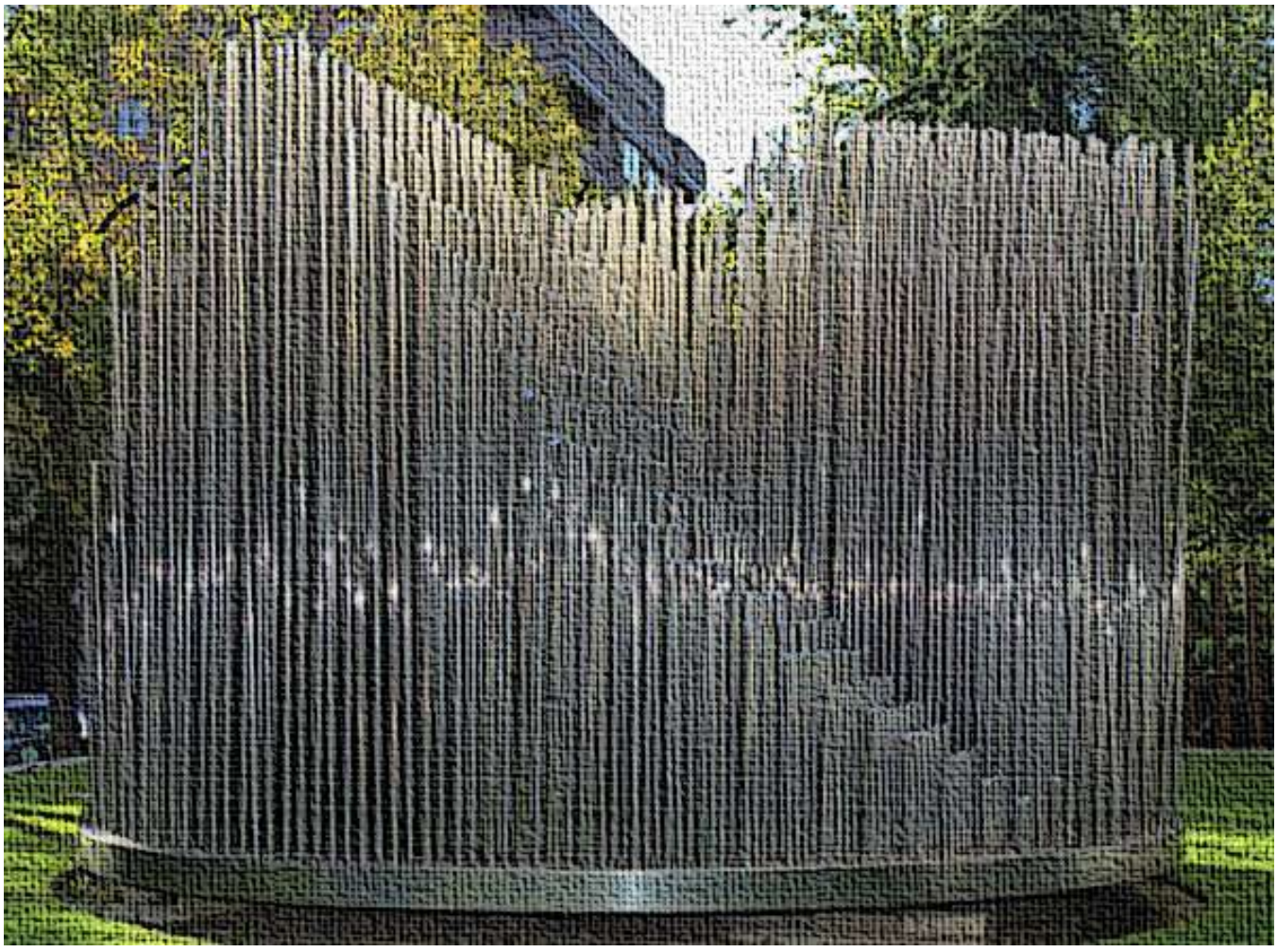
ISSN 0711-6659

canadian acoustics
acoustique canadienne

Journal of the Canadian Acoustical Association - Revue de l'Association canadienne d'acoustique

DECEMBER 2019
Volume 47 - - Number 4

DÉCEMBRE 2019
Volume 47 - - Numéro 4



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Canadian Acoustics publishes refereed articles and news items on all aspects of acoustics and vibration. Articles reporting new research or applications, as well as review or tutorial papers and shorter technical notes are welcomed, in English or in French. Submissions should be sent only through the journal online submission system. Complete instructions to authors concerning the required "camera-ready" manuscript are provided within the journal online submission system.

Canadian Acoustics is published four times a year - in March, June, September and December. This quarterly journal is free to individual members of the Canadian Acoustical Association (CAA) and institutional subscribers. Canadian Acoustics publishes refereed articles and news items on all aspects of acoustics and vibration. It also includes information on research, reviews, news, employment, new products, activities, discussions, etc. Papers reporting new results and applications, as well as review or tutorial papers and shorter research notes are welcomed, in English or in French. The Canadian Acoustical Association selected Paypal as its preferred system for the online payment of your subscription fees. Paypal supports a wide range of payment methods (Visa, Mastercard, Amex, Bank account, etc.) and does not requires you to have already an account with them. If you still want to proceed with a manual payment of your subscription fee, please use the application form from the CAA website and send it along with your cheque or money order to the secretary of the Association (see address above). - Canadian Acoustical Association/Association Canadienne d'Acoustique c/o JASCO Applied Sciences 2305–4464 Markham Street Victoria, BC V8Z 7X8 - - - secretary@caa-aca.ca - Dr. Roberto Racca

L'Acoustique Canadienne publie des articles arbitrés et des informations sur tous les aspects de l'acoustique et des vibrations. Les informations portent sur la recherche, les ouvrages sous forme de revues, les nouvelles, l'emploi, les nouveaux produits, les activités, etc. Des articles concernant des résultats inédits ou des applications ainsi que les articles de synthèse ou d'initiation, en français ou en anglais, sont les bienvenus.

Acoustique canadienne est publié quantre fois par an, en mars, juin, septembre et décembre. Cette revue trimestrielle est envoyée gratuitement aux membres individuels de l'Association canadienne d'acoustique (ACA) et aux abonnés institutionnels. L'Acoustique canadienne publie des articles arbitrés et des rubriques sur tous les aspects de l'acoustique et des vibrations. Ceci comprend la recherche, les recensions des travaux, les nouvelles, les offres d'emploi, les nouveaux produits, les activités, etc. Les articles concernant les résultats inédits ou les applications de l'acoustique ainsi que les articles de synthèse, les tutoriels et les exposées techniques, en français ou en anglais, sont les bienvenus. L'Association canadienne d'acoustique a sélectionné Paypal comme solution pratique pour le paiement en ligne de vos frais d'abonnement. Paypal prend en charge un large éventail de méthodes de paiement (Visa, Mastercard, Amex, compte bancaire, etc) et ne nécessite pas que vous ayez déjà un compte avec eux. Si vous désirez procéder à un paiement par chèque de votre abonnement, merci d'utiliser le formulaire d'adhésion du site de l'ACA et de retourner ce dernier avec votre chèque ou mandat au secrétaire de l'association (voir adresse ci-dessus). - Canadian Acoustical Association/Association Canadienne d'Acoustique c/o JASCO Applied Sciences 2305–4464 Markham Street Victoria, BC V8Z 7X8 - - - secretary@caa-aca.ca - Dr. Roberto Racca

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Message du président
President's Message

Votre président vieux de 2 ans vous parle...

Cette année encore, ce numéro 4 de l'Acoustique Canadienne nous permet de revoir les nombreux accomplissements ayant eu lieu, au cours des 12 derniers mois, au sein de notre association. Parmi ceux-là, résumés en page 65 dans le compte-rendu de l'assemblée générale des membres rédigé par notre secrétaire exécutif, Roberto Racca, plusieurs méritent d'être soulignés. Durant mes congés estivaux -grave erreur- j'ai entrepris une mise à jour majeure des serveurs de l'ACA, afin de pouvoir déployer la dernière version de Open Journal System (OJS 3.1). Cette migration ne s'est pas faite sans peine et a causé un arrêt de nos serveurs pour quelques jours, courant juillet, sans aucune perte de données heureusement. Cependant, nous avons depuis une version plus intuitive pour la gestion éditoriale du journal Acoustique Canadienne, et nous avons de surcroît l'aide d'un vrai administrateur système, Selim Izrar, dont je salue l'aide bienvenue après 8 années seul à ce poste.

Suite à de nombreuses discussions, doléances et réflexions, une initiative a été lancée par le Comité de direction de l'ACA en 2019 visant à mieux servir sa communauté et ses membres. Un sondage a été envoyé en juin et les résultats analysés durant l'été, puis discutés lors de la rencontre à Edmonton (AB) en octobre. Trois initiatives ont ainsi été priorisées : a) augmenter la visibilité de notre association et de sa présence parmi les différents médias sociaux; b) intensifier les démarches à l'intention des jeunes et de la nouvelle génération d'acousticiens; c) rendre plus accessible notre revue Acoustique Canadienne à la communauté de pratique, notamment par la mise en place d'une nouvelle section intitulée « Le coin des praticiens » et incluant la publication d'études de cas et autres développements pratiques en acoustiques.

Concernant la première de ces trois initiatives, un poste de Rédacteur Média Sociaux (Social Media Editor) a été créé, et vise à mettre en place une politique de communication et à communiquer avec les membres de l'ACA et le grand public à travers nos différentes plateformes, incluant LinkedIn, Twitter, Facebook, YouTube, etc. Je suis heureux d'annoncer que Romain Dumoulin, rédacteur associé de notre journal, a accepté de

Your 2-year-old president speaking...

This year again, this issue 4 of Canadian Acoustics allows us to review the many achievements that have taken place over the past 12 months within our association. Among these, summarized on page 65 in the minutes of the General Assembly of Members prepared by our Executive Secretary, Roberto Racca, several deserve to be highlighted. During my summer holidays - a serious mistake - I undertook a major update of the CAA servers, in order to be able to deploy the latest version of the Open Journal System (OJS 3.1). This migration was not without effort and caused a downtime of our servers for a few days in July, without any data loss though. However, we have since then had a more intuitive version for the editorial management of the Canadian Acoustics journal, and also, we have the collaboration of a real system administrator, Selim Izrar, whose help I welcome after 8 years alone in this position.

Following many discussions, grievances and reflections, an initiative was launched by the CAA Board of Directors in 2019 to better serve its community and its members. A survey was sent in June and the results were analyzed over the summer and discussed at the meeting in Edmonton (AB) in October. Three initiatives have been prioritized: a) increase the visibility of our association and its presence in the various social media; b) intensify efforts for young people and the new generation of acousticians; c) make our Canadian Acoustics journal more accessible to the community of practice, in particular by setting up a new section called "Practitioners' Corner" and including the publication of case studies and other practical developments in acoustics.

Regarding the first of these three initiatives, a position of Social Media Editor has been created, and aims to set up a communication policy and communicate with CAA members and the general public through our various platforms, including LinkedIn, Twitter, Facebook, YouTube, etc. I am pleased to announce that Romain Dumoulin, current associate editor of our journal, has agreed to take up this challenge for the next 2 years. Your comments and encouragement are welcome and can be sent directly to him via media@caa-aca.ca

relever ce défi pour les 2 prochaines années. Vos commentaires et encouragements sont les bienvenus et peuvent lui être adressés directement via media@caa-aca.ca .

Toujours du côté des nouveaux arrivés, je tiens à souligner l'implication de Pierre Grandjean (U. Sherbrooke) comme relecteur-correcteur, une tâche essentielle pour la qualité des articles publiés dans notre revue. Il remplace Olivier Valentin que je remercie pour ses presque 3 années de service menées avec efficacité et professionnalisme.

Je profite enfin de cet éditorial pour saluer le travail de l'équipe organisatrice de la conférence Semaine canadienne de l'acoustique (AWC19) qui s'est tenue à Edmonton (AB) du 9 au 11 octobre 2019 grâce à l'énergie et au professionnalisme du professeur Ben Tucker (U. Alberta) et de son équipe dont vous trouverez le rapport en page 47.

Avant que vous commenciez la lecture de ce numéro, je vous souhaite à tous un très joyeux temps des fêtes.

Jérémie Voix
Président

Still on the side of newcomers, I would like to highlight the involvement of Pierre Grandjean (U. Sherbrooke) as copyeditor, an essential task for the quality of the articles published in our journal. He succeeds Olivier Valentin whom I thank for his nearly 3 years of service conducted with efficiency and professionalism.

Finally, I would like to take this opportunity to acknowledge the work of the organizing team of the Acoustics Week in Canada (AWC19) conference held in Edmonton (AB) from October 9 to 11, 2019, thanks to the energy and professionalism of Professor Ben Tucker (U. Alberta) and his team, whose report can be found on page 47.

Before you start reading this issue, I wish you all a very happy holiday season.

Jérémie Voix
President

SOUND ATTENUATION OF AN ACOUSTIC BARRIER MADE WITH METAMATERIALS

Gino Iannace [*1], Umberto Berardi [†2]; Giuseppe Ciaburro [‡1] and Amelia Trematerra [♦1]
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Résumé

Bien que les premières études en ont été réalisées il y a un demi-siècle par Viselago, les métamatériaux représentent une nouvelle approche dans les domaines de l'acoustique appliquée et du contrôle du bruit. Dans cet article, après une brève introduction à l'état de l'art des métamatériaux pour des applications acoustiques, l'atténuation du son par une barrière acoustique créée à partir des lois des métamatériaux est examinée. Une maquette à l'échelle 1/10 a été construit à l'aide de barres cylindriques de 30 cm de hauteur et de 1,5 cm de diamètre. La longueur de la barrière était de 100 cm. La barrière a été étudiée pour quatre combinaisons de rangées de barres différentes, d'espacement de barres différents afin de créer différentes géométries régulières. Les pertes par insertion de chaque configuration sont rapportées.

