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GENERAL SUBMISSIONS - REVIEW PAPER

Classifying Sound: A Tool to Enrich Intangible Heritage Management
Murray Parker1 & Dirk H. R. Spennemann1

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Human existence is accompanied by environmental sounds as by-products of people’s activities and sounds that are intentionally generated to allow human society to function. The resulting soundscapes are perceived and experienced by listeners within a social context. These soundscapes are composed of a myriad of individual sounds in both the individual and communal social spheres, and may be perceived positively or negatively, with some sounds having significant value attributed to them by certain segments of society. This paper explores the type and classification of sounds in the urban environment and presents a best fit model of sound classification in order to enable a greater understanding of the potential heritage management of this resource.

ORIGINAL PAPERS

Band Gap Mechanism and Design of a New Type of Six-Ligament Chiral Structure
Yajun Xin1,2, Ran Wang1, Yongtao Sun3,4, Qian Ding3 & Shuliang Cheng5

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2. Hebei Province Low-Carbon and Clean Building Heating Technology Innovation Center, Yanshan University, Qinhuangdao, China
3. Department of Mechanics and Tianjin Key Laboratory of Nonlinear Dynamics and Control, Tianjin University, Tianjin, China
4. State Key Laboratory of Mechanical Behavior and System Safety of Traffic Engineering Structures, Shijiazhuang Tiedao University, Shijiazhuang, 050043, China
5. Key Laboratory of Mechanical Reliability for Heavy Equipment and Large Structure of Hebei Province, Yanshan University, Qinhuangdao, China

Achieving low-frequency and wide band gaps with a simple and small structure can be a challenging task. In this paper, a new type of six-ligament chiral structure with simple geometric parameters and smaller geometric dimensions is designed. The side length of the chiral unit cell is only 20 mm. The proposed structure and the design idea it embodies may be of assistance to deal with the challenges mentioned above. A numerical simulation is performed to analyze the relationship between the geometric parameters and band gap characteristics of the structure. Based on this relationship, a geometrically optimized structure is proposed and the simulation results show it has better band gap characteristics which can achieve low-frequency and wide band gaps. Moreover, frequency response analysis is used to verify the accuracy of the simulation. Finally, the band gap mechanism is analyzed by analyzing the mode diagrams of the structure.

Enhanced Wideband Low-frequency Sound Absorption of a Single-layer Multiple Parallel-arranged Inhomogeneous Microperforated Panel Absorber
Faisal Rafique1, Jiu Hui Wu1, Syed Murawat Abbas Naqvi2,3 & Fuyin Ma1

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2. Key Laboratory of Thermo-Fluid Science and Engineering, MOE, Xi’an Jiaotong University, Xi’an, 710049, China
3. Mechanical Engineering Department, NF (IEFR), Faisalabad, Pakistan

A single layer of four parallel-arranged inhomogeneous micro-perforated panels (MPP) absorber is proposed to achieve low-frequency sound absorption and wider frequency bandwidth. The hole diameter of the four parallel-arranged MPP is set to be equal to or less than 1 mm. The theoretical formula for calculating the absorption coefficient under normal incident sound is established based on an electrical equivalent circuit model (ECM). The parametric study has been performed on the MATLAB software, and the expected results are obtained. The results indicate that the proposed model can produce a wider absorption bandwidth of 195–455 Hz in the low-frequency region with an average absorption coefficient of more than 90% (\(\alpha > 0.91\)). To achieve the desired effect, the absorption coefficient and the bandwidth can be tuned by adjusting the aperture size, perforation ratio, thickness of MPP with depth and width of the back cavity. Also, it is found that MPP can produce wider bandgaps with good absorption peaks in the low-frequency region by designing sub-MPP of smaller hole diameter, large perforation ratio, and with large cavity depths and the sub-MPP of large hole diameter, small perforation ratio, and with short cavity depths. The finite element method has been employed on COMSOL Multiphysics 5.5a to simulate the acoustic absorption performance of the model and compared with the ECM-based predicted and square impedance tube-based experimental results. Compared with other homogeneous MPPs of different arrangements, this absorber provides exceptional absorption performance in a low-frequency range due to its lightweight structure, and convenient manufacturing availability, this enhanced form of MPP absorber has great potential in acoustics and noise control applications.

A Helmholtz Resonator-Based Acoustic Metamaterial for Power Transformer Noise Control
Naser Sharafkhani1

1. School of Mechanical and Mechatronic Engineering, Faculty of Engineering and IT, University of Technology Sydney, Sydney, Australia

Controlling low-frequency noise propagated by power transformers in urban and industrial areas poses a technical challenge in the design of sound absorbers. Although existing acoustic metamaterials are largely successful as single-band absorbers, they are far from optimal approaches to absorb power transformer noise. As a common method of providing multi-band
Forbidden Transmission of Broadband Duct Noise Realized by Compactly Placed Detuned Resonators

Jingwen Guo¹, Yi Fang¹ & Xin Zhang¹

¹. Department of Mechanical and Aerospace Engineering, The Hong Kong University of Science and Technology, Clear Water Bay, Kowloon, Hong Kong SAR, China

Effective broadband duct sound propagation control is highly required in many practical engineering applications. In this study, a compact structure constituted by multiple detuned resonators is proposed for broadband duct noise transmission control. The coupling characteristics of two detuned resonators flush-mounted on the sidewall of a duct are firstly investigated. Results show that a coherent perfect absorption (CPA) is induced when these two resonators are precisely designed. Meanwhile, a nearly flat transmission forbidden band is formed, which is very beneficial for duct noise control. Furthermore, it is found that the appearance of the forbidden band is insensitive to the distance between resonators. On this basis, a customized broadband CPA-based structure constructed by detuned resonators is developed, in which the geometric parameters of each adjacent resonator satisfying the CPA condition and the resonators are closely placed. By overlapping the forbidden band of adjacent resonators, a broad duct sound transmission forbidden band is attained. The acoustic performance of the proposed compact design is demonstrated experimentally.

Directional Response of a Horizontal Linear Array to an Acoustic Source at Close Range in Deep Water

Yanqun Wu¹,², Wen Zhang¹, Zhengliang Hu¹,², Weihua Zhang¹,², Bingbing Zhang¹,², Jun Wang¹,², Wei Guo¹,², Guojun Xu¹,² & Min Zhu¹,²

¹. School of Meteorology and Oceanography, National University of Defense Technology, Changsha, 410073, China
². Hunan Key Laboratory for Marine Detection Technology, Changsha, 410073, China

During an experiment conducted in the deep South China Sea, a bottom-mounted horizontal linear array (HLA) collected the radiated noise from a moving cooperative ship at a distance less than 13 km. Bearing-time records of the HLA through plane-wave beamforming showed significant bearing estimation errors and two or three split bearing tracks of the ship that leads to misjudgment of target numbers. To reveal the physics underlying the experimental phenomena, the directional response of the HLA to an acoustic source at close range was developed by normal mode theory. Numerical simulations were conducted to analyze the acoustic intensity distribution characteristics and the arrival structures of the acoustic field. Comparative results of beamforming obtained with normal mode and ray theory show that the ray model provides an easy way to predict the split bearings for HLA beamforming. When sources are near the endfire of the array, significant bearing estimation errors and the beam splitting effect for a large aperture array were the main issues. For sources near the broadside of the array, the beam broadening effect was the most significant concern. The effect of the array length on the beamforming anomalies and the array gain loss was also investigated. With the present theories, the HLA beamforming anomalies during the experiment were well explained.

