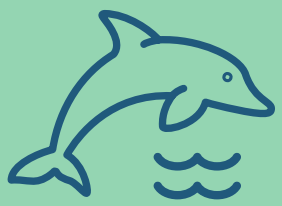
We're helping to make concert halls sound better with improved acoustics, giving concert goers a multi-sensory, spatial, three-dimensional experience.

DECEIVE THE SENSES

ACOUSTICAL ENGINEERING AT SOUTHAMPTON

See with sound

We're helping to improve ultrasound imagery, enabling doctors to understand medical conditions in greater detail without invasive treatments.



Protect whales and dolphins

We're working to understand how marine mammals use underwater sound and the impact man-made underwater noise has on marine life.

97% of graduates are employed or in further study within six months of graduation

DLHE, 2015/16-2016/17

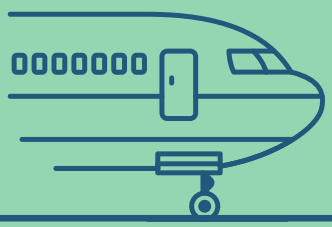
Revolutionise life

We're transforming lives with cochlear implants. A cochlear implant converts sound to electric impulses that travel to the brain, allowing people who could not hear anything to hear almost everything.

You will be taught at the world-leading **Institute of Sound and Vibration Research**

Hush up aircraft

We're working to make aeroplanes quieter, helping to reduce the impact of air traffic and travel on residential areas. Our Rolls-Royce University Technology Centre in Gas Turbine Noise has been improving noise technology, products and processes for the last two decades.



Feel the crowd roar

We're helping to improve sound bar systems within home cinema systems; making for a more immersive experience on movie nights and the big game atmosphere for football and other sports.

Discover more:
www.southampton.ac.uk/engineering/acoustics

IOA support for student members

Almost 17% of the IOA's membership comprises students. To join us as a student costs you nothing, but it gives you an initial level of access to the Institute's resources. You can join now if you are studying acoustics or are on an acoustic-related course.

One of the main benefits of becoming a Student Member is the opportunity for networking – it's quite likely that you could meet your first (or next) potential employer simply by attending the IOA's regular meetings and events.

Aside from having access to branch and group meetings and getting to know the Institute better, you will also receive the IOA's monthly newsletter, which lists upcoming events and meetings and provides you with much deeper insights into what the IOA provides its members.

Professional competency

Membership of the IOA is often seen as a prerequisite for demonstrating one's professional competency in the field. Student members will get to know what's required to obtain full membership of the IOA in future, a process that requires you to provide evidence of a sufficient level of knowledge and experience.

Full membership is open to those who satisfy Council as being suitably qualified educationally and who have a minimum of three years' experience of responsible work in acoustics.

Students usually progress from Student Membership to Associate Membership once they are suitably qualified educationally in acoustics, or when they have an appropriate period of experience in acoustics instead. Associate Membership is for those who have obtained the appropriate academic qualifications for the grade of Member but who do not (yet) have the relevant period of experience in the profession.

The Institute of Acoustics has a fascinating and diverse membership working in a variety of research, educational, environmental, governmental and industrial organisations. Its members range from university students through to qualified professionals in all disciplines.

The Institute is a very active professional body. It has nine specialist interest groups, some of which are featured in this publication. These groups organise meetings throughout the year and the IOA also holds regional events through its Branch network.

To join the IOA as a student costs you nothing, but it gives you an initial level of access to the Institute's resources

'Members range from university students through to qualified professionals in all disciplines.'

TAKE A LOOK

If you would like to become a Student Member, email **membership@ioa.org.uk**

We look forward to supporting you right at the very start of your career.

WANT YOUR QUALIFICATIONS TO TAKE YOU FURTHER, FASTER?

ESTABLISHED 1974 – GLOBAL MEMBERSHIP – INDUSTRY LEADERS
17 UK CENTRES – MANUFACTURING – CONSTRUCTION – MARINE
HAVS – CENG – CONSULTANCY ENVIRONMENTAL – HEALTH & SAFETY
NOISE MEASUREMENT – BUILDING ACOUSTICS

Established for more than 40 years, the Institute provides graduates, and those with a proven interest in acoustics, the chance to become a recognised member of a vibrant and active global network with regular UK meetings and CPD.

Specialise your diploma at ioa.org.uk/students

- Building Acoustics
- Regulation and Assessment of Noise
- Environmental Noise: Measurement, Prediction and Control
- Noise and Vibration Control Engineering

FOR MORE INFORMATION:

T: 0300 999 9675 **E:** education@ioa.org.uk **www.ioa.org.uk**

Institute of Acoustics

WHAT'S SO USEFUL ABOUT ACOUSTICS?

WHAT'S IT ABOUT?

Acoustics is the interdisciplinary science that deals with the study of all mechanical waves in gases, liquids, and solids including vibration, sound, ultrasound and infrasound.

Many people think that acoustics is strictly musical or architectural in nature. While acoustics does include the study of musical instruments and architectural spaces, it also covers a vast range of topics, including: noise control, SONAR for submarine detection, ultrasounds for medical imaging, thermoacoustic refrigeration, seismology, bioacoustics, and electroacoustic communication.

Professional acousticians use their expertise to work in a huge variety of fields – from the design of a recording studio or smart phone audio apps to environmental and workplace noise measurement and control, and from the assessment of wind farm nuisance to car and jet engine design, to name just a few.

WHO IS THE IOA?

The IOA is the UK's professional body for those working in Acoustics, Noise and Vibration. It's a British professional engineering institution founded in 1974.

THE SCIENCE OF SOUND, ITS PRODUCTION, TRANSMISSION AND EFFECTS

406 Silbury Boulevard, Milton Keynes, MK9 2AF
Telephone: +44 (0) 300 999 9675 / email: ioa@ioa.org.uk
www.ioa.org.uk

Institute of **Acoustics**