Mots clefs: métamatériaux, barrière acoustique, perte par insertion, maquette acoustique.

Abstract

Although the first studies of them date back to a half century ago to Viselago, metamaterials represent a new solution in applied acoustics and noise control fields. In this paper, after a brief introduction to the state of art of metamaterials for acoustic applications, the sound attenuation of an acoustic barrier made following metamaterial rules is investigated. A 1:10 scale model was built using cylindrical bars, 30 cm high and 1.5 cm in diameter. The length of the barrier was 100 cm. The barrier was investigated for four combinations of the rows of the bars, spacing bars to create different regular geometries. The insertion losses of each configuration are reported.

Keywords: metamaterials, acoustic barrier, insertion loss, scale model.

1 Introduction

The study of metamaterials represents a new research line in the fields of applied acoustics and noise control. Metamaterials are structures designed to control the propagation of wave-like phenomena thanks to well-defined geometries. The control of the sound propagation is obtained by the interaction between the the sound waves and the regular geometric shapes of metamaterials. Periodic structures, constituted by the repetition of geometric elements, realize sound attenuation effects, due to the destructive interference of the waves that propagate through these elements. The periodic distribution of materials creates destructive effects due to interferences which depend on the frequency and therefore on the wavelength of the incident sound [1,2].

The first studies in this field date back to over half a century ago with the works of V. Viselago and J. Pendry [3], and were directed to the control of the propagation of electromagnetic waves. Only more recently, these theories have been applied to the fields of applied acoustics and noise control.

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Metamaterials are obtained by geometric structures of regular shape. The word *metamaterial* is made of two words: meta and material. The word *meta*, from *metamorfosi* means a change in conditions. Metamaterials are usually periodically structured, with a local resonant component. Sound waves interact with these components and, since the dimensions of the elements are smaller compared to the sound wavelength, the metamaterials assume specific physical properties, such as a negative elastic modulus, a negative mass density or a negative refractive index.

Today, additive manufactures can lead to new practical applications of metamaterials, as complex geometries can be realized easily [4,5]. With the possibility to model ad build complicated geometries, it is possible to obtain sound attenuation in any desired frequency range, a condition that often cannot be reached with traditional sound-absorbing porous materials. For example, Berardi recently proposed 3D-printed twisted rubes with circular sections in which the sound enters, generating a negative interference between the sound wave at the input and the output ones [4,5]. The use of 3D printers made possible to obtain aesthetically pleasant structures that were transparent, and tunable to low frequency sound absorption.

Other interesting applications of metamaterials are in the aerospace field. In fact, at low frequencies, traditional materials are unable to prevent sound transmission [6]. Sound attenuation obtained with metamaterials can be used as urban furnishing elements or for sound-absorbing barriers in the

trasporation fields, replacing the traditional noise control systems [7,8]. In Madrid, there is a sculpture created in the 1950s by Eusebio Sempere in the garden of «Juan March Foundation», which consists of hollow steel bars of 3 cm in diameter arranged at a 10 cm distance from each other (Fig.1). Based on acoustic measurements, it was shown that when the sound propagated through this structure, specific frequency bands attenuated significantly [9,10].

Figure 1 – Sculpture « Organo » by Eusebio Sempere in Madrid.

The rows of trees, of appropriate diameter and height of the trunk, arranged on a regular grid, can provide an attenuation similar to traditional noise barriers, especially at low frequencies [11,12]. Further applications of regular rod structures, often known as sonyc cristals, have been developed for silencing the impellers of air conditioning systems and the noises generated by rotating parts [13]. This growing field is explored in the next section together with the discussion of a new barrier system.

2 Metamaterial Noise Barriers

Several studies have investigated bars arranged to generate a sonyc cristal barrier. The cylinders that constitute the elements of these structures can be either empty or full, without any change in the sound attenuation, as this occurs for the interaction with a solid surface (Fig. 2). Previos works have demonstrated the same sound absorption could be obtaniend when the elements were made with solid cylinders, hollow cylinders with openings (and therefore with resonant cavities), and hollow cylinders with openings with sound-proofing material [14].

Other configurations for bars arranged as metamaterials combined together these structures with traditional acoustic screens, in order to increase the sound attenuation [15]. For example, the use of bamboo elements arranged regularly to obtain adequate sound attenuation [16], and then the bamboo rods were drilled to obtain a series of multiple resonant Helmholtz resonators to increase the sound attenuation at low frequencies.

The aim of this work is to perform acoustic measurements over a real-sized sample barrier in order to figure out diffraction components and to verify the main challenges for the application of standardised measurements to sonic

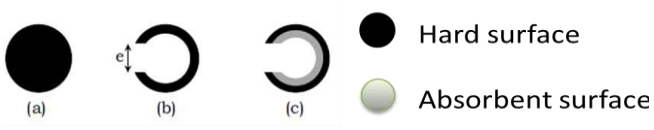

Figure 2 - Type of geometries considered in sonyc cristal studies, both ealing with hard surface and sound absorbent surfaces [17].

crystals. As the anticipated application could be for controlling traffic noise, whose spectrum is centred around 1,000 Hz, the barrier will be designed to have a high absorbent coefficient in the range from 800 Hz to 1250 Hz.

3 Design of Metamaterial Noise Barrier

In this section, a noise barrier built following a metamaterial approach is presented and investigated. The noise barrier model was built on a scale of 1:10 compared to the real dimensions. So, the frequency range from 500 Hz to 10 kHz was investigated instead of the equivalent range from 50 Hz to 1,000 Hz of the real full scale [18-21].

The barrier was built using cylindrical wooden bars, 30 cm high and 1.5 cm in diameter; the total length of the barrier was 100 cm. The overall geometry of the barrier was made with four rows of cylindrical rods, alternating with each other, spacing each row with an empty space equal to the size of the diameter of the sticks, creating a regular, empty-full geometry. The material chosen for construction was hardwood as it is an eco-friendly material, which can be disposed without damaging the environment. Based on the literature, it is evident that he acoustic characteristics of the sound attenuation effects of the barrier do not change with the type of material, as hey arrefected only by the different geometries of the elements.

The main purpose of this work was to analyze the challenges related to the acoustic measurements, the choice of the number of rows of cylindrical elements to be used, and the relative distance between them to obtain a suitable sound attenuation. The results were assessed based on the insertion loss, defined as the difference of the sound pressure levels measured without and with the barrier.

The sound source was an RCF TWT 50 dome tweeter. The sound source had a smooth free field response in the chosen frequency range, and it was located at a 4.5 cm height from the floor. The receiver was a condenser microphone GRAS Sound & Vibration A/S 40 AR, which was mounted on a little tripod at 5 cm height from the floor. The sound source was placed on one side of the barrier, while the microphone was placed on the opposite side; the floor was acoustically reflective.

All acoustic measurements were performed using an MLSSA system (MLS maximum length sequences), which allows the measurement of the impulse response of a time-invariant linear system by cross correlating the microphone output signal with the maximum length sequence signal feeding the loudspeaker [22]. The sound source was fed with an MLS acoustic signal in order to eliminate any unwanted reflections from the measurement environment from the signal detected by the microphone. The first step was the sound source characterization by measuring the field sound

pressure impulse response along its principal radiation axis at a reference distance d=1.0 m, when sound source and microphone are on the floor, facing each other. Figure 3 shows the layout of the barrier with the position of the sound source and the receiver.

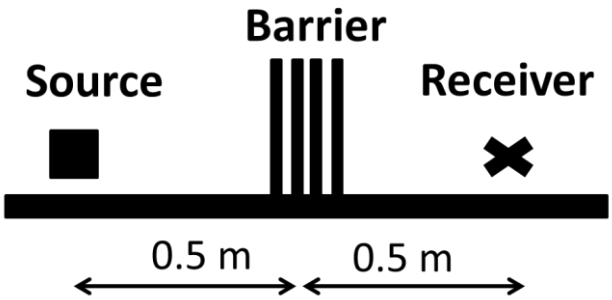

Figure 3 – Cross-sectional layout of the metamaterial barrier with the position of the sound source and receiver.

Figure 3 and 4 show the layout of the barrier with the position of the sound source and receiver, and the distance between the elements, and with the indication of the distance between the rows. Figure 4 shows the floor arrangement of the cylindrical elements that constitute the metamaterial barrier. The cylindrical elements were arranged with an empty and with a full geometry. The empty dimension was equal to the full one (1.5 cm). The elements of each row were mutually staggered, so that the line of sight was interrupted.

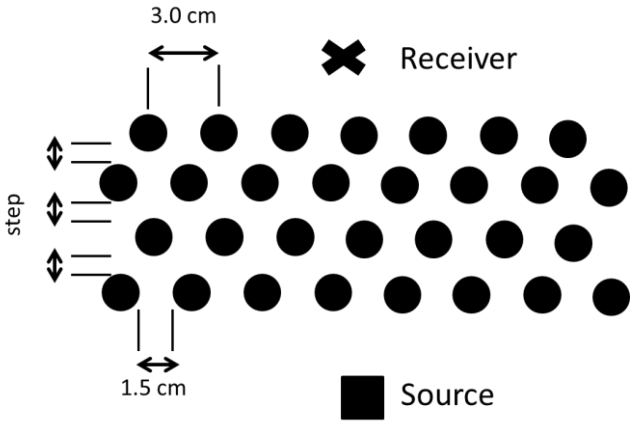

Figure 4 – Horizontal layout of the metamaterial barrier with the position of the sound source and receiver.

Different configurations were considered. The first configuration analyzed was with the distance between each row of 2 cm. The second configuration analyzed was with the distance between each row of 5 cm. The distance between the source-receiver was 100 cm, and the barrier was placed at 50 cm from the source and 50 cm from the receiver.

Figure 5 shows the frontal view photo of the barrier, and Figure 6 shows the aerial view during the acoustic measurement sessions.

The measurements of the acoustic characteristics of the metamaterial barrier were compared also with the sound attenuation measurements done with a traditional noise barrier. For this scope, a rigid 30 cm high screen was placed

Figure 5 - Frontal view of the metamaterial barrier, with sound source.

Figure 6 - Aerial view of the metamaterial barrier.

between the source and the receiver position, with a height equal to that of the barrier built with metamaterials; the position of the sound source and receiver have not been changed. In this way, at the same height, it was possible to evaluate the effects of sound attenuation of a barrier created with metamaterials compared to a traditional one.

Figure 7 shows the impulse responses measured as direct sound (A) and after being diffracted by the barrier effect. In this figure, it is possible to note the effects of the presence of the barrier both in terms of increase in the length of the impulse response over time and for the decrease of the amplitude value of the first sound impulse detected by the microphone.

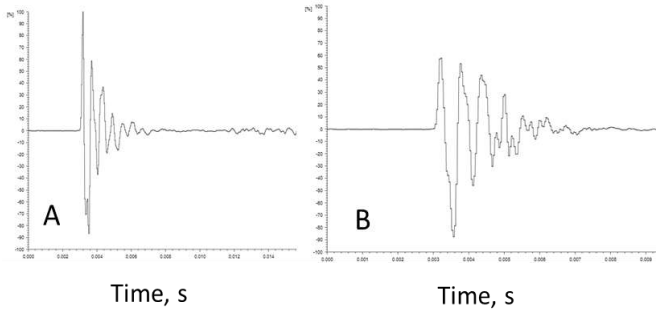

Figure 7 – Impulse responses measured. (A) Direct sound. (B) Diffracted sound by metamaterial barrier effect.

Figure 8 shows the measured values of the IL (dB) with a traditional noise barrier, metamaterial barrier step 5 cm and step 2 cm. In the field of low frequencies, the barrier built with metamaterials has a greater value than sound attenuation, compared to a traditional one. While at high frequencies the attenuation due to the traditional noise barrier

is greater. This effect is known, as traditional barriers in the low frequency region are not very effective, and to increase the sound attenuation it is necessary to increase the height from the ground [23, 24]. It is important to note that there are differences in the values of sound attenuation in the configurations with a distance between the rows of 2 cm or 5 cm. Figure 8 shows that as the distance between the rows increases the sound attenuation (IL, dB) increases in the low-frequency region, while for the smaller distance (2 cm) the sound attenuation occurs towards higher frequencies. This result was somehow expected since the sound attenuation of the metamaterial is a function of the distance between the elements. However, this result suggests further studies to be addressed with variable distances between the rows and variations in the dimensions of the cylindrical elements.

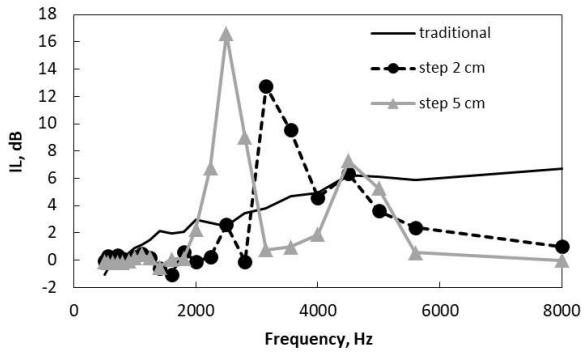

Figure 8 – Measured values of the IL (dB) with a traditional barrier. Metamaterial barrier: step 5 cm and step 2 cm.