Influence Analysis of Internal Solitary Wave on Towed Line Array Shape and Compensation Strategy

Maofa Wang¹, Yibo Liu¹, Zefei Zhu¹, Dayong Peng³, Huanhuan Xue¹, Youping Gong¹,² & Chuanping Zhou¹

¹. Ocean Engineering Research Center, School of Mechanical Engineering, Hangzhou Dianzi University, Hangzhou, 310018, China
². School of Mechanical Engineering, Zhejiang University, Hangzhou, 310027, China
³. Key Laboratory of Underwater Acoustic Environment, The Institute of Acoustics of the Chinese Academy of Sciences, Beijing, 100192, China

Due to the flexibility of the towed line array, shear currents caused by an internal solitary wave (ISW) distort the array shape. This will lead to a mismatch between the conventional target detection algorithm and the array shape, resulting in a significant decline in the performance of the towed line array gain, azimuth resolution, etc. Based on the improved motion model of towed cable constructed by Ablow and Schechter (Ocean Eng, 10: 443–457, 1983), we propose a motion model of the towed line array under an ISW according to the Korteweg-De Vries (KdV) equation and solve the model by finite difference method combined with the Newton iteration method. In addition, the DFT beamforming theory is used to detect the target signal after the array shape distortion compensation to verify the validity of the model. The data analysis shows that the array shape distortion caused by the ISW is mainly affected by the relative position between the array and the ISW, the amplitude of the ISW, the fluid layer density, the fluid layer depth, the towing velocity, the tangential/normal drag coefficient, the elastic modulus, and the towed cable density. The influence of elastic modulus and the towed cable density on array shape distortion can be ignored. The detection results show that the output signal power is about 6 dB higher than the output noise power, and the array gain and azimuth resolution are improved after array shape distortion compensation.

Passage of Monochromatic Sound Through a Gas Pipeline Wall

A. V. Lun-Fu¹, M. A. Bubenchikov², A. M. Bubenchikov² & D. V. Mamontov²

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². Department of Mathematical and Mechanics, National Research Tomsk State University, Tomsk, Russia, 634050

On the basis of a rigorous mathematical description of the motion of monochromatic waves, a method is proposed for determining the acoustic permeability of a wall containing an arbitrary number of layers. The method is based on finding exact distributions for incident and reflected waves in each of the layers.
under consideration and “stitching” linear combinations of these distributions at all common boundaries of adjacent acoustic zones. As a result, to determine the coefficients of linear representations of solutions, a system of algebraic equations is obtained, which can be solved in any and standard way. The study completes the enumeration of all frequencies from the considered spectrum. As an illustrative example, the axisymmetric problem of sound output from a single-layer pipe of a gas pipeline is considered.

**The Influence of Face Masks on Verbal Communication in Persian in the Presence of Background Noise in Healthcare Staff**

Mohsen Aliabadi1, Zahra Sadat Aghamiri1, Maryam Farhadian2, Masoud Shafiee Motlagh1 & Morteza Hamidi Nahra3

1. Center of Excellence for Occupational Health, School of Public Health and Occupational Health and Safety Research Center, Hamadan University of Medical Sciences, P.O. Box 4171-65175, Hamadan, Iran
2. Department of Biostatistics, School of Public Health and Research Center for Health Sciences, Hamadan University of Medical Sciences, Hamadan, Iran
3. Department of Audiology, School of Rehabilitation, Hamadan University of Medical Sciences, Hamadan, Iran

Wearing face masks has resulted in verbal communication being more challenging during the COVID-19 pandemic. This study aimed to investigate the effect of face masks on the speech comprehensibility of Persian nurses in healthcare settings. Twenty female nurses from the governmental hospitals randomly participated in an experiment on seven typical commercial face masks at two background noise levels. Nurses’ speech intelligibility from a human talker when wearing each face mask was determined based on the Borg CR10 scale. Based on the linear mixed model, the speech intelligibility of nurses from a human speaker wearing surgical masks, N95 masks, and a shield with face masks were approximately 10%, 20%, and 40–50% lower, respectively, than no-mask conditions (p<0.01). The background noise decreased the speech intelligibility of nurses by approximately 22% (p<0.01). The use of a face shield further decreased speech intelligibility up to 30% compared to using a face mask alone (p<0.01). The vocal efforts of nurses when wearing surgical masks were not significant compared with the baseline vocal efforts (p>0.05); however, vocal efforts of nurses when wearing N95 and N99 respirators were at an unacceptable level. The face masks had no considerable effect on the speech spectrum below 2.5 kHz; however, they reduced high frequencies by different values. Wearing face masks has a considerable impact on the verbal communication of nurses in Persian. The level of background noise in the healthcare setting can aggravate the effect sizes of face masks on speech comprehensibility.

**TECHNICAL NOTE**

**Noise Exposure and its Effects on the Hearing of Indoor Cycling Instructors**

Marcos Vinicius Soares Martins1, Karina Mary de Paiva2, Eriberto Oliveira do Nascimento3, Bruno Sérgio Portela1, Danúbia Hillesheim4 & Paulo Henrique Zannin3

1. Department of Physical Education, State University of the Midwest (Unicentro), Guarapuava, Brazil
2. Department of Audiology and Speech Therapy, Federal University of Santa Catarina, Campus Reitor João David Ferreira Lima, Rua Delfino Conti, s/n, CEP, Florianópolis, 88040-900, Brazil
3. Mechanical Engineering Department, Federal University of Paraná, Curitiba, Brazil
4. Graduate Program of Collective Health, Federal University of Santa Catarina, Florianópolis, Brazil

To ascertain the influence of occupational exposure to SPL on the hearing threshold of indoor cycling (IC) instructors. This is a cross-sectional study involving eleven IC instructors at fitness centers in Guarapuava, PR, Brazil. Questionnaires were applied to assess occupational characteristics and reported auditory and extra-auditory symptoms. The hearing threshold was evaluated by pure tone audiometry testing at seven moments: after 14 h of acoustic rest, and before and immediately after exposure to SPLs of 95, 85 and 75 dB(A), making a total of 77 measurements of the group of instructors. Differences in means were assessed using the Kruskal–Wallis test. The k-means and composition method was applied using principal component analysis to verify the main factors associated with the broadband multi-frequency measurement at the hearing threshold. The average bilateral hearing threshold showed a significant increase at the intensity of 95 dB(A), at all the tested frequencies (p<0.05) and at most of the frequencies, at 85 dB(A). Conclusions exposure to the equivalent sound pressure levels of 85 dB(A) and 95 dB(A) significantly altered the average hearing threshold of indoor cycling instructors.

**ERRATUM**

In Acoustics Australia, News Item, Issue 48 (2), pp 149-180, published 11 August 2020 there was an error in the Authors names listed against an article in the Abstract section (p.153)

The corrected version is:-

**Simulated Operational Path Analysis Method for the Separation of Intake and Exhaust NOx**

Yawei Zhu1,2,3, Chihua Lu1,2,3, Zhen Liu1,2,3, Weizhi Song1,2,3, Liping Xie1,2,3 & Jian Shen1,2,3

1. Hubei Key Laboratory of Advanced Technology for Automotive Components, Wuhan University of Technology, Wuhan, 430070, China
2. Hubei Collaborative Innovation Center for Automotive Components Technology, Wuhan University of Technology, Wuhan, 430070, China
3. Hubei Research Center for New Energy and Intelligent Connected Vehicle, Wuhan University of Technology, Wuhan, 430070, China
FROM THE PRESIDENT

At the time of writing this report, we are in final preparations for Acoustics 2021 Making Waves conference in Wollongong. It was disappointing to have to postpone this event from November 2021 as it significantly increased the organisational work, particularly by the Technical Co-Chairs, Nicole Kessissoglou and Marc Buret who have done an amazing job with the program. However, these are the times we live in. By the time you read this March edition of Acoustics Australia, I hope that you have either just attended the best AAS conference ever, or wish you hadn’t missed it!

Conferences are core part of the Australian Acoustical Society in that they bring together academics, consultants, defence researchers, government regulators and industry. When that occurs, good things can happen. I have been asked many times, why don’t we do conferences virtually, rather than go to all the effort that is involved with in-person events? So I’ll provide a bit more background on that.

There is now a fair amount of experience in running virtual and hybrid conferences and it has been shown that hybrid conferences in particular, are not financially viable unless registration fees for virtual delegates are kept at the same price as for in-person delegates, with additional AV costs often being prohibitive, even for larger conferences.

For the Acoustics 2021 conference, the AV cost were around $14k and would basically have tripled if we went hybrid to an acceptable quality. It is doubtful many of our members would consider $850 to watch papers from a 2 - 3 stream conference on their work computer good value. Additionally, exhibitors who heavily subsidise conference venue costs, have less interest in supporting virtual or hybrid conferences. In-teenoise this year in Glasgow the AAS Federal Council considered all these matters and believed it was important to try and run a conference this year, otherwise it would be 4 years (2019 - 2023) between meetings on Australian soil. This is why we persevered under non-ideal circumstances.

There is certainly a place for virtual and hybrid conference, most likely in very specialised niche areas, however we do not see this as a viable model for our types of conferences. We will however be looking to hosting more Tech Talks on Zoom this year. The Acoustical Society of New Zealand meeting in Wollongong in May 2022, largely because the important networking opportunities were being lost. The AAS Federal Council considered all these matters and believed it was important to try and run a conference this year, otherwise it would be 4 years (2019 - 2023) between meetings on Australian soil. This is why we persevered under non-ideal circumstances.

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In the meantime, stay safe and enjoy this issue of Acoustics Australia.

Jeff Parnell

FROM THE CHIEF EDITOR

This year marks the publication of the 50th volume of Acoustics Australia. The journal first began in 1972 under the name of The Bulletin of the Australian Acoustical Society. The very first issue featured a single technical note entitled ‘Air conditioning ductliners: a new test for rating aeroacoustical performance’ by J.A. Irvine from the CSR Building Materials Research Laboratories in NSW. Since then, the journal has published hundreds of manuscripts from Australian and international contributors. To mark our 50th anniversary, I would like to highlight the 10 most influential articles published in Acoustics Australia over the last 50 years. The following are our most highly cited papers according to Scopus and Google Scholar. As you will see, the paper topics are varied and include ultrasound, noise control, aeroacoustics, wind turbine noise and underwater noise.

Acoustics Australia’s 10 most highly cited articles:

1. Leong, T., Ashokkumar, M., Sandra, K. (2011) The fundamentals of power ultrasound - A review, Acoustics Australia 39 (2), pp. 54-63.
2. De Bree, H.-E. (2003) The MicroTorr: An Acoustic Particle Velocity Sensor, Acoustics Australia 31 (3), pp. 91-94.
3. Doolan, C.J., Moreau, D.J., Brooks, L.A. (2012) Wind turbine noise mechanisms and some concepts for its control, Acoustics Australia 40 (1), pp. 7-13.
4. Hansen, K., Kelso, R., Doolan, C. (2012) Reduction of flow induced airflow tonal noise using leading edge sinusoidal modifications, Acoustics Australia, 40 (3), pp. 172-177.
5. Erbe, C. (2013) International regulation of underwater noise, Acoustics Australia 41 (1), pp. 12-19.
6. van Kamp, I., van den Berg, F. (2018) Health Effects Related to Wind Turbine Sound, Including Low-Frequency Sound and Infrasound, Acoustics Australia 46 (1), pp. 31-57.
7. Huang, Z., Zheng, H., Guo, L., Mo, D. (2020). Influence of the Position of Artificial Boundary on Computation Accuracy of Conjugated Infinite Element for a Finite Length Cylindrical Shell, Acoustics Australia 48 (2), pp. 287-294.
8. Sakagami, K., Yairi, M., Morimoto, M. (2010) Multiple-leaf sound absorbers with microperforated panels: An overview, Acoustics Australia 48 (2), pp. 76-81.
9. Sakagami, K., Kobatake, S., Kano, K., Morimoto, M., Yairi, M. (2011) Sound absorption characteristics of a single microperforated panel absorber backed by a porous absorbent layer, Acoustics Australia 39 (3), pp. 95-100.
10. Arcondoulis, E.J.G., Doolan, C.J., Zander, A.C., Brooks, L.A. (2010) A review of trailing edge noise generated by airfoils at low to moderate Reynolds number, Acoustics Australia 38 (3), pp. 129-133.

I would like to take this opportunity to thank all who have contributed to Acoustics Australia over the past 50 years as authors, reviewers or in journal managerial or editorial roles. I hope you enjoy this issue of Acoustics Australia and I look forward to your readership for another 50 years!

Danielle Moreau
Acoustics News

From the General Secretary

Welcome to 2022!