4 Conclusions

In this paper, the study of the sound attenuation of a barrier made with metamaterials is reported. The study was preceded by a summary of the state of the art of this topic.

The final results of this work suggest that the barriers obtained with metamaterials can be used to mitigate noise due to road traffic because this type of noise is emitted in a particular frequency range (the traffic noise spectrum is centred at around the frequency of 1,000 Hz), or other noise sources emitted by a stationary sound source. As they can be a valid substitute for traditional barriers. Future studies will involve combined systems to different distances between the rows and combining different sizes of the diameters of the cylindrical bar elements that make up the barrier. Furthermore, the metamaterials can be used for the acoustic correction of enclosed spaces in the architectural acoustic field.

Acknowledgments

This work was financially supported by Ministero dell'Istruzione, dell'Università e della Ricerca (MIUR) - PRIN 2017 Progetto Settore PE8 codice 2017T8SBH9_001 "Theoretical modelling and experimental characterization of sustainable porous materials and acoustic metamaterials for noise control"

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NOISE, VIBRATIONS, AND HEARING LOSS IN THE WORKPLACE

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Résumé

Il s'agit d'une revue des documents provenant des bases de données Google ScholarMD et MendeleyMD qui traitent du risque de perte auditive lorsque des travailleurs exposés au bruit subissent des vibrations mécaniques ressenties dans le corps. Ces vibrations proviennent d'une grande variété de processus et d'opérations utilisés dans l'industrie, les mines et la construction, la foresterie et l'agriculture ainsi que les services publics. Les documents de référence semblent soutenir la théorie selon laquelle le risque de perte auditive augmente lorsque des vibrations sont également présentes.

Mots clefs: perte d'audition, lésion de l'oreille interne, vibrations mécaniques, vibrations main-bras et corps entier.

Abstract

This is a review of papers accessed from the Google Scholar™ and Mendeley™ databases that deal with risk of hearing loss when mechanical vibrations are also applied to the bodies of noise-exposed workers. Those vibrations arise from a wide variety of processes and operations performed in industry, mining and construction, forestry and agriculture, and public utilities. The referenced papers appear to support the theory that the risk of hearing loss increases when vibrations are also present.

Keywords: Hearing loss, Inner ear damage, Mechanical Vibrations, Hand-Arm and Whole body vibrations.

1 Introduction

Long term exposures to high noise levels present a serious health hazard affecting millions of workers worldwide. In Canada alone, 42% of working individuals reported employment in occupations with hazardous noise exposure [1].

Exposure to mechanical vibrations is also prevalent in the workplace. The European Agency for Safety and Health at Work [2] has pointed out that 24% of all workers interviewed during a survey reported being exposed to mechanical vibration. The vibrations arise from a wide variety of processes and operations performed in industry, mining and construction, forestry and agriculture, and public utilities.

There are two ways to categorize vibrations depending on the way they enter the human body. Whole-body vibrations (WBV) occur when the body (seating or standing) is supported on a surface which is vibrating, e.g. in all forms of transportation and when working near heavy industrial machinery. Hand and arm transmitted vibrations (HAV) occur when the vibration enters the body through the hands, e.g. in various work processes where rotating or percussive power tools, or vibrating workpieces, are held by the hands or fingers. There are well documented musculoskeletal issues and pathologies that arise when workers are exposed to mechanical vibrations [3].

In many situations, workers exposed to mechanical vibrations (WBV and/or HAV) are also exposed to high levels of noise. The question that has been frequently asked is does the combined action of noise and vibrations have a synergetic (additive or interactive) effect regarding hearing loss. In other words, is the resulting loss larger when vibrations are also present?

In the field of Occupational Hygiene, there will be some occasions where there are exposures to two or more agents acting simultaneously. The term "synergetic effects" is used when the resulting health effects are larger than those expected by the sum of the individual effects acting separately. In the case of noise and vibrations, the term might not apply because there is no evidence of effects of vibrations on hearing. So, it will be more appropriate to talk in terms of "enhancement" of the effects of the noise, when vibrations are present. In summary, the question is "does the presence of vibrations (WBV or HAV) increases the risk of hearing loss"?

A search of the literature was conducted using Google Scholar™ and Mendeley™ databases. Keywords for our search included noise induced hearing loss and mechanical vibration. The search yielded very few investigations. The present paper is a systematic review of those investigations from our search that we judged to be conducted with adequate rigor.

2 Review of the Literature

In an early study, Okada [4] measured temporary threshold shift (TTS) after exposing 5 male students to a 101-dB sound-pressure level (SPL) broad band steady-state noise. The TTS was increased by simultaneous vibration of 500 cm/sec^2 and 5 Hz, which is regarded as the resonance frequency of human body.

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Pyykkö et al. [5] performed a longitudinal study of hearing loss and hand-arm vibrations among a group of lumberjacks in the years 1972 (n=72) and 1974— 1978 (n=203). Among the conclusions, he found that with equal noise exposure the noise induced permanent threshold shift (NIPTS) was about 10 dB greater in lumberjacks with vibration induced white fingers symptoms (VWF) than without VWF. Pyykkö and colleagues surmised that the possible reason for more advanced NIPTS in subjects with VWF is that vibration might operate in both of these disorders through a common mechanism that is, producing a vasoconstriction in both cochlear and digital blood vessels as a result of sympathetic nervous system activity.

Manninen [6] undertook an experimental investiga-tion of the combined effect of noise, whole body vibra-tions, and dynamic muscular work on TTS_2 (after 2 minutes) at 4000Hz and 6000 Hz. He found that noise plus vibration, and noise plus dynamic muscular work, caused the most obvious combined effects. The combined effect of all three factors (noise, vibration, and work) on the TTS_2 values after three consecutive exposure periods was significant at the $\alpha = 0.025$ level at 4000 Hz, and at the $\alpha = 0.05$ level at 6000 Hz.

In a study by Pyykkö, Pekkarinen & Starck [7], a detailed analysis of risk factors for the development of sensory-neural hearing loss (SNHL) was carried out on 122 forestry workers. The authors stated: "We did not observe any exaggerated risk of hearing loss due to combination of noise and vibration". Another interesting observation is that in combined exposure, subjects with Vibration White Fingers (VWF), as well as subjects with enhanced diastolic blood pressure, will run a higher risk for noise induced hearing loss.

Pekkarinen [8] studied the interaction between noise exposure (broadband at 100 dB(A)) and hand-arm vibration (125 Hz at an acceleration of 2 m/s^2) in people with vibration induced white finger symptoms (VWF). As per the author, this interaction is evidenced as a permanent hearing loss. However, he couldn't explain why this interaction is seen only in people with VWF.

Zhu, Sakakibara, & Yamada [9] investigated whether hand-arm vibration and noise have a combined effect on temporary threshold shift (TTS_2) of hearing among healthy subjects. Their results showed that simultaneous exposure to hand-arm vibration and noise can enhance the TTS_2 of hearing compared to only exposure to noise. However, hand-arm vibration alone did not cause TTS_2.

The data from Palmer et al. [10] support an as-sociation between finger blanching and hearing loss, which is not explained by confounding occupational exposure to noise. They suggest that further investigations are warranted to confirm the association and explore possible mechanisms, such as sympathetic vasoconstriction in the cochlea.

Zou, Pyykkö, Sutinen, & Toppila [11] applied transcranial vibration to seven animals at a frequency of 250 Hz for 15 min (five animals were used as normal controls) to investigate cellular and molecular mechanism linked to vibration induced hearing loss in animal models. Compound action potential (CAP) thresholds were measured by round window niche action electrodes. The average immediate hearing loss was 62 dB and 48 dB after three days. The authors concluded that transcranial vibration from temporal bone drilling produces cochlear shear stress that may be linked to both the damage and repair process of the cochlea.

Sutinen, Zou, Hunter, Toppila, & Pyykkö [12] studied the role of temporal bone vibration in the etiology of hearing loss, following the hypothesis that sensorineural hearing loss after middle ear surgery can be explained by the noise generated by drilling, without considering the vibration generated by the burr. They used an electromagnetic shaker to vibrate the bony external ear canal of guinea pigs (n = 30) at different frequencies and accelerations. The hearing threshold was measured with auditory evoked responses. A significant threshold shift developed but recovered after 7 days.

House, Sauvé, & Jiang [13] assessed construction workers for hearing loss and other factors. The authors found that vibration white fingers (VWF) had a statistically significant effect on hearing loss for all audiometric frequencies combined after controlling for years worked in construction.

Pettersson, Burström, Hagberg, Lundström, & Nilsson [14] studied 189 workers in a heavy engineering industry, with Hand-Arm Vibrations (HAV) exposure, through questionnaires, observations, and measurements. The results showed that working with vibrating machines in an environment with noise exposure increases the risk of hearing loss, supporting an association between exposure to noise and HAV, and the noise-induced hearing loss.

Turcot, Girard, Courteau, Baril, & Larocque [15] identified 96 workers with Vibration White Fingers (VWF) in a population of 15,751 vibration-exposed workers. They all had significantly worse hearing at every frequency studied (500, 1000, 2000 and 4000 Hz) compared with other mining and forestry workers without VWF. The authors conclude that their study confirms previous findings of greater hearing loss at higher frequencies in workers with VWF. The authors also found a significant difference in hearing loss at low frequencies. Therefore, these findings support the association between combined noise and hand-arm vibration (HAV) exposure and noise induced hearing loss (NIHL) in workers with VWF.

3 Summary

The review of the above papers appears to confirm that the risk of hearing loss increases in the presence of vibrations, both hand-arm or whole body. Although the cause is not clearly identified, the effects appear to be evident especially in workers with VWF. The blanching of the fingers (in the HAV pathology), suggests a circulation problem common to fingers and cochlear hair fiber cilia, but this is something that needs further investigation.

Another possibility that cannot be discounted based on the available evidence is that workers with VWF were also exposed to a high level of bone-conducted noise. At the cochlea, air-conducted and bone-conducted noise exposures should not be distinguishable. Future experimental studies involving animal models might consider incorporating noise

exposure with and without bone-conducted noise exposure in order to rule out this alternative explanation.

Regardless of the mechanism involved, it appears that the presence of vibrations represents an additive hearing loss risk. The action to be taken is the same as when vibrations are not present: the noise exposure should be brought to below the 85 dBA level either by engineering noise controls of by wearing of hearing protectors. There is no evidence of hearing loss caused by only exposure to vibrations. However, vibrations (both HAV and WBV) can be harmful. As a result, measures must be put in place to bring vibration amplitude (and accelerations) below safety limits.

Remerciements/Acknowledgments

Thanks are given to F. Copelli, SMART Lab Manager, for reviewing and helping to format this paper.

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TOWARD A BETTER UNDERSTANDING OF THE ROLE OF TRANSPORTATION NOISE IN CHRONIC DISEASE: THE VANCOUVER STUDIES

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Résumé

Le bruit est un problème majeur de santé publique. Un programme de recherche de l'Université de la Colombie-Britannique a examiné le rôle du bruit, de façon indépendante et combiné à la pollution de l'air, dans la causalité des maladies chroniques. Depuis 2000, une série d'études a modélisé le bruit environnemental dû au transport routier, ferroviaire et aérien, étudié les corrélations entre les polluants atmosphériques et sonores et examiné l'association entre le bruit et l'incidence d'un certain nombre de maladies chroniques telles que les maladies coronariennes, le diabète et l'arthrite. Nous avons également examiné l'association du bruit avec des issues défavorables de naissance. Les conclusions de ces études ont été largement citées et incorporées dans des revues systématiques à l'appui des principes directeurs de l'OMS pour bruit communautaire. Cet article résume les méthodes et les résultats de ce programme de recherché.

Mots clefs : Le bruit de la circulation et de modélisation du bruit, les maladies chroniques, les résultats à la naissance.

Abstract

Noise is a major public health problem. A research program at the University of British Columbia has been examining the role of noise, independently and combined with air pollution, in chronic disease causation. Since 2000, a series of studies has modeled environmental noise due to road, rail and air transportation, investigated correlations between air and noise pollutants, and examined the association of noise and incidence of a number of chronic diseases such as coronary heart disease, diabetes and arthritis. We also examined the association of noise with adverse birth outcomes. The findings of these studies have been widely cited and incorporated into reviews supporting WHO community noise guidelines. This paper summarizes the methods and results of this program of research.

Keywords: Traffic Noise, Noise Modelling, Chronic Disease, Birth Outcomes.

1 Introduction

Noise has been the source of annoyance and sleep disturbance complaints for millennia; through the ages there are accounts of cities trying to reduce noise from tradespeople and from traffic – all well before the advent of the automobile. In the middle of the 20th century, however, the impact of noise on human health began to be more widely studied in a scientific manner. Early studies showed some intriguing results – for example, associations with increased blood pressure - but the early body of evidence was criticized as being contradictory, of generally low quality, and showing "slow evolution in sophistication" [1]. The science however improved and broadened in scope and in 2000, Passchier-Vermeer & Passchier published a review of noise exposure and public health that concluded "…there is sufficient scientific evidence that noise exposure can induce hearing impairment, hypertension and ischemic heart disease, annoyance, sleep disturbance, and decreased school performance…for other effects such as changes in the immune system and birth defects, the evidence is limited" [2]. The quality of studies had improved greatly, with larger cohort studies of noise and cardiovascular disease (CVD) [3] and noise and school performance [4], and a plausible biological model of effects was proposed [5]. Still, there remained uncertainty about the role of noise in traffic-related chronic disease, as noise was considered to be potentially confounded - perhaps highly - by exposure to traffic-related air pollution, a field with a great deal of ongoing research in the early 2000's [6].