The AAS has undergone substantial change in the way it operates since my last report. The Society has transitioned to a new web-based association management platform, Membes, which is Australian made and is far superior to the previous platform, iMIS. The iMIS system was put in place in early 2020 and utilising it was an ongoing battle with unreliable server function and constant software issues. The AAS persevered despite these issues and engaged with the software developers on a number of occasions in an effort to secure a more reliable, functional platform for members. Despite this, the platform continued to present issues and after much consideration, the move to Membes was arranged.

The final transition to the new platform took place in late January, and after a few little anticipated hiccups, is now live and serving AAS members and the public well. A few new features are available for members via the Membes platform, including simplified invoicing, community features such as forum and group portals, and a fresh new layout among other things. I urge all members, if they haven’t already, to visit the site at www.acoustics.org.au, log in and have a look around.

Membership numbers continue to grow and as I write this report, new membership applications continue to be submitted. Current membership numbers stand at 725 individual members, with 24 Sustaining members continuing their ongoing support of the AAS. It’s great to see new faces in the member base and I know that existing members will ensure they feel welcome.

At the time of writing this report, Acoustics 2021- Making Waves is fast approaching and I am looking forward to meeting with members again in person in Wollongong from February 21-23. This three day event will be packed full of quality presentations and innovation and the Novotel Northbeach is a stunning location for this. A fascinating collection of papers will be presented by world class experts and there is sure to be a topic that will intrigue you. An impressive collection of trade exhibitors and sponsors will be there to showcase their products and answer any questions you may have regarding these.

I hope I have the opportunity to catch up with as many of you as possible whilst in Wollongong, sit in on a few presentations, meet some new people and answer any questions you may have.

Julie Sobolewski

WA Division

The Australian Acoustical Society WA Division was pleased to present Mr Mitchell Cox with the WA Tertiary Prize for 2021, at our Christmas Sundowner on December 16, 2021. The WA Tertiary Prize is awarded for the best student project in acoustics and/or vibration completed at a Western Australian tertiary institution. Mitchell’s Masters of Professional Engineering project: “Development of a Model and Algorithm for Active Sound Absorption using a Loudspeaker” was carried out under the supervision of Prof. Jie Pan, A/Prof. David Mathews, and Ms Hongmei Sun at the University of Western Australia. We wish Mitchell all the best with his future endeavours.

The Christmas Sundowner (held at the Northbridge Brewing Company) was well attended, and was a great opportunity for members to meet in a relaxed setting.

WA Division President Iain Parnum presenting the award to Mitchell Cox.

Given the current spread of COVID-19 throughout Western Australia, committee meetings and technical sessions will revert to online events. WA members are asked to keep an eye on their e-mails for information regarding future AAS activities.

Benjamin Farrell

QLD Division

As we kick-off a new year, AAS activities in Queensland continue to be relatively subdued with the ongoing impacts of the Covid pandemic. The Queensland division has held three meetings in recent months. On 29 September, the Queensland division AGM was held in person along with two technical presentations; “Analysis of the Kilde 130 Algorithm in Common Use in Queensland” by Olivia Lloyd and “Analysis of CoRTN Modelling for Motorway Conditions in Queensland” by Amelia Grace. Both presentations were recorded and are available on the AAS website. On 15 December we had our Queensland division Christmas party, also in person, at the Queensland Cricketers Club. There was a good turnout and it was a nice night to reflect back on the year together over a drink. Finally, the Federal AGM was held on 18 January. This meeting was initially intended to be held in person in Brisbane, but ended up being hosted as an online event only due to Covid concerns/precautions.

There has been some movement in the Queensland division committee with Craig O’Sullivan (vice-chair), David Mee (membership grading convener) and Michael Lanchester (technical meeting sub-committee) stepping down from their committee positions at the end of 2021. We want to thank them for all the ways they served the division over their time on the committee – it has been appreciated! That leaves seven members on the current committee. We are looking forward to seeing how 2022 shapes up and hope to catch-up with our interstate peers soon!

Chris Grainger
SA Division

The SA Division enjoyed a brilliant Christmas Dinner together on the back of another Covid year of drama. Nevertheless, the SA Division have experienced an influx of younger acousticians over recent months, with the addition of renewed interest by long time members and associated firms. Our 45th AGM was held on the 26th of October, and Lyal Douglas, Manager - Victorian Business Licensing Authority. The second meeting was held on the 12th of October. Zoe presented on Professionals Australia’s assessment scheme as an assessment entity for the Victorian Professional Engineer registration.

The first was presented by Zoe Williamson, Engineer Assessment Engagement Co-ordinator – Victoria with Professionals Australia on the 12th of October. Zoe presented on Professionals Australia’s assessment scheme as an assessment entity for the Victorian Business Licensing Authority. The second meeting was held on the 26th of October, and Lyal Douglas, Manager, Engineering Capability with Engineers Australia presented on Engineers Australia’s assessment scheme. We acknowledged both speakers for their time and the quality of their presentation, and the valuable advice they provided in their responses to our members’ questions. The video for both technical talks are available to members on the society’s website.

We would like to make a call for technical talk presentations to all Victorian members. If you have a project or matter you think could make an interesting presentation (about 30-45 minutes in length), or give rise to fruitful discussions with other members, please contact the Division Secretary at vic-secretary@acoustics.asn.au. We would be pleased to consider all suggestions for a technical meeting.

We were also lucky enough to be out of lockdown to have a face to face end of year function on the 8th of December, which was held at Le Bon Ton in Collingwood and attended by about 20 people.

Darren Jurevicius

Vic Division

We have continued the Division Technical meetings online with two meetings on the assessment of qualifications and experience or competencies for Victorian Professional Engineer registration.

The first was presented by Zoe Williamson, Engineer Assessment Engagement Co-ordinator – Victoria with Professionals Australia on the 12th of October. Zoe presented on Professionals Australia’s assessment scheme as an assessment entity for the Victorian Business Licensing Authority. The second meeting was held on the 26th of October, and Lyal Douglas, Manager, Engineering Capability with Engineers Australia presented on Engineers Australia’s assessment scheme. We acknowledged both speakers for their time and the quality of their presentation, and the valuable advice they provided in their responses to our members’ questions. The video for both technical talks are available to members on the society’s website.

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Rohan Barnes

NSW Division

The 51st Annual General Meeting of the NSW Division of the Australian Acoustical Society was held on Thursday 9th December 2021 via Zoom. The AGM was combined with two technical presentations from Con Doolan from UNSW who talked about “COVID - airborne droplet dispersion and masks” and Chris Marsh from NSW EPA who talked about his “Review of substantial increases in noise related enquires once the first COVID-19 pandemic related public health orders came into force”.

After the AGM most positions on the NSW Divisional Committee have remained the same with a notable change being David Suwandi finishing up his time with the committee. David Suwandi joined the NSW Division committee in 2018. He has provided fantastic support for the committee being Treasurer. We would like to say thank him very much for all his time and effort.