At this time at the University of British Columbia, Brauer was undertaking a large-scale traffic-related air pollution study (the Border Air Quality Study, or BAQS) combining exposure data from land-use regression modelling of major air pollutants [7] with "linked" health insurance database resources [8]. The linked-health databases covered the entire population of BC and allowed researchers to follow individuals over long time periods, tracking health events through hospital discharge records, cancer registries, physician billing records, pharmacy usage, as well as data submitted to the BC perinatal registry, and birth and death certificates. BAQS study subjects were assigned exposures via their residential postal code which had been geocoded, and linked to various modeled air-pollutant exposure "surfaces". At the same time, Davies was completing studies on the role of occupational noise in BC sawmills on cardio-vascular disease outcomes [9, 10]. It seemed an obvious next step to combine these programs of inquiry at UBC to examine these two major traffic-related pollutants – air and noise – and the nature of their co-exposure on effects on human health. It would provide one of the first opportunities to examine the

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pollutants simultaneously, and thus examine the interaction of the exposures, in a very strong study setting.

This paper, summarizes the corresponding programme of research at UBC on the combined effects of noise and traffic-related air pollution on human health. It does not include new analyses of the data but does direct the reader to recent systematic reviews on environmental noise and health that incorporate the BC study findings.

2 Methods

2.1 Exposure assessment – community noise

Road and rail

We utilized noise-propagation modeling software to create a "noise map" of the 22 municipalities that comprised the Greater Vancouver Regional District (GVRD, now Metro Vancouver). GVRD had a population of 2.1 million at the time; the modeled area was approximately 2,200 Km^2. Noise-prediction models estimate community noise exposure through quantitative analysis of the generation (e.g. road traffic), propagation (e.g. topographical effects, atmospheric absorption), and attenuation (e.g. screening effects and building reflections) of various noise sources [11]. We used CadnaA (DataKustik GmbH; Greifenberg, Germany), a model-based computer program, to estimate annual average community noise levels for the year 2003. Model input data included road traffic volumes (from a transportation planning model EMME/2 (INRO Consultants, Montreal, Canada); road-width data (the distance between the center lines of the outer most lanes); and road type (based on the provincial Digital Road Atlas [12], divided into three categories freeway: highway, arterial, or collector and local. Each road type was assigned a specific percentage of truck traffic. In addition, the model took into account the influence of road speed limits, intersections, road gradients, road surface material, elevated sections (bridges), building height, footprint, reflection/absorption characteristics, and land topography. We used GIS Innovations (Tallahassee, Florida, USA) and other available data sources including Google Earth and geographic information systems (GIS; ArcGIS; ESRI, Redlands, CA, USA) to retrieve these road traffic data.

In the study region, the urban rapid transit system (''Skytrain'') is the major railway noise source. Rail noise exposure assessment was based on railway operation data including length of trains, velocity, percentage of disk brakes, and number of each type of train by day, evening, and night. Road and rail noise prediction used the RLS-90 and Schall-03 (edition 1990) models respectively.

Air

Vancouver International Airport was presumed the dominant source of aircraft noise in the study region. The Airport Authority produces aircraft noise exposure forecast (NEF) contours to describe the noise exposure levels in the area surrounding the airport [13]. The noise contours are created using noise prediction models that take into account aircraft operation information including flightpath, frequency, aircraft types, and local meteorology. We used the noise exposure forecast contours for 2003 to estimate the contribution of aircraft to community noise in the study area.

Modeling

Based on the above input data, annual day-evening-night A-weighted equivalent continuous noise levels (L_{DEN} dB(A)) were calculated for a 10 X 10 m grid (at 4 m above the ground). The L_{DEN} metric integrates noise levels during the day (L_{DAY}, 06:00–18:00), the evening (18:00–22:00), and the night (L_{NIGHT}, 22:00–06:00); it reflects increased sensitivity of residents to community noise during evening and night by adding a 5 dB penalty to evening noise levels and a 10 dB penalty to night noise levels. Based on the estimated noise levels for these grids, we calculated annual average noise levels for each 6-character postal code area in the study region by energetically averaging the noise levels of the grids contained in a postal code area (using the Statistics Canada Postal Code Conversion File [14]). Noise levels were calculated for road traffic only and from all sources combined. In the study region, postal code areas vary greatly in size depending on the density of population: in urban areas, a postal code typically represents one side of a city block or a high-rise building; however, in rural areas a postal code may represent a larger area. Because metropolitan Vancouver is a highly urbanized region, the vast majority of the postal codes represent small geographical areas; on average, a residential postal code may include about 35 individuals.

Air pollution and other exposures

We used high-spatial-resolution land-use regression models to estimate participants' residential exposures to traffic-related air pollutants, including black carbon, $PM_{2.5}$, nitrogen dioxide, and nitric oxide, for the year 2003. Furthermore, these estimates were combined with air quality-monitoring data to calculate monthly concentrations and average concentrations during the 5-year exposure period for each pollutant in each postal code area [7].

2.2 Cohort studies

In British Columbia, the mandatory health insurance program provided health care coverage for nearly all residents [8]. We used linked administrative health datasets to assemble two population-based cohorts. Each had a 5-year exposure period (January 1994–December 1998) and a 4-year follow-up period (January 1999–December 2002). In the "adult cohort" all GVRD residents who had registered with the provincial health insurance plan, had resided in the study region during the 5-year exposure period, and were 45–85 years of age were included. The "birth cohort" comprised all live-births in the follow up period in the greater GVRD. We excluded multiple births, children who were missing key information such as birthweight or parity, maternal age at delivery, or who were identified to be of First-Nations descent.

Data linkage and statistical analysis

During the 5-year exposure period, subjects' exposures to community noise and traffic-related air pollutants were estimated based on averages weighted by time spent at each person's residence (through their residential postal code). For subjects who changed their residences, we calculated equivalent noise levels and average air pollution levels during the exposure period. Among adults, subjects who had partially missing data because of changes in residences (moving from or to areas outside the exposure assessment domain) for more than a total of 15 months, or in more than 3 consecutive months during the exposure period were excluded.

Appropriate statistical modeling analyses were applied in each study to examine relative risks (e.g. cox proportional hazard, logistic regression) and to examine the exposure/response relations (e.g. smoothed splines). Potential confounders were examined at the individual level if available (e.g. age, sex) or at the neighbourhood level if not (e.g. socio-economic status, ethnicity). In the birth cohort, additional individual level co-variates such as maternal age at birth, smoking status, parity etc. were also available and used.

Studies were approved by the institutional review board of The University of British Columbia (Behavioural Research Ethics Board certificate #H08-00185).

3 Results

3.1 Noise exposure estimation

The resulting noise map for GVRD estimated annual averages of L_{DEN}, L_{Day} and L_{Night} for road only, as well as for road, air and light rail [15]. An excerpted area is shown Figure 1 as an illustration. The model did not include freight and passenger trains, industrial sources, or float plane traffic.

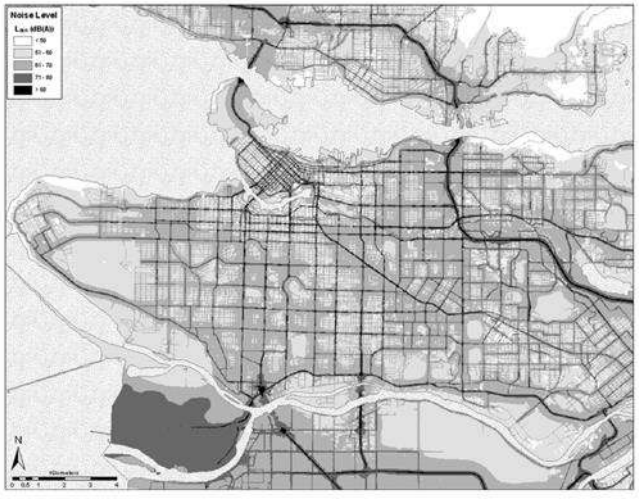

Figure 1: An excerpt of the noise map produced for Metro Vancouver, for the year 2003 (from [14])

Summary noise exposure statistics are shown in Table 1. One of the key findings from this study was that the correlations between concentrations levels of air pollutants and noise were quite low, with the exception of carbon black. The correlation coefficient of modelled noise levels with black carbon concentrations was 0.48 (95% CI, 0.47–0.48), but only r = 0.18 (95% CI, 0.17–0.18) for PM2.5. These findings were consistent with correlations between measured noise and pollution data from earlier work done at UBC [16], that countered earlier assumptions of potential confounding; along with other concurrent studies [17] it suggested that it would be reasonable to attempt to examine the independent health effects of noise and air-pollution.

Table 1: Summary noise and air pollution model statistics (from[14]).

Pollutant	Mean ± standard deviation	Median	Interquartile range
Noise			
L_{den} (dB(A))	63.8 ± 6.0	62.6	59.8–67.6
L_{day} (dB(A))	64.3 ± 5.9	63.1	60.3–68.1
L_{night} (dB(A))	53.8 ± 5.9	52.6	49.9–57.5
Road traffic, L_{den} (dB(A))	63.1 ± 5.9	61.9	59.2–66.8
Aircraft, L_{den} (dB(A))	32.1 ± 16.2	34.8	22.3–43.9
Air pollutant			
BC (10^{-5}/m)[a]	1.71 ± 1.35	1.01	0.85–2.15
$PM_{2.5}$ (μg/m^3)	4.06 ± 1.73	4.01	3.14–4.78
NO_2 (μg/m^3)	31.4 ± 8.3	29.5	26.0–34.0
NO (μg/m^3)	32.8 ± 15.6	28.5	23.3–37.4

BC: black carbon, L_{day} dB(A): annual daytime A-weighted equivalent continuous noise level, L_{den} dB(A): annual day-evening-night A-weighted equivalent continuous noise level, L_{night} dB(A): annual nighttime A-weighted equivalent continuous noise level.

[a] Equivalent to approximately 1.19 ± 0.88 μg/m^3 elemental carbon (10^{-5}/m black carbon ≈ 0.8 μg/m^3 elemental carbon).

3.2 Chronic disease studies

Coronary Heart Disease (CHD)

We began by examining the joint effects of transportation noise and air pollution in heart disease mortality [18]. We defined the outcome as death from CHD during the 4-year follow-up period, defined as having International Classification of Diseases (ICD) codes 410–414 and 429.2 (9th revision) or I20–I25 (10th revision) listed as the cause of death on the death certificate.

Our adult cohort had a total of 445,868 subjects who met the inclusion criteria, of whom 33,448 (7.5%) were lost to follow-up (the greatest percentage of these because they left the Province). During the follow-up period, 3,095 subjects died of CHD (mortality rate = 1.83 per 1,000 person-years).

Residential noise exposure was associated with CHD mortality: A 10-dB(A) elevation in noise levels was associated with a 26% (95% CI: 17, 35) increase in the risk of CHD mortality. Adjustment for age, sex, preexisting comorbid conditions, and neighborhood socio-economic status (SES) halved the effect estimate, whereas further adjusting for PM2.5 and nitrogen dioxide concentrations had little influence. Additional adjustment for back carbon levels (black carbon is a marker for diesel engine exhaust) had a greater influence on the effect estimate, but a 10-dB(A) elevation in noise levels was still associated with a 9% (95% CI: 1, 18) increase in the risk of death from CHD in the final model. Both noise and black carbon exposure were independently associated with death from CHD (Figure 2). Elevations equal to the interquartile range in noise (6.6

dB(A)) and black carbon (0.97 10-5/m) were associated with 6% (95% CI: 1, 11) and 4% (95% CI: 1, 8) increases in CHD mortality respectively. In our study, aircraft noise was less correlated with traffic-related air pollutants than was road traffic noise and there was no significant increase in the risk of death from CHD associated with exposure to aircraft noise.

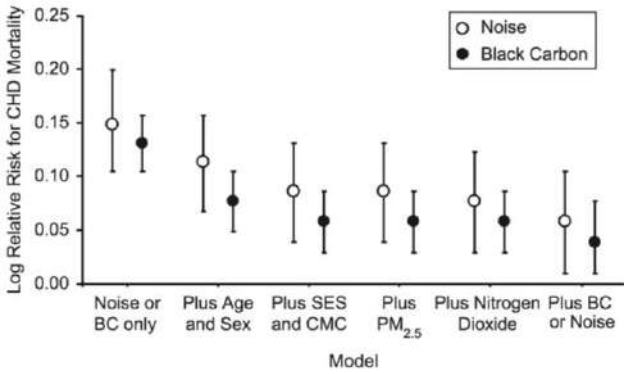

Figure 2: Log relative risks for coronary heart disease (CHD) mortality associated with an elevation equal to the interquartile range in noise levels (6.6 dB(A)) or black carbon (BC) concentrations (0.97 10-5 /m). Models were successively adjusted for the indicated variables (CMC=comorbid condition). The final black carbon model was adjusted for noise, and the final noise model was adjusted for black carbon. Bars are 95% confidence intervals (from [18]).

Diabetes

Given the link between noise and coronary heart disease observed in our study and others, and the hypothesized biological mechanisms, we anticipated associations between noise exposure and metabolic risk factors. A few studies had examined the influence of transportation noise exposure on metabolic risk factors for cardiovascular health such as body mass index, waist circumference, central obesity. Diabetes is another metabolic risk factor that places an enormous burden on the Canadian population but had received only limited study. We undertook to study the association between noise and diabetes in the Vancouver adult cohort [19], using a case definition of a hospitalization or physician visits with codes for diabetes in the follow-up period (ICD-9 code 250, with ICD-10 coding back-translated to ICD-9 coding). We excluded subjects who had prior hospital or doctor visits for diabetes during the exposure period so as to identify only new (incident) cases. The cohort comprised 380,738 individuals. Of these, 3.4% were identified as incident diabetes cases during the follow-up period. Noise exposure was associated with incidence of diabetes after adjustment for age, gender, and area-level household income; there was an 8% increase in the incidence of diabetes with an IQR increase in noise exposure (~ 7 dBA LDEN). The relationships were found to be linear for a wide range of the data with the exception of extreme exposure values (Figure 3). By the time of this study, we were also able to look at not only the possible joint effects of traffic related air pollution, but also potential protective effects of neighbourhood walkability and greenness, following up on the work of UBC colleagues Frank [20] and Hystadt [21] respectively. We showed that greenness showed a protective association with the incidence of diabetes, with an interquartile range (IQR) increase in greenness being associated with a 10% decrease in odds for the incidence of diabetes in the fully adjusted models, while neighborhood walkability showed a 5% decrease in odds for the incidence of diabetes in the fully adjusted models with an interquartile increase in walk-ability score.

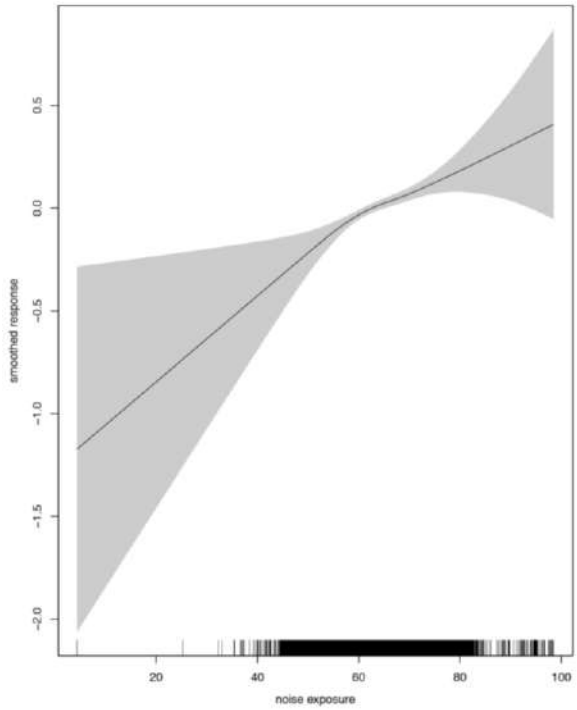

Figure 3: Functional relationship between noise exposure (LDEN) and incident diabetes cases; adjusted for age, gender and area-level income. Line is the log odds of diabetes incidence (log base 10); gray area is 95% CI (from [19]).

Rheumatoid Arthritis

The risk of rheumatoid arthritis (RA) has been associated with living near traffic, and prior evidence suggesting that air pollution may not be responsible for this association [22]. Noise, another traffic-related potential hazard, had not been studied as a risk factor for RA and so we undertook to examine the possible relation [23]. RA cases are harder to define than CHD or diabetes. We used three different case definitions that included (i) multiple contacts with health system with a relevant ICD-9 code (714.0–714.9) listed for an out-patient or in-patient visit, (ii) use of anti-rheumatic drugs, and (iii) visits to specialists such as internists or rheumatologists.

We observed an increased risk of RA with residential proximity to traffic as anticipated; the largest risk increases were seen in association with road types of higher traffic volume and with greater proximity, suggesting a dose–response pattern. In that way, our findings were similar to those from the US Nurse's Health Study [22]. However, we did not find an association of RA incidence with noise, nor

Table 2: Risk of incident Rheumatoid Arthritis in relationship to Noise and air pollution during 5-years before diagnosis (odd's ratios with 95% CI, per interquartile range increase in exposure) (from[23]).

Exposure	RA-ICD-9			RA-prescription			RA-specialist		
	Cases (*n*)	Controls (*n*)	OR (95% CI) [IQR]	Cases (*n*)	Controls (*n*)	OR (95% CI) [IQR]	Cases (*n*)	Controls (*n*)	OR (95% CI) [IQR]
NO-LUR ($\mu g/m^3$)	3,280	33,234	0.99 (0.95, 1.02) [10.6]	2,659	26,846	0.96 (0.92, 1.00) [10.8]	1,883	19,059	0.96 (0.91, 1.00) [10.6]
NO_2-LUR ($\mu g/m^3$)	3,278	33,229	0.95 (0.90, 0.99) [6.3]	2,657	26,842	0.89 (0.84, 0.94) [6.3]	1,881	19,059	0.90 (0.85, 0.96) [6.3]
Black carbon-LUR ($\mu g/m^3$)	3,138	32,159	0.97 (0.93, 1.01) [0.62]	2,553	25,935	0.94 (0.90, 0.98) [0.61]	1,818	18,420	0.92 (0.87, 0.97) [0.62]
$PM_{2.5}$-LUR ($\mu g/m^3$)	3,175	32,304	0.96 (0.91, 1.00) [2.7]	2,567	26,144	0.93 (0.88, 0.98) [2.7]	1,819	18,518	0.92 (0.87, 0.98) [2.7]
PM_{10}-IDW ($\mu g/m^3$)	2,712	27,208	0.91 (0.88, 0.95) [0.87]	2,135	21,850	0.90 (0.86, 0.94) [0.87]	1,653	15,709	0.91 (0.86, 0.96) [0.87]
O_3-IDW ($\mu g/m^3$)	3,055	30,698	1.15 (1.08, 1.23) [8.4]	2,454	24,791	1.26 (1.18, 1.36) [8.6]	1,724	17,636	1.07 (0.98, 1.16) [8.4]
CO-IDW ($\mu g/m^3$)	2,826	28,269	0.87 (0.82, 0.91) [169]	2,249	22,807	0.83 (0.78, 0.88) [169]	1,633	16,274	0.86 (0.80, 0.92) [169]
SO_2-IDW ($\mu g/m^3$)	3,082	30,963	0.90 (0.86, 0.94) [3.1]	2,477	25,011	0.84 (0.79, 0.89) [3.1]	1,733	17,761	0.88 (0.82, 0.93) [3.1]
Noise [dB(A)]	2,188	22,734	1.03 (0.97, 1.09) [6.9]	1,711	18,346	1.00 (0.93, 1.07) [7.0]	1,315	13,173	0.96 (0.88, 1.04) [6.9]

ORs were adjusted for age, sex, and neighborhood SES.

was RA not associated with other traffic-related air pollutants such as NO2 or PM2.5 in our study.

3.3 Birth outcomes

We examined birth outcomes among noise-exposed mothers in the Vancouver birth cohort [24]. The cohort was constructed by extracting data from the same linked administration files as the adult cohort but with added data from the BC Perinatal Database (Perinatal Services British Columbia). These data comprised all live births in 1999 through 2002 in the GVRD. Vital statistics records were identified for 81,347 children born in the study area during the study period; 73,387 had mothers with verified complete residential history within the study area during pregnancy. Following exclusions, 68,238 births remained for study.

Among the subjects, the primary outcomes studied were preterm births (<37 weeks of gestation), moderately preterm (30–36 weeks) and very preterm (<30 weeks of gestation) births versus term (≥37 weeks of gestation) births; term birth weight (in grams); term low birth weight (<2,500 g); and fetal growth defined as small size for gestational age (birth weight below the 10th percentile of the cohort, stratified by sex, for each week of gestation).

As estimated noise levels across the various pregnancy periods (entire pregnancy and trimesters) were highly correlated in all subjects ($r > 0.96$), as well as for those who changed residence during pregnancy ($r > 0.89$), only analyses of average exposure during the entire pregnancy were reported.

The associations of noise and the primary outcomes are shown in Figure 4. Our findings suggested an effect of residential exposure to traffic noise on being small for gesta tional age, term low birth weight, and term birth weight, but not on preterm birth. The association of noise exposure and term birth weight showed a mean reduction of - 19 g per 6 dB(A) [95% CI – 23 to - 15]. In joint air pollution-noise

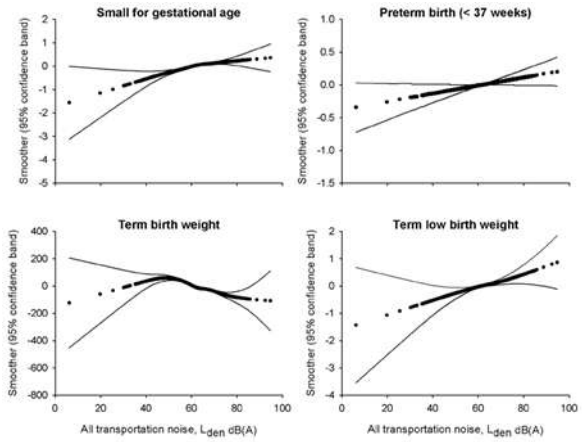

Figure 4: Smoothing splines with pointwise ± 1.96 standard error bands for the associations of all transportation noise exposure with the logits of small for gestational age, preterm birth, low weight at term and with birth weight at term (from [24]).

models, associations between noise and term birth weight remained largely unchanged, whereas associations decreased for all air pollutants (Figure 5).

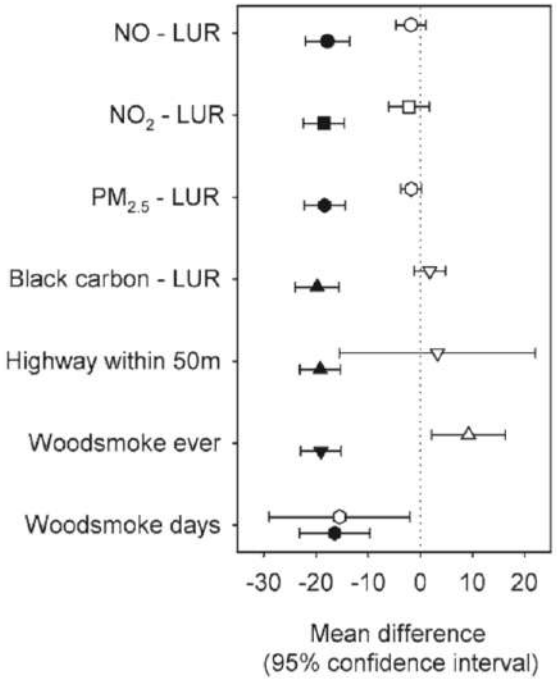

Figure 5: Joint associations of all transportation noise (black symbols) and land use regression estimates of air pollution, road proximity, and wood-smoke exposure (white symbols) with term birthweight. Associations are presented as mean difference (in grams) with 95% CI. Increments are 6 dBA noise, 10 ug/m3 NO, NO2, 1 ug/m3 PM2.5; Black Carbon 10-5/m, 40 wood-smoke days (from [24]).

4 Conclusion

This program of research at UBC has contributed to the better understanding of the role of noise in chronic disease in adults, and its effect on birth outcomes among mothers exposed to noise during pregnancy. While no association was observed between exposure to noise and rheumatoid arthritis, positive associations were observed between noise and increased risk for coronary heart disease, noise and diabetes, and negatively between noise and term birthweight. In all cases, the effects of noise were found to be independent of other exposures related to traffic and urban form, most notably, air pollution. It is worth noting that although the relative risks or effect sizes observed were often small, the outcomes (such as diabetes or coronary heart disease) are highly prevalent in the Canadian population, meaning these differences still carry potentially large public health significance. The actual burden of disease related to community noise exposure has been estimated in some countries (e.g. such as Ericksson's work [25]) but not yet in Canada. The findings of the Vancouver studies have cited over 750 times, and have been incorporated into more recent systematic reviews such as those by the WHO on CVD and metabolic disorders [26] and birth effects [27] which form the basis for the European Noise Guidelines [28].

The strengths of the research program include the very large cohort size (almost half a million in the adult cohort and 70,000 in the birth cohort) as well as the quality of the outcome data (access to health insurance data and vital statistics via linked health records, see Population Data BC at https://www.popdata.bc.ca) and co-variate data, as well as the scale and quality of the exposure data, and the ability to create residential histories. The creation of concurrent noise and air pollution exposure "surfaces" allowed for increased understanding of the covariance of noise and air pollution, and for some of the first joint-exposure studies to be undertaken; now it is standard practice for major epidemiological studies in this field to include both (as well as other measures of urban form) to better adjust for potential confounding and for better understanding of potential interactions.

However, no method can measure true exposure, and sources of error in estimated exposure included not modeling all salient features of the local environment (such as not including float plane traffic; Coal harbor – CYHC – handled over 54,000 movements in 2009, the 35th busiest airport in Canada) and not taking into account individual factors, such as room orientation, window opening behaviour, and time-activity patterns. Nevertheless, many of these exposure misclassification errors are likely to be non-differential in nature (the direction of the error is not associated with outcome status); this typically results in an underestimation of the true exposure-response estimate, not an overestimation [29]. The use of administrative health databases meant that we were unable to obtain all relevant individual-level confounder data, such as socioeconomic and various risk factor data (ethnicity, education level, income, BMI, smoking history, diet, etc.) into account. Such factors may confound findings observed between noise and the incidence of chronic disease. However, we were able to partially adjust for some of these factors by using neighborhood-level socioeconomic status (SES) measures, and ethnicity characteristics. This study was reliant on administrative records for diagnosis, which will have missed undiagnosed cases and residents who

do not attend health care providers, although registration in the BC universal health care system is very high (nearly 100%).