Unfortunately this year due to Covid no awards and grants have been presented. Just a reminder please consider applying for our awards and grants which can be viewed from the AAS website. Matthew Harrison is looking after awards and grants for the Committee.

John Wassermann

AAS PUBLICATIONS

Based on the experience with publication of the journal Acoustics Australia via Springer, we have now launched the Australian Acoustical Society Monograph series.

The first of this series is currently in production and is the English translation from Russian of the book “Movement of Acoustic Energy in the Ocean" by Vladimir A. Shchurov. on underwater acoustics. This would not have been achieved without the liaison and assistance of Alexander Gavrilov, from Curtin University, to first obtain a grant from the US Office of Naval Research to fund the translation from Russian to English. This monograph will be the first to be published by Springer in the Australian Acoustical Society Monograph series.

If anyone is currently considering publishing a book on acoustics, we invite you to consider proposing that this become part of the AAS Monograph Series via Springer and discuss with Marion Burgess, AAS Publications at aaspublications@acoustics.asn.au
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Acoustics News

NAE Report: Aerial Mobility Noise Issues and Technology

The National Academy of Engineering (NAE) have recently released their Engineering a Quieter America - Aerial Mobility: Noise Issues and Technology report. The document is the final report on a virtual workshop hosted by the National Academy of Engineering (NAE) in Washington, DC on December 2-3, 2020, which was organized by the INCE Foundation in cooperation with the National Aeronautics and Space Administration (NASA) and the Federal Aviation Administration (FAA).

The report is available for viewing here.

Women Get Crystal Vision In Acoustics

On Friday, 12 November 2021, acoustic engineering firm Resonate Consultants added another meaningful award to their collection by winning the National Association of Women in Construction (NAWIC) Crystal Vision 2021 Award for their excellence in empowering and supporting women. The Crystal Vision Award is a prominent South Australian award that recognises a female-led organisation in the construction, property or related industries. The criterion looks at organisations' initiatives that benefit and empower women, actively promote the inclusion and advancement of women, and implement important “firsts” for women in the industry.

Resonate Consultants is a largely female-led organisation, supported by a female workforce of over 30 per cent, uncommon for the male-dominated industry. A solid female leadership team, comprising Sarah Leo, CEO, and Deb James, Managing Director, supported by Briony Hillard, National Finance Manager, influences the organisation’s culture and policies and extends this to the broader community.

Knowing that support comes from within, Resonate Consultants consciously and enthusiastically develop their female employees and unhesitatingly promote from within, all whilst providing the skill development, knowledge sharing and mentoring required.

With only 12 %[1] of the Australian engineering workforce women (well below other countries) and 11 %[2] in building and construction, being recognised for this award is significant in that Resonate Consultants are contributing to an essential ongoing equity factor in those industries.

Today, Resonate Consultants employ ten females throughout the organisation, including three graduate consultants, two senior consultants, two business support team members, plus a National Finance Manager, Managing Director and CEO. A 30 per cent female workforce is higher than the average organisation in the engineering industry, and they pride themselves on their initiatives and values to provide an equitable workplace for all.

As well as a paid parental leave scheme for the organisation there is a robust focus on wellbeing as a core value with an emphasis on prioritising wellbeing through a monetary allowance, flexible working options, training and team collaboration.

Additionally, as part of the company ethos, Resonate Consultants pride themselves on making staff more visible throughout client engagement, documentation and marketing processes, rather than just being a behind-the-scenes worker. This visibility helps the careers and confidence of women across the firm, particularly in an industry that can benefit from seeing more women in these roles. Being able to see women’s involvement and their ability to excel has a positive impact on the willingness of other women to enter the industry.

This award means that Resonate Consultants will now automatically be considered for the 2022 national awards. They are also thrilled to be able to enjoy the stunning glass trophy, handcrafted by Emma Klau.

References:

1.  https://www.engineersaustralia.org.au/News/diversity-engineering-12-women-not-enough
2.  https://masterbuilders.com.au/Resources/Career-Centre/Women-Building-Australia

L to R:- Deb James, Managing Director; Darren Jurevicius, Managing Director; Sarah Leo, CEO, Nick Henrys, Senior Consultant; Jenna MacDonald, Senior Consultant
INTERNATIONAL YEAR OF SOUND

The International Year of Sound (IYS) is a global initiative of the International Commission for Acoustics, to promote the importance of sound in our world. It was planned for only 2020 but with the pandemic arriving soon after the official opening in January 2020, it was extended throughout 2021. There will be various closing events around the world with the final closing and summary during the ICA congress in Korea, 24-28 October 2022. It is time to reflect and consolidate what has been achieved over this two year period and what legacy will continue. The activities and resources that have been compiled on the website truly reflect the support and enthusiasm from the member societies and other organisations to embrace the goals of the IYS.

The website, sound2020.org has been pivotal to the success of the IYS and all the content is still available. The number of monthly visits to the site reached a high of 8,880 for March 2020 and has continued between 4,000 and 6,000 visits per month for both 2020 and 2021. The central actions by the ICA involved the opening at the Sorbonne University in January 2020, the production of the film which is available in short and long version, and the international student competition. This student competition received over 650 entries for the primary school level and approaching 100 stanzas and videos for the high school level. A video collection of the winning entries should soon be available from the website.

The structure of the IYS relied on the local societies to organise activities and close to 200 events have been held in 31 countries. In the resources category, there are almost 100 on-line and special projects that have been made available via the website. Many of these are freely accessible educational material. As well, the topic has been featured in many publications both within the scientific community (e.g., Acoustics Today) and the general media (i.e., newspapers and magazines). The co-organisers (Marion Burgess and Michael Touradakis) have also participated in a number of national and international media interviews and podcasts.

While it has led to challenges, the pandemic of 2020-21 has provided a unique experience for everyone around the world to become personally aware, in so many aspects of our life, of the importance of sound in both the desired form and also in the undesired form of noise. After the closing of the International Year, the continued actions by the acoustic community via their national societies and the International Commission for Acoustics will aim to ensure the achievements of the IYS in promoting the importance of sound in our world is not forgotten.

Marion Burgess,  
Co-organiser IYS

ACOUSTICS 2022 CONFERENCE – WELLINGTON

NEW DATES: 31 Oct-2 Nov 2022

The Acoustical Society of New Zealand (ASNZ) will be held at Te Papa Tongarewa Museum in Wellington New Zealand, from 31 Oct – 2 Nov 2022. Acoustics 2022 will provide engineers and scientists in all fields of acoustics the chance to share their work with colleagues. Six plenary/keynote lectures, a full and interesting programme covering a wide range of topics, and some excellent social functions, will give attendees the opportunity to exchange views and share experiences. There will also be a unique opportunity for manufacturers and suppliers to showcase the latest developments in acoustic instrumentation, software and noise and vibration control products. Surrounded by nature and fuelled by creative energy, Wellington is a compact city with a powerful mix of culture, history, nature and cuisine. Fuel your visit with strong coffee and world-class craft beer – Wellingtonians are masters of casual dining, with plenty of great restaurants, night markets and food trucks. On the waterfront itself you’ll find Te Papa Tongarewa Museum, New Zealand’s national museum. Te Papa, as it’s colloquially known, means ‘our place’ and is one of the best interactive museums in the world. It is an iconic New Zealand building, right in the heart of the capital city. It is easily accessible by international and domestic flights into Wellington airport, which is only a short 15 min drive from the venue. The Acoustics 2022 Organising Committee looks forward to welcoming you to Wellington in November. We hope that the conference gives you an opportunity to strengthen your existing networks and that you leave with great memories, fresh ideas, and new friendships. Keep up to date with the latest conference information by visiting: www.acoustics2022.com
ACOUSTICS 2022
JOINT NEW ZEALAND & AUSTRALIAN ACOUSTICAL SOCIETIES CONFERENCE
THE NATURE OF ACOUSTICS
31 OCT – 2 NOV 2022
TE PAPA, WELLINGTON, NEW ZEALAND

www.acoustics2022.com
We encourage any readers who find an item that may be of interest to other readers to send the item to acousticsaustralia@acoustics.asn.au

In addition, we greatly appreciate the contribution of Bob Fitzell who has brought some of the items in this section to our attention.

Scientist of the year - 2021 NSW Premier’s prizes for science and engineering

Professor Jim Patrick AO (Adjunct Professor of Linguistics at Macquarie University) and Chief Scientist – Emeritus at Cochlear has been named Scientist of the year for his significant contribution to the advancement of science and/or engineering that has benefited the people of NSW.

See the full article in the Australian Hearing Hub newsletter here

Tech experts issue warning for overlooked health hazard associated with headphone use

This article outlines how Tech experts are warning that overuse of headphones can lead to hearing problems. See the full article written by Alex Chapman for 7News here

‘Songs of Disappearance’ album featuring birdsongs of endangered species reaches the top five ARIA album charts

An album, titled ‘Songs of Disappearance’ which feature the birdsongs of 53 of the rarest bird species in Australia, has sold more than 3000 copies. The project was inspired by a landmark extinction report from BirdLife Australia. Anthony Albrecht, a PhD student at Charles Darwin University (CDU) helped create the album and the tracks were recorded by David Stewart Nature Sound, a wildlife sound recordist. Proceeds from the album will be donated for conservation efforts.

See the full article written by Samantha Dick and Housnia Shams and published by ABC News here

New research highlights connection between language and social skills

As reported in the Australian Hearing Hub newsletter a recent study has explored how group based interventions are beneficial for the development of social skills in children with hearing loss.

See the full article in the Australian Hearing Hub newsletter here

How urban soundscapes affect humans and wildlife — and what may have changed in the hush of lockdown

This article discusses how soundscapes affect the well-being of inhabitants — both human and non-human. It also talks about how lockdowns have changed these soundscapes, both positively and negatively. See the full article written by Kurt Iveson and Dieter Hochuli for “The Conversation” here

How does music make you feel? AI may know your feelings better than you do

The author, Jessica Sharmin Rahman, a PhD candidate in the School of Computing at the Australian National University discusses how she conducts experiments using advanced sensors to record the physiological reactions of the participants when listening to music. She has also built an artificial intelligence system that can use this data to automatically learn patterns in relation to the type of music and the emotional and physiological reactions. See the full article published by ABC Science here

Coming to terms with noise

When the global pandemic struck, the world’s major cities were plunged into silence. But were they? New research casts doubt on just how quiet it really got when people were suddenly forced from the streets. It adds to our complex understanding of noise and sound and how both will shape our future. Listen to the broadcast from ABC radio here

Why violins have F-Holes: The science & history of a remarkable renaissance design

This article talks about a study conducted by acoustician Nicholas Makris and his colleagues at MIT and published by the Royal Society, that looks at how a violin’s f-holes serve as the perfect means of delivering its powerful acoustic sound. See the full article written by Josh Jones and published in Open Culture here

Bulimba Barracks buyers should be restricted from making noise complaints, Brisbane airport says

A 20 hectare site in Bulimba, QLD recently purchased by developers from the Department of Defence is set to become an 855-home master planned community. Brisbane Airport Corporation says the site will be impacted by flight noise between 60 and 70 dB. Brisbane City Council says the application by Shayher Group is still being assessed.

See the full article written by Lucy Stone and published by ABC News here
Teach yourself to echolocate – A beginner’s guide to navigating with sound

While you may have seen the descriptions of how blind people can be taught to use echo location, this article gives a detailed description of how we can all begin to listen to the landscape. Read the full article here

Open-plan office noise increases stress and worsens mood: we’ve measured the effects

A study recently conducted by Libby Sanders, (Assistant Professor of Organisational Behaviour at Bond University) with Matthew Stead from Resonate Acoustics as one of the co-authors says the evidence shows office noise really does have a significant impact. The study has shown that office noise in an open plan office does have a causal relationship on a workers cognitive performance, physiological stress and mood.

For more information on this study see here

‘We wanted to see the shape of sound’

Chinese studio Open Architecture unveils ‘Chapel of Sound’, a sculptural open-air concert hall in the forests of Jinshanling, near a section of the Great Wall of China. For the full article written by Ellie Stathak see here

The history of scientific publishing: new series launched with Ismail Serageldin

The international Science Council has produced an 8 part educational video series on the history of Scientific Publishing. Presented by ISC Patron Ismail Serageldin, the series traces 50 centuries of innovations and explores the past, present and future. You can watch the series here

Darwin professor suggests Mozart claimed credit for some of his sister’s compositions

Charles Darwin University Professor Martin Jarvis says he found evidence Mozart claimed credit for his older sisters work. See the full article written by Samantha Dick and published by ABC News here

Fossils reveal when animals started making noise

This article written by Palaeontologist Dr Michael Habib discusses how recent insights into the evolution of animal acoustics have led to a new understanding of how our modern-day soundscapes came to be. He talks about how the study of fossils has revealed when the major types of sound-production and sound-detection structures appeared in the forerunners of today’s invertebrate and vertebrate creatures. See the full article here
Obituary

MARSHALL HALL 1943 – 2021

Marshall Hall was born and educated in Perth, graduating from the University of Western Australia with a BSc with honours in physics in 1965 and a Diploma of Education in 1966. He moved to Sydney in 1967 to take up a position of Scientific Officer at the Royal Australian Navy Experimental Laboratory in Rushcutters Bay. The laboratory had about 60 staff and its main thrust had been experimental studies of the detection of submarines by passive acoustics. In 1969, its name changed to the Royal Australian Navy Research Laboratory (RANRL) and he was able to use the results of his research at RANRL. From 1981–1982, he was an Exchange Scientist at the (then) Naval Ocean Systems Center, San Diego, CA, working on ray and mode theories of sound propagation in deep water. At DSTO, he progressed to Senior Research Scientist and to Principal Research Scientist. He retired in 2003 and was an Emeritus Scientist in DSTO until 2006.