The elucidation of noise from transportation sources as an independent risk factor for chronic health disease has far reaching implications not only for future research (such that major studies of the effects of air pollution on health now also consider noise) but also on policy, and on urban planning. Measures to mitigate air pollution levels from traffic sources may not always be consistent with reducing noise levels [30]. For example, electric vehicles may eliminate tail-pipe emissions, but they do not reduce noise at higher speeds where noise from the road/tire interface is more dominant. Currently, policy around noise mitigation in Canada is still largely regulated at the municipal level, and driven by annoyance and economic outcomes. Despite the growing evidence linking noise to chronic disease such as those described in this paper, Canada lags far behind Europe in terms of formulating true health-based regulations to govern noise exposures.

Moving forward, our research group is currently a participant in the CIHR-funded Canadian Urban Environmental Health Research Consortium or "CANUE" [31]. As part of the CANUE Noise Data Team, we are working to further develop noise exposure data resources for all major urban centers in Canada, using noise measurement, data propagation techniques as well as land-use regression modelling, in a common harmonized manner consistent with the CANUE mission [32]. New research projects are under way. We are currently we are examining the role of noise in neurological disease; preliminary results indicate a possible increase in incident multiple sclerosis with increasing transportation noise exposure (unpublished data). We will also begin assessing the role of noise in early child development through a recently CIHR-funded study 'Born to be Wise: Impact of Modifiable Early-life Environmental Exposures on the Health and Development of Children', that has a primary goal of addressing the research gap between the effect of environmental exposures on early development, and the influence of interactions between harmful exposures and beneficial exposures, as well as studying relations between various environmental exposures and children's early development and health [33].

If you wish to learn more about these studies or our ongoing program of noise and health research, please contact the author.

Acknowledgments

In Memory of Prof. Murray R Hodgson, for his collegial support, insightful contributions and friendship. Also to colleagues at UBC Dr. Michael Brauer, Dr. Hind Sbihi, and Dr. Wenqi Gan; at Queen Mary, London, Prof. Stephen Stansfeld and Dr. Charlotte Clark. This work was funded by in part by CIHR, by Health Canada via an agreement with the British Columbia Center for Disease, the Center for Health and Environment Research at the University of British Columbia, and the Michael Smith Foundation for Health Research. In kind support was provided in part by DATAKustik GmbH.

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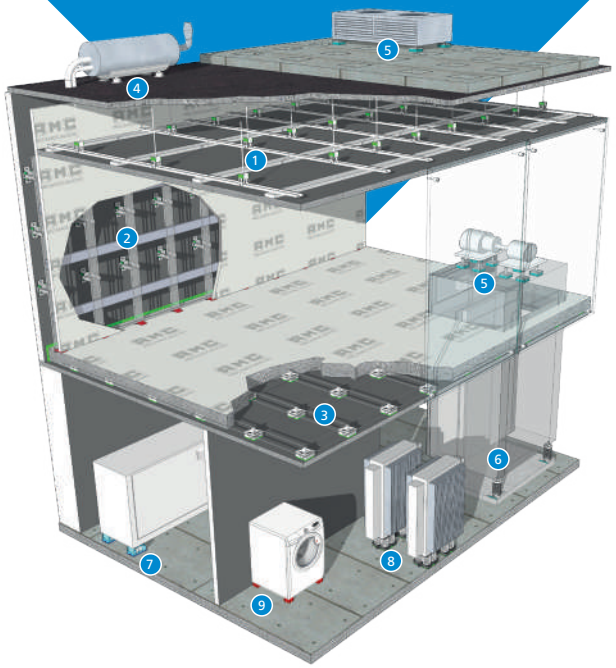

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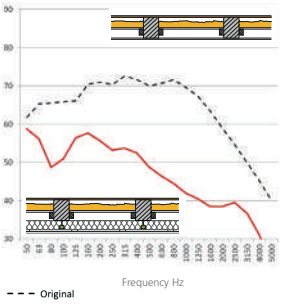

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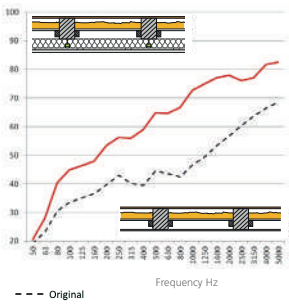

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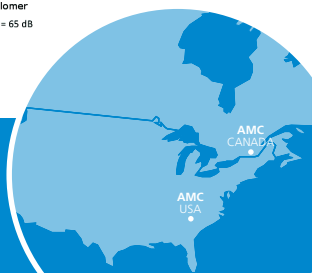

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Les normes scientifiques élevées maintenues par la revue Acoustique canadienne doivent beaucoup au dévouement constant des réviseurs de la revue, qui donnent généreusement de leur temps et de leur expertise. JCAA est heureux de rendre hommage à cette contribution en reconnaissant ceux qui ont participé au processus d'examen. Ainsi, l'équipe de rédaction de l'Acoustique Canadienne reconnaît avec une gratitude particulière les réviseurs suivants qui ont examiné des articles au cours de la période des 12 derniers mois.

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2019 ICA EARLY CAREER AWARD

Michael R. Stinson *[1]
[1]MG Acoustics, Ottawa, Ontario, Canada.

Résumé

La International Commission for Acoustics a remis sa bourse de début de carrière au professeur Jérémie Voix, président de l'Association canadienne d' acoustique (ACA). Ce bref rapport décrit le processus suivi et recueille les souvenirs de ce moment important pour notre association.

Mots clefs : International Commission for Acoustics, Early Career Award

Abstract

The International Commission for Acoustics presented its Early Career Award to Professor Jérémie Voix, the President of the Canadian Acoustical Association (CAA). This short report describes the process and collects the memories from that important moment for our association

Keywords: International Commission for Acoustics, Early Career Award

1 The ICA Early Career Award

The following sections are extracts from the ICA website detailing the Early Career Awards [1].

1.1 Qualifications

The ICA Early Career Award is presented at the Triennial ICA Congress to an individual who is relatively early in his/her professional career (about 10-15 years of active career), who has contributed substantially, through published papers, to the advancement of theoretical or applied Acoustics or both, and who has been active in the affairs of Acoustics through his/her National Society, other National Society(ies), Regional or International organizations.

1.2 The Award

The Award consists of an Award Certificate, a Medal, and an Honorarium. The honorarium for the Early Career award to be announced at the ICA 2019 Congress was Euro 2,000.

1.3 Award Presentation

The award shall be presented at the banquet or a Plenary Session of the ICA Triennial Congress by the President of the Board of the ICA. The award recipient will be introduced by an individual from the nominating National Society and given the opportunity to make remarks in acceptance of the award. The award recipient will present a paper during the Congress and this presentation will be clearly identified in the program. A list of award recipients and a photograph of the most recent award recipient and his/her citation will be listed on the ICA website.

1.4 Past recipients of the ICA Early Career Award

According to the ICA website [2], the recipients have been:

2016 - Prof Frank Russo (Ryerson University)
"*For outstanding contributions to psychological acoustics, particularly the theory of musical cognition and perception*"

2013 - Prof Tapio Lokki (Aalto University)
"*For outstanding contributions to room acoustics, particularly for novel subjective and objective assessment methods of concert halls*"

2010 - Prof Torsten Dau (Technical University of Denmark)
"*For outstanding contributions to auditory processing and perception, auditory neuroscience and technical applications of auditory models in hearing technology*"

2007 - Prof Nico F. Declercq (Georgia Institute of Technology)
"*For outstanding contributions to ultrasonics, particularly for studies of propagation and diffraction of acoustic waves*"

2004 - Prof Timothy Leighton (University of Southampton)
"*For both scientific and educational contributions to underwater acoustics, particularly for the role of bubbles in scientific phenomena*"

2004 - Prof Oleg Sapozhnikov (Moscow State University)
"*For contributions to nonlinear acoustics, particularly for theoretical and experimental studies of high amplitude ultrasound*"

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2 Introduction of 2019 ICA Early Career Award recipient by ICA Secretary General

The following is the introduction of Jérémie Voix by ICA Secretary General, Dr. Michael Stinson, for the 2019 Early Career Award from the International Commission on Acoustics (ICA), given during the International Congress on Acoustics on September 11th in Aachen, Germany.

Figure 1: ICA Secretary General, Dr. Michael Stinson, introducing Prof. Jérémie Voix, the ICA Early Career Award recipient during the ICA 2019 Congress in Aachen, Germany.[Photo courtesy of Sabine Schmidt © ICA 2019]

"It is my pleasure to introduce the winner of the 2019 ICA Early Career Award, Professor Jérémie Voix.
You have just heard a minute ago, an explanation of the qualifications for this award. It should be clear that you have to be good to win this award. And Jeremie Voix is good. During his young career, he has made major contributions in research, in technology transfer, in teaching, and in service to scientific organizations.

Jérémie Voix is a leading expert in hearing protection and ear acoustics. An underlying theme in his work is the merging of hearing protector, hearing aid, and communication features into a single wearable device. He is an author of over 40 refereed publications and over 70 proceedings papers, addressing topics such as measurement of the effectiveness of hearing protectors, variability in ear plug fitting, digital audio, and hearing aid technology. He is also working on techniques for an in-ear, micro-energy harvester. He has two book chapters in the next edition of the Noise Manual, widely used by industrial hygienists.

I first came to know Jérémie several years ago at technical sessions in hearing acoustics. I was impressed with his level of knowledge, so early in his career. But more than that, it was his ability to bridge the gap between theory and practical application that stood out.

His research efforts are made in close collaboration with industrial partners so the transfer of technology is rapid. As well as being Full Professor at the Université du Québec in Montréal, Canada, he is the Chief Scientific Officer of EERS Global Technologies, developing a variety of in-ear products. Dr. Voix holds 11 patents, maybe more by now.

Figure 2: ICA Secretary General (left) Dr. Michael Stinson, Prof. Jérémie Voix and ICA President (right) Prof Michael Taroudakis, at the ICA 2019 congress in Aachen, Germany.[Photo courtesy of Sabine Schmidt © ICA 2019].

Given his fundamental and practical capabilities, it is not surprising that he is frequently called upon to serve on standards writing committees and to consult with industry. Recently, Dr. Voix was appointed as an expert for the World Health Organization's "Make Listening Safe" initiative.

Professor Voix is an engaging and effective teacher. He has supervised students at many levels, including 2 Ph.D. students, 16 M.Sc. students, 11 capstone students, and 26 undergraduates.

I got to know Jérémie better when I was organizing the 2013 ICA congress in Montreal. Jérémie was a member of our organization team, and was a great help, being productive, efficient, reliable, and innovative.

Figure 3: ICA Early Career Award medal and certificate with mention « Jérémie Voix is hereby presented the Early Career Award for outstanding contributions to ear acoustics, particularly in-ear technologies for protection, communication and biosensing ».

I am not the only one to recognize his organizational skills. He has chaired and organized many technical sessions and workshops, nationally and internationally. And, more recently, Jérémie Voix was the general chair of the highly successful ICSV congress that was held two months ago in Montreal.

Jérémie Voix has served the Canadian Acoustical Association at many levels. He was editor of their journal for several years, overseeing the transition into an online publication. He has served on their Board. Currently, he is President of the CAA.

It has been a long journey for a teenager in northern France making his own loudspeakers to this stage here as winner of the ICA Early Career Award. It will be interesting to see where Jérémie Voix goes from here."

After this introduction and a warm handshake from ICA President Michael Taroudakis, the Award Ceremony closed on a word from Prof. Voix, thanking the Canadian Acoustical Association for its support of his candidacy and highlighting that this is now two presidents of the CAA in a row that have received the triennial award -- his colleague Prof. Frank A. Russo was the 2016 award winner. He also encouraged young acousticians to get involved in this professional organization, volunteer here and there, etc., and they may have one day such a good surprise! ;-)

References

[1] ICA - Early Career Award; Retrieved from http://www.icacommission.org/eaward.html, 22 October 2019

[2] ICA - Early Career Award – Past Recipients; Retrieved from http://www.icacommission.org/eaward.html, 22 October 2019

THE 26TH INTERNATIONAL CONGRESS ON SOUND AND VIBRATION: BEHIND THE SCENE

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Résumé

L'International Institute of Acoustics and Vibration (IIAV) et l'Association canadienne d'acoustique (CAA) ont eu le plaisir d'inviter des scientifiques et des ingénieurs du monde entier à participer au 26e Congrès international sur le son et les vibrations (ICSV26) qui s'est tenu à Montréal du 7 au 11 juillet 2019. Cet événement a été un grand succès, avec 1015 résumés reçus, 861 participants, 829 présentations, 52 pays, 45 sessions structurées, 31 sessions régulières, 31 présidents de zones thématiques, 27 volontaires, 25 exposants, 15 zones thématiques, 9 événements sociaux, 6 conférences plénières, 4 journées chaudes et ensoleillées, 3 visites scientifiques et 1 lieu unique et pratique. Ce rapport présente les faits saillants de la conférence dans l'espoir d'aider les futurs organisateurs de la conférence.