RANRL was a particularly innovative place to work. It was small and had a strong sense of camaraderie from the teamwork essential for the experiments at sea. This led to regular exchange of ideas and support of colleagues. In 1975, RANRL joined other defence laboratories in Australia to form the Defence Science and Technology Organisation (DSTO) but kept its identity and innovative environment for many years after.

Marshall received a Ph.D. degree in electrical engineering (acoustics) from the University of New South Wales, in 1974. This was sponsored by RANRL and he was able to use the results of his research at RANRL. From 1981–1982, he was an Exchange Scientist at the (then) Naval Ocean Systems Center, San Diego, CA, working on ray and mode theories of sound propagation in deep water. At DSTO, he progressed to Senior Research Scientist and to Principal Research Scientist. He retired in 2003 and was an Emeritus Scientist in DSTO until 2006.

Marshall worked in many areas of underwater acoustics, his main contributions being in propagation and scattering of sound. Propagation is complicated by the variable sound speed depth profiles that lead to sound ducts and refraction and by the consequent reflections from the bottom that dominate propagation in shallow water. Scattering occurs from the surface, the bottom and the volume of the ocean and provides a reverberation that limits sonar performance. Marshall’s strength was in mathematical modelling of these processes but he also spent significant time at sea with colleagues measuring propagation loss and scattering. Work at sea was hard and stressful with long hours and bouts of sea sickness. It was quite an achievement to obtain the good results, especially with the limitation of equipment in the pre-digital age.

Marshall wrote many journal papers, conference papers and reports over the years. Most journal papers were published in the Journal of the Acoustical Society of America, the leading international journal for underwater acoustics, and in Acoustics Australia and its predecessor. He regularly presented papers at international and Australian conferences and became well known for his work. He also provided expert review of many papers submitted to scientific journals and was a valued reviewer for Acoustics Australia.

Marshall continued to do research during the two decades since his retirement. Over the last several years he applied his expertise to many areas, particularly to understanding how sound is produced by pile driving, which has become a hot topic. The piles are driven into the sea floor to support infrastructure such as wharfs and the base for offshore wind turbines. This produces intense impact noise which can be damaging to fish near the piles and can also affect whales. He even wrote a paper on the noise of snapping shrimps several kilometres upstream of the mouth of Cooks River which flows into Botany Bay at Sydney airport. Within his last year, Marshall was an Honorary Visiting Fellow at University of Technology Sydney and contributing to a mine detection research project and a novel acoustic underwater modem and communication network for shallow water coastal zones. His expertise on underwater acoustics, especially the physical aspects, was valued and he significantly enriched the team discussions.

Marshall was planning to attend the AAS conference in Wollongong in February and also considering participation in an international conference. He was a keen tennis player with regular weekly games with a local group. In the last few years he gained great satisfaction from his young grandson and was able to meet the new grandchild just a few days before he was rushed to hospital.

Underwater acoustics is a small community in Australia, and his presence will be missed. Marshall is survived by his wife Jennifer and children Edward Hall, Wendy Lord Smith and Stephen Lord.

Doug Cato
Future Conferences

With the ongoing COVID-19 pandemic uncertainty remains regarding future meetings nationally and internationally. While all care is taken to present the most up to date information, Acoustics Australia cannot guarantee the accuracy of the listings below and recommends that you seek the latest details from respective conference website, in particular if the meeting is to be held only in person or allow some form of remote participation.

Additional meetings may be listed on the ICA calendar at: - http://www.icacommission.org/calendar.html

Quiet Drones 2022 – Paris, France
27-30 June 2022

The second international symposium on Noise from UAV and UAS will be held in Paris 27-30 June 2022. The Programme will cover all themes related to noise and acoustics of UASs and UAVs (both referred as Drones). The symposium will also discuss evolutions from Urban Air Mobility to Advanced Aerial Mobility and present activities of collaborative projects, exchange working groups, standardization committees, first experimentations of air taxis in European cities. Remote access will be available for those who cannot or prefer not to come in person.

To read or download the call for papers, find out more about the venue or see important dates, visit our website: https://www.quietdrones.org/go.php?id=129

ICSV 28 – Singapore
24-28 July 2022

International Congress on Sound and Vibration (ICSV) is an annual premier event led by International Institute of Acoustics and Vibration (IIAV). This congress combines all aspects of acoustics, noise and vibration. The Society of Acoustics (Singapore), or SAS, is proud to join hands with IIAV in organising the ICSV 28 in Singapore. There will be presentations by researchers across many different fields of acoustics and vibration, special sessions on emerging research and technologies organized by experts in those areas, along with sessions and topics focused on local needs and scenarios. The conference will be held at the iconic Sands Expo and Convention Centre, and is expected to attract many international delegates and exhibitors from related industries.

In the light of ongoing COVID-19 pandemic, we are proposing ICSV 28 to be a hybrid congress; a mix of in-person and virtual participation. As the vaccination against COVID-19 progresses in many countries we are hoping that a good number of participants will be able to travel and participate in-person. The virtual component of the conference would help delegates who are unable to travel to engage with the conference and present their research contributions as pre-recorded videos.

One of the safest countries in the world, Singapore is also the best illustration of how people of different religious faiths can co-exist in peace and harmony. A Garden City state littered with lush green vegetation in an urban setting, a world- class airport, efficient transportation system, mouth-watering international cuisines and ease of communication in English makes it a very special place for all visitors. So, besides participating in the conference, it is also important for delegates to take the opportunity to explore, understand and experience the unique cultures of Singapore.

https://www.icsv28.org/

Internoise 2022 – Glasgow, Scotland
21-24 August 2022

The 51st International Congress and Exposition on Noise Control Engineering is to be held at the Scottish Event Campus (SEC) in Glasgow on the 21-24 August 2022. This is the major international conference on noise control engineering and attracts scientists, engineers and consultants from around the world. The Congress is organised by the Institute of Acoustics (IOA) and the United Kingdom Acoustics Network (UKAN) on behalf of the International Institute of Noise Control Engineering (I-INCE).

The Congress theme is Noise Control in a more Sustainable Future. This theme is particularly timely and the congress venue is the same as that for the recent conference on climate change COP 26. The Technical Program will have sessions in Main Topics ranging from Aircraft Noise to Underwater, Ship and Offshore Acoustics. Included is the Topic: Profession, Training and Outreach, which will be of special interest to young researchers, engineers and consultants who are at the early stage of their careers.