Mots clefs: conférence, organisation, conseils, expérience de première main

Abstract

The International Institute of Acoustics and Vibration (IIAV) and the Canadian Acoustical Association (CAA) were pleased to invite scientists and engineers from all over the world to attend the 26th International Congress on Sound and Vibration (ICSV26) held in Montréal 7–11 July 2019. This event was a great success, with 1015 abstracts received, 861 participants, 829 presentations, 52 countries, 45 structured sessions, 31 regular sessions, 31 theme area chairs, 27 volunteers, 25 exhibitors, 15 theme areas, 9 social events, 6 plenary lectures, 4 warm and sunny days, 3 scientific visits, and 1 unique and convenient venue. This report presents the highlights of the conference in hope to support future conference organizers.

Keywords: conference, organization, advises, hands-on experience

1 Introduction

The International Institute of Acoustics and Vibration (IIAV) and the Canadian Acoustical Association (CAA) were pleased to invite scientists and engineers from all over the world to attend the 26th International Congress on Sound and Vibration (ICSV26) held in Montréal 7–11 July 2019.

This congress is a leading event in the area of Acoustics and vibration and provides an important opportunity for scientists and engineers to share their latest research results and exchange ideas on theories, technologies and applications in these fields. The Congress featured a broad range of high-level technical papers from across the world: distinguished plenary lectures presented recent developments in important topics of sound and vibration and included discussions about future trends.

2 The seed and gestation

The seed for ICAV26 was planted when Prof. Crocker eventually approached Prof. Voix, the soon-to-be General Chair, in October 2015. After Franck Sgard agreed to be Scientific Chair, the local scientific committee was quickly started around the enthusiasm and good will of a dozen local colleagues from industry and academia. Tourisme Montreal, a promotional entity for the city of Montreal, was solicited early 2016 and in June the first contact was established with Mrs Carol Damiani, quickly seconded by Mrs. Paola Pilot, who would soon become one of the most instrumental persons to guide the general and technical chairs through the many necessary steps required for the organization of a large scientific conference. After a relatively busy year of visits, meetings and discussions, email exchanges with IIAV Head Office, the final budgets were ready. They included submissions received for 3 different venues (two hotels and Montreal Congress Center), two audio-visual rentals and various scenarios for social events. The "Montreal Bid Book" was presented at the IIAV Board Meeting in July 2017 in London (UK) and the various options discussed with IIAV Executive Committee. The Hotel Bonaventure venue was eventually chosen, the Congress dates were finalized and the green light was received from IIAV for ICSV26 Organizing Committee to make it happen! ICSV26 congress was finally coming to light in early September 2017, right after a formal Local Hosting Agreement was executed between IIAV and the Canadian Acoustical Association (CAA) through its president -at the time- Prof. Frank Russo.

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The logo and the website placeholder

Everything starts with a logo and a website. The logo was inspired by the Jacques-Cartier bridge, a famous infrastructure built in 1930, and the final design, reproduced in Fig. 1, was provided by Mrs Clara Michaud. A first version of the website was launched in Fall 2017 with http://www.icsv26.org as registered domain. The website hosting was offered by CAA, and several official email identities and alias were created, such as :

- info@icsv26.org,
- general_chair@icsv26.org,
- scientific_chair@icsv26.org,
- secretariat@icsv26.org,
- exhibitors@icsv26.org,
- media@icsv26.org;

to ensure professional and consistent communication channels during the whole conference endeavour.

Figure 1: The official banner of ICSV26, featuring its logo and the Jacques Cartier bridge

2.1 The committees

The Local and International Organizing and Scientific Committees were formed in 2017 and were also proposed to the IIAV Board of Directors during the ICSV24 meeting held in London (UK).

Organizing committee

The Local Organizing Committee comprised the General Chair, the Scientific Chair, the Sponsors and Exhibitors Chair and co-Chairs, the secretary and the on-site coordinator and members of the IRSST Communication Department. It was supported by an International Organizing Committee made up of the IIAV President Malcolm Crocker and several IIAV directors and members.

Scientific committees

The local committee included the General Chair, the Scientific Chair, 21 theme area chairs and 39 session chairs coming out from Canadian Universities, research centres and companies. The International Scientific Committee comprised 10 IIAV officers and directors together with about 130 session chairs. Figure 2 recalls the names of the persons in charge in the two committees.

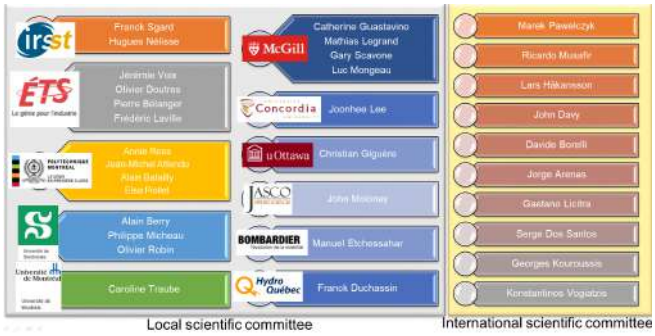

Figure 2: The local and international scientific committees

The Theme Area Chairs were responsible for coordinating their theme area, defining regular and structured sessions on different topics areas, appointing chairs to organize these sessions, contributing to the definition of plenary sessions and overseeing the evaluation of abstracts and proceedings that were peer-reviewed.

2.2 A good surprise

The IRSST/Ambassadors' Club Joint Award was handed out to ICSV26 General and Scientific Chairs at the 2018 Recognition Award Gala, a marquee event organized by the Palais des congrès de Montréal. IRSST president and CEO, Ms. Marie Larue, underscored the work of the two award recipients at the 2018 Recognition Gala: "I would personally like to congratulate researchers Jérémie Voix and Franck Sgard, whose dedication and efforts succeeded in bringing this prestigious international congress to Montreal."

"Influential women and men who actively attract international congresses to Montreal do so with a passion and pride that are both celebrated at the Recognition Award Gala, a prestigious event where our vibrant metropolis is showcased by the tourism industry and the university and business communities," explained Professor Hany Moustapha, president of the Ambassadors' Club of the Palais des congrès de Montréal.

Figure 3: ICSV26 General Chair (left) and Scientic Chair (middle) holding the Amabassadors' Club plaque (left) and Mrs Marie Larue, President of IRRST (right).

2.3 The Scientific Program

In order to cover the broadest range of high-level technical contributions from all over the world, the Scientific Program was structured into 15 Theme Areas (T), that included several Structured Sessions and Regular Sessions (see Fig. 4).

Figure 4: Theme areas

Theme Area T01 - Acoustical measurement and instrumentation

This Theme Area, lead by Lars Håkansson, covered all aspects related to the measurement of sound and vibration. It included sessions concerning traditional measurement instruments but also proposals concerning new measurement concepts: new transducers, new mathematical algorithms, new acoustical parameters, or new applications of traditional technologies for multimedia and virtual reality. The Regular Sessions were T01 RS01 - Acoustic imaging and acoustic detection (Lars Håkansson, Sweden), T01 RS02 - Measurement techniques and sensors (Lars Håkansson, Sweden & Triantafillos Koukoulas, South Korea), T01 RS03 - Measurement uncertainty in Acoustics (Lars Håkansson, Sweden & Andreas Linderholt, Sweden), T01 RS04 - Instrumentation for sound and vibration measurements and analysis (Lars Håkansson, Sweden) and the Structured Session was mostly T01 SS01 - Sound and vibration measurements and analysis (Lars Håkansson, Sweden & Claes Hedberg, Sweden & Mitsunori Mizumachi, Japan).

Theme Area T02 - Active noise and vibration control-mechatronics

This theme, lead by Alain Berry, Philippe Micheau and Marek Pawelczyk, included any concept or device that requires a combination of actuators (loudspeaker, piezoceramic, inertial actuator...), sensors (accelerometer, microphones...) and control units for real-time signal processing. The theme includes active and semi-active, control of sound and vibration, smarts structures, smart earplug, smart headset, mechatronics,etc. Presentations included conceptual design of system, theoretical development, algorithms design and practical implementations. The Regular Sessions were T02 RS01 - Active control of sound and vibration (Alain Berry, Canada & Philippe-Aubert Gauthier, Canada), T02 RS02 - Active structural acoustic control (Philippe Micheau, Canada), T02 RS03 - Semi-active control (Philippe Micheau, Canada), while the Structured Sessions were T02 SS01 - Actuators and sensors for active control (Manuel Melon, France & Bruno Gazengel, France), T02 SS02 - Algorithms for active control (Jordan Cheer, United Kingdom & Marek Pawelczyk, Poland) and T02 SS03 - Active meta-materials (Hervé Lissek, Switzerland).

Theme Area T03 - Aeroacoustics, thermoacoustics, combustion noise, aircraft noise and vibration

his Theme Area, lead by Luc Mongeau, Manuel Etchessahar and Ricardo Musafir, was devoted to all aspects concerning sound generated by fluid flow, combustion processes or by the interaction of a flow with surfaces, as well as aircraft noise and vibration. Some examples included description of source mechanisms or of propagation in particular situations; jet noise; fan and compressor noise; wind turbines; active or passive control of aerodynamically generated sound and vibration, notably in aircraft, trains and other vehicles, including space vehicles; analytical and numerical solutions for specific problems. The Regular Sessions were T03 RS01 - Aeroacoustics (Luc Mongeau, Canada & Michel Roger, France & Kaveh Habibi, Canada), T03 RS02 - Aviation noise (Jim Kok, Netherlands & Ricardo Musafir, Brazil), while the Structured Sessions were T03 SS01 - Acoustic simulation, test and control in spacecraft (Zheng Ling, China & Stephan Tewes, Germany), T03 SS02 - Computational Aeroacoustics (Gwenael Gabard, France), T03 SS03 - Combustion noise and Thermoacoustics (Maria Heckl, United Kingdom), T03 SS04 - Aircraft cabin noise and vibration control (Stephan Tewes, Germany), T03 SS05 - Wind turbine noise (Kaveh Habibi, Canada), and T03 SS06 - Aicraft engine noise (Robby Lapointe, Canada).

Theme Area T04 - Environmental and community noise, soundscapes

This Theme Area, lead by Catherine Guastavino, Franck Duchassin and Gaetano Licitra, covered all aspects of environmental, community noise and soundscape research. These topics included, but are not limited to, environmental noise strategy, the role of sound in urban experience, outdoor noise propagation, community involvement and soundscape assessments. The Regular Sessions were T04 RS01 - Community and environmental noise (Anthony Gérard, Canada & Romain Dumoulin, Canada), T04 RS02 - Noise impact assessment (Stephen Keith, Canada & Martin Meunier, Canada), T04 RS03 - Noise modelling and mapping (Gaetano Licitra, Italy & Anthony Gérard, Canada), while the Structured Sessions were T04 SS01 - Soundscape auralization (Philippe-Aubert Gauthier, Canada & Cédric Camier, France & Anthony Gérard, Canada), T04 SS02 - Urban soundscapes (Daniel Steele, Canada), and T04 SS03 - Action plans in urban areas (Anthony Gérard, Canada & Erik Buehlmann, Switzerland).

Theme Area T05 - Physical Acoustics, ultrasound and wave propagation

This Theme Area, lead by Pierre Belanger and Serge Dos Santos, touched upon all aspects of ultrasonic wave propagation including analytical modelling, numerical modelling, transduction mechanisms, imaging algorithms, quantitative inversion algorithms as well as nonlinear Acoustics. This theme was interested in the biomedical, nondestructive testing and structural health monitoring fields of application. The Regular Sessions were T05 RS01 - Ultrasound and ultrasonic measurements techniques and sensors (Daniel Pereira, Canada), T05 RS02 - Physical Acoustics (Daniel Pereira, Canada & Pierre Belanger, Canada & Guillaume Haiat, France), while the Structured Sessions were T05 SS01 - Wave propagation in complex media (Guillaume Haiat, France & Pierre Belanger, Canada), T05 SS02 - Nonlinear Acoustics and vibrations (W. S. Gan, Singapore), T05 SS03 - Sound propagation in curvilinear spacetime (Giorgio Palma, Italy), T05 SS04 - Duct Acoustics (Hans Boden, Sweden) and T05 SS05 - Acoustic emission (Md. Tawhidul Islam Khan, Japan)

Theme Area T06 - Industrial and occupational noise and vibration

This theme, lead by Hugues Nélisse and Franck Sgard, involved hearing loss prevention and protection of workers exposed to occupational noise and vibration. It included the identification of risk arising from noise and vibration at work, the development and improvement of measurement and assessment methods, predictive and modeling methods, hearing protection (measurements, advanced technologies, comfort), hand-arm and whole-body vibration, machinery and factory noise, etc. The Regular Session was T06 RS01 - Noise source identification in the workplace (Dariusz Pleban, Poland), while the Structured Sessions were T06 SS01 - Hearing protection (Alberto Behar, Canada & Cameron Fackler, United States & Hugues Nélisse, Canada), T06 SS02 - Hand-arm and whole-body vibration (Pierre Marcotte, Canada), T06 SS03 - Noise and vibration in small, medium and large industries (Naval Agarwal, United States) and T06 SS04 - Advances in machinery noise and vibration control (Eleonora Carletti, Italy).