Whilst we are looking forward to people attending in person, we are also offering a virtual option, primarily for intercontinental travellers. The majority of presenters and attendees of a technical session will still be in the room, with a minority of presenters and attendees on-line. The full program of social and networking events will still take place.

https://internoise2022.org/
ISMA/USD conferences - Leuven
12-14 September 2022

The ISMA/USD conferences are organized by the KU Leuven LMSD (Mecha(tro)nic System Dynamics) division and will be held in Leuven (Belgium) from 12 to 14 September 2022 as a live in-person event.

The 30th edition of the international ISMA Noise and Vibration Engineering Conference - ISMA2022 is next year’s edition of a sequence of biennial international conferences on noise and vibration engineering, structural dynamics and modal testing.

Since 2012 this event is organized in conjunction with the USD conference on Uncertainty in Structural Dynamics – USD2022, which will be organized for the 9th time. Intended as a forum for engineers, researchers and other professionals in the different conference fields, the meetings focus on both academic research excellence and top-notch industrial innovations and applications and strive to cultivate interaction between them.

This will be an in-person-only event with technical presentations, time for discussions, conference exhibition and networking opportunities. We aim to pick up again from the last physical edition in 2018, where the technical programme included 420 technical papers in 8 parallel tracks and 4 plenary poster sessions and where we had the pleasure to welcome 700 participants.

Full conference proceedings will be published digitally and submitted for reference in the ISI Web of Science.

The annual ISMA course on Modal Analysis and the annual ISAAC seminar on Applied Acoustics. will be held on September 15-16, 2022.

Information on the conference can be found on our website:
http://www.isma-isaac.be.

ICA 2022 – Gyeongju, Korea
24-28 October, 2022

ICA2022, to be held on behalf of the International Commission for Acoustics will be held in Gyeongju, Korea, October 24 to 28, 2022 and will offer the unique opportunity to learn about the study and latest research as well as to exchange ideas and information on acoustics through plenary lectures, technical sessions, and poster presentations. In addition, various social programs have been planned for participants to enjoy the fascinating Korean culture and share our warm spirit of friendship.

Koreans have a well-known love of music, from K-pop to Western classical music to reinterpretations of traditional Korean music. It follows then that Koreans are highly sensitive to the quality of sound, not only in musical instruments but also in everyday products and spaces. Thus, our technical advancement in acoustics is tied to centuries of musical appreciation.

As the cradle of the country’s religion, philosophy, arts and of course, music, Gyeongju can offer visitors an insight into the development of acoustics in Korea. Furthermore, the entire city is an open-air museum full of ancient sites and treasures which include three UNESCO World Heritage Sites. In short, the unique and authentic glimpse of Korean culture through Gyeongju City into Korean culture makes it the ideal backdrop for ICA2022.

We look forward to seeing you in Gyeongju, Korea.
http://ica2022korea.org

Acoustics 2022 – Wellington
31 October-2 November 2022

The Acoustical Society of New Zealand (ASNZ) Conference will be held at Te Papa Tongarewa Museum in Wellington New Zealand, from 31 October-2 November 2022.

Acoustics 2022 will provide a unique opportunity for manufacturers and suppliers to showcase the latest developments in acoustic instrumentation, software and noise and vibration control products.

Surrounded by nature and fuelled by creative energy, Wellington is a compact city with a powerful mix of culture, history, nature and cuisine. Fuel your visit with strong coffee and world-class craft beer – Wellingtonians are masters of casual dining, with plenty of great restaurants, night markets and food trucks.

On the waterfront itself you’ll find Te Papa Tongarewa Museum, New Zealand’s national museum. Te Papa, as it’s colloquially known, means ‘our place’ and is one of the best interactive museums in the world.

It is an iconic New Zealand building, right in the heart of the capital city. It is easily accessible by international and domestic flights into Wellington airport, which is only a short 15 min drive from the venue.

On behalf of the Acoustics 2022 Organising Committee, we look forward to welcoming you to Wellington in November and hope that the conference gives you an opportunity to strengthen your existing networks and that you leave with great memories, fresh ideas, and new friendships.

We encourage you to save the dates in your calendar and register your expression of interest today to be kept up to date with the latest information and program news.
https://www.acoustics2022.com/

NOVEM 2023 – Auckland
10 – 12 January 2023.

The conference will be a major gathering of researchers, from research establishments and from industry, working in the areas of noise and vibration.

The emphasis of the conference is on new and emerging methods, techniques and technologies in acoustics and vibration.

As with previous NOVEMs, each day will contain a Keynote Forum, which will bring together key specialists within a common theme, followed by extensive discussion. These themes represent major scientific challenges related to noise and vibration.

We look forward to welcoming you to Auckland in January, 2023.
https://www.novem.ac.nz/
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DIARY

Editorial Note – With the ongoing COVID-19 pandemic uncertainty remains regarding future meetings nationally and internationally. While all care is taken to present the most up to date information, Acoustics Australia cannot guarantee the accuracy of the listings below and recommends that you seek the latest details from respective conference website, in particular if the meeting is to be held only in person or allow some form of remote participation.

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2022

23 - 27 May, Denver, Colorado
182nd Meeting of the Acoustical Society of America
https://acousticalsociety.org/asa-meetings/

20 - 23 June, Southampton, UK International Conference on Underwater Acoustics (ICUA 2022)
icua2022.org/

27 - 30 June 2022
Quiet Drones 2022 – Paris, France
https://www.quietdrones.org/go.php?id=129

24 - 28 July, Singapore, Singapore
28th International Congress on Sound and Vibration (ICSV28)
www.iiav.org/

21 - 24 August, Glasgow, UK
51st International Congress and Exposition on Noise Control Engineering (INTER-NOISE 2022)
ternoise2022.org/

12 - 14 September, Leuven, Belgium
ISMA/USD conferences
http://www.isma-isaac.be

2022 continued

24 - 28 October, Gyeongju, Korea
24th International Congress on Acoustics (ICA 2022)
http://ica2022korea.org/

31 October - 2 November, Wellington, New Zealand
Acoustics 2023
https://www.acoustics2023.com/

2023

10 - 12 January, Auckland, New Zealand
NOVEM 2023 Noise and Vibration Emerging Methods
https://www.novem.ac.nz/

4 - 8 December, Sydney, Australia
Acoustics23, Sydney
Joint meeting AAS, ASA, Wespac and PRUAC
https://acoustics23sydney.org/
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- **FM01**: Resilient Floor Mount
- **SB06**: Resilient Stud Wall Tie for double stud walls
- **SB08**: Resilient Stud or Masonry Veneer Wall Tie
- **SB03**: Resilient Stud Wall Mount – General Purpose
- **SB10**: Resilient Stud or Masonry Veneer Wall Mount for cavity widths greater than 100mm

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- DA-21: Data Recorder

**NATA Calibration of**

- Sound Level Meters
- Noise Loggers
- Octave Band Filters
- Acoustic Calibrators

**Hire**

- Noise Loggers
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