Theme Area T07 - Structural dynamics and nonlinear vibration

This Theme Area, lead by Alain Batailly, Mathias Legrand and Elsa Piollet, covered all aspects of experimental and computational methods for the characterization, analysis, design and optimization of nonlinear mechanical systems. These topics include, but are not limited to, emerging methods in mechanical system design, optimal design in the framework of nonlinear dynamics, vibration control and damping of nonlinear systems, stochastic analysis and robust design, recent developments in numerical methods (finite volumes, boundary element methods, octree mesh, isogeometric analysis), artificial intelligence and machine learning in structural dynamics, and rotordynamics. The Regular Sessions were T07 RS01 - Modal analysis (Miroslav Janota, Czech Republic & Vadym Kruts, Ukraine), T07 RS02 - Vibration and control of nonlinear mechanical systems (Mohammad Rafiee, Canada & Elsa Piollet, Canada & Annie Ross, Canada), T07 RS03 - Structural Acoustics and vibration (Guilhem Michon, France & Évangéline Capiez-Lernout, France & Simon Jones, United States), T07 RS04 - Rotordynamics (Elsa Piollet, Canada), T07 RS05 - Fatigue, fracture and joint interfaces (Mohammad Rafiee, Algeria), and T07 RS06 - Optimal design and uncertainty quantification (Kamal Kesour, Canada).

Theme Area T08 - Materials for noise and vibration control

This theme, lead by Olivier Doutres and Jorge Arenas, touched on the recent advances in material science, manufacturing processes, chemistry, and nanotechnologies that were producing significant improvements in the design, production, and performance of specialized materials and metamaterials. Papers related (but not limited) to advances, development, analysis and/or optimization of materials or metamaterials that have been produced for the specific purpose of providing high values of sound absorption, vibration damping, and vibration and/or noise isolation are welcome within this Theme Area. The papers covered fundamental research, and/or applications, related to design, modelling, testing, and/or manufacturing of noise and vibration control materials or metamaterials. Due to the importance of the subject, this area also welcomed studies on environmentally friendly materials that are made of recycled products and/or through less contaminating processes. The Structured Sessions were T08 SS01 - Passive sound absorbing and insulating materials (Raymond Panneton, Canada & Francesco Asdrubali, Italy & Thomas Dupont, Canada & Philippe Leclaire, France), T08 SS02 - Vibration damping materials (Mohammad Rafiee, Canada), T08 SS03 - Acoustic metamaterial and phononic crystal: fundamentals & applications (W. S. Gan, Singapore & Wonju Jeon, South Korea) and T08 SS04 - Characterization of acoustical materials (Chiara Scrosati, Italy & Edoardo Alessio Piana, Italy & Nicolaas Bernardus Roozen, Belgium & Olivier Robin, Canada).

Theme Area T09 - Audiology, prosthetics, speech sciences, communication in noise

This theme, lead by Christian Giguère, covered all aspects related to advancements in the hearing and speech sciences, including but not limited to the following topics: psycho/physiological Acoustics, audiology, speech Acoustics and disorders, bio-inspired signal processing, and prosthetics. The Regular Session was T09 RS01 - Psychological and physiological Acoustics (Benoît Jutras, Canada & Christian Giguère, Canada), while the Structured Sessions were T09 SS01 - Hearing aids, cochlear implants and other hearing technologies (Christian Giguère, Canada), T09 SS02 - Development of speech tests for clinical and auditory fitness for duty evaluations (Josée Lagacé, Canada & Chantal Laroche, Canada) and T09 SS03 - Integrating personal hearing protec-

tors in safe working routines: use, communication and environmental awareness (Rachel Bouserhal, Canada).

Theme Area T10 - Signal processing and nonlinear methods

This theme, lead by Jean-Michel Attendu and Annie Ross, covered a wide range of topics related to the application of signal processing and nonlinear methods to the analysis of acoustics and vibration systems. This includes linear and nonlinear signal processing, vibro-acoustic imaging, source localization, inverse problems, big data problems, parametric and non-parametric pattern recognition, vibro-acoustical condition monitoring, diagnosis and prognosis. The Regular Sessions were T10 RS01 - Signal processing techniques for acoustic array systems and inverse problems (Thomas Padois, Canada), T10 RS02 - Fault diagnosis and prognosis (Aouni Lakis, Canada), T10 RS03 - Machinery health monitoring (Sébastien Laurier-Chapleau, Canada), T10 RS04 - Signal processing in Acoustics and vibration (Annie Ross, Canada), while the Structured Session was T10 SS01 - Compressive sensing and sparse signal reconstruction (Gilles Chardon, France).

Theme Area T11 - Room and building Acoustics

This theme, lead by John Laurence Davy and Joohnee Lee, covered all aspects of building and room Acoustics related to the transmission of sound and vibration through building elements, the acoustical qualities of spaces and the architectural acoustic design. The common framework was the noise and vibration control methodology and the evaluation of the perceived quality of sound in rooms. The Regular Sessions were T11 RS01 - Building Acoustics (Joohnee Lee, Canada & Siu-Kit Lau, Singapore), T11 RS02 - Human response to noise and vibration in built environments (Pyoung Jik Lee, United Kingdom), while the Structured Sessions were T11 SS01 - Room Acoustics design: from modeling, to VR and final project (Umberto Berardi, Canada), T11 SS02 - Classroom Acoustics (Lily Wang, United States), T11 SS03 - Measurement and prediction of sound insulation (Jeffrey Mahn, Canada & John Davy, Australia) and T11 SS04 - Structureborne and impact noise in buildings session (Naval Agarwal, United States & Roderick Mackenzie, Canada).

Theme Area T12 - Underwater and maritime noise

This theme, lead by John Moloney and Davide Borelli, covered underwater and maritime noise included ship noise and vibration, harbour and environmental underwater noise, underwater noise from pile driving, marine propeller noise, underwater acoustic communication and signal processing, numerical methods for underwater Acoustics and vibroacoustics of submerged structures. The Regular Sessions was T12 RS01 - Underwater sound (Venugopalan Pallayil, Singapore), while the Structured Sessions were T12 SS01 - Technology for underwater sound measurement and monitoring (Adrian Brown, United Kingdom), T12 SS02 - Ship and harbour noise and vibration (Davide Borelli, Italy & Tom Dakin, Canada & Ildar Urazghildiiev, United States), and T12 SS03 - EU Interreg Italy-France Maritime Projects on noise reduction in harbors (Ildar Urazghildiiev, United States & Gaetano Licitra, Italy).

Theme Area T13 - Acoustics education

This theme, lead by Frédéric Laville and Olivier Robin, included presentations from professionals with various involvements in acoustic education (practitioners, researchers, program directors, etc.) in all fields of Acoustics and for various audiences (K-University, workers, general public, etc.) with various needs. The goal was to share specific knowledge on (or experience with) a pedagogical approach, curriculum development or some educational tools so that conference participants (and future readers of the conference proceedings) will have elements to improve their own implication in acoustic education. The Structed Sessions were T13 SS01 - Education in Acoustics: catching attention or teaching in minutes using traditional or nontraditional media and methods (Olivier Robin, Canada) and T13 SS02 - Education in acoustics programs at all levels (K-8, K-12, undergraduate and graduate) (Frédéric Laville, Canada & Jean-Philippe Migneron, Canada).

Theme Area T14 - Musical Acoustics

This theme (quite new for ICSV) was lead by Gary Scavone and Caroline Traube and covered all aspects related to advancements in musical Acoustics, including but not limited to the following topics: modeling and analysis of musical instruments and the singing voice, analysis and synthesis of musical sounds, experimental techniques for sound and instrument characterization, psychoacoustics, music cognition, performance and pedagogy, new devices for music performance and interaction. The Regular Session was T14 RS01 - Musical Acoustics (Delphine Chadefaux, France) and the Structured Sessions were T14 SS01 - Vibroacoustics of musical instruments (Thomas Hélie, France & Marthe Curtit, France), T14 SS02 - Tools for musical instrument design and making (Jean-Pierre Dalmont, France), T14 SS03 - Biomechanical control of musical instrument (Caroline Traube, Canada), and T14 SS04 - Physical modeling of musical instruments and singing voice (Tamara Smyth, United States & Jean-François Petiot, France).

Theme Area T15 - Road and railway noise and vibration

This theme, lead by Georges Kouroussis and Konstantinos Vogiatzis, covered the broad issue of generation and propagation of sound and ground borne vibration from road and rail transport. Structured sessions were dedicated partly to the urban environment, with low speed rail bound transport and road transport. In addition, novel mitigation measures against noise from main roads, such as low noise pavements, were also highlighted. Recent developments such as the revision of EU type approval standards and the gradual increase of electric and hybrid vehicles were treated. The Regular Session was T15 RS01 - Railway noise and vibration

(Georges Kouroussis, Belgium & Wim van Keulen, Netherlands), while the Structured Sessions were T15 SS01 - Noise and vibration from transportation (Georges Kouroussis, Belgium & Wim van Keulen, Netherlands), and T15 SS02 - Vehicle noise, vibration and harshness (NVH)(Sifa Zheng, China).

Plenary lectures

Six plenary lectures on various acoustics and vibration topics were given by speakers from North America, Europe and Asia.

- Conventional and non-conventional porous materials for noise control: overcoming conventional limits (Pr R. Panneton, Canada)
- Unique vibration phenomena in high-speed, lightweight, compliant gears (Pr R. Parker, United States of America)
- Variability in speech and spoken word recognition: a short introduction (Pr M. Clayards, Canada)
- Noise transmission and absorption of lightweight structures: an overview and experience (Bilong Liu, China)
- Underground Acoustics (Rupert Thornely-Taylor, United Kingdom)
- Acoustical behavior of the bone-implant interface: from multiscale modeling to the patients bed (Guillaume Haiat, France)

2.4 The real website and online registration systems

The website placeholder was eventually replaced in March 2018 with an instance of the ICSV core website, a PHP-based site developed and carefully maintained by Dr. Sebastian Budzan, in tight collaboration with Prof. Marek Pawelczyk. While ICSV website was offering all the required features for attendees account creation, abstract submission, abstract review, paper submission, 2-rounds paper review, as well as theme area and session chairs management, its documentation was very light. The conference coordinator, Mrs. Nathalie Dabin, and the General and Technical Chairs spent a lot of time figuring out the various features and their use, calling from time to time Dr. Budzan to the rescue. One funny-moment was when Dr. Budzan had to fix the time-down counter math logic, as it was the first time in ICSV website history that the counter had to count for more than one year in advance! An alternative solution had to be found also, outside of ICSV website for the registration of ICSV26 delegates and the payment of their registration fees. That mandate was given to Opus-Agora, a local Professional Congress Organizer (PCO). Unfortunately, the lack of interoperability between the ICSV site and this later registration system, has forced a lot of manual conciliation, resulting in some delays (between registration and invoicing, between payment and receipt receiving, etc.) and headaches both for the ICSV26 Local Organizing Committee and the PCO in charge of the online and onsite registration of ICSV26 delegates.

The sponsors and exhibitors registration was handled very diligently and efficiently by Mr. Julien Biboud and Mrs Stéphanie Filteau, generously allocated to ICSV26 from Mecanum Inc. by Prof. Noureddine Atalla. Exhibitors also used the PCO registration systems, while Sponsors would directly deal with Mecanum.

3 The conference outcome

This section details the ICSV26 conference outcomes, from the scientific, human and environmental perspectives.

3.1 The Presentations

A total of 829 presentations were given within 15 theme areas, 45 structured sessions and 31 regular sessions.

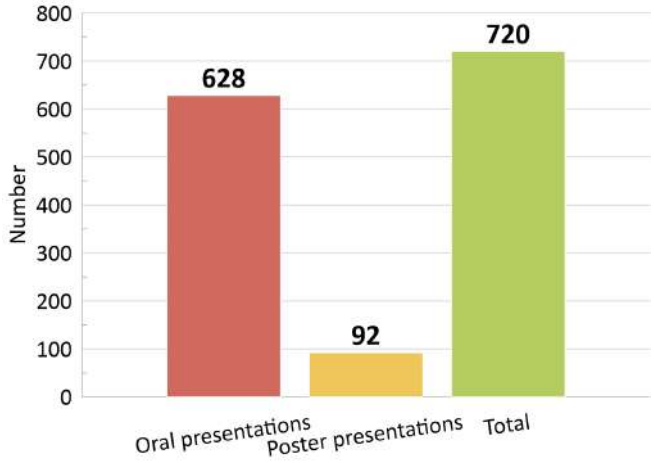

Figure 5: Distribution of presentations by type

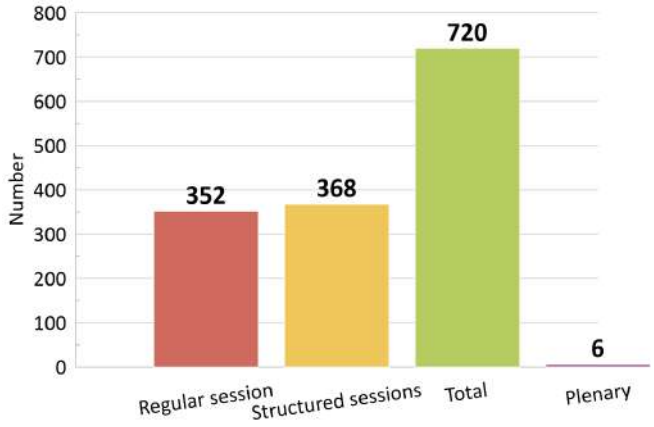

Figure 6: Distribution of presentations by session types

3.2 The Delegates

A total of 861 individuals participated in ICSV26, including delegates, exhibitors, accompaying persons and organizing team members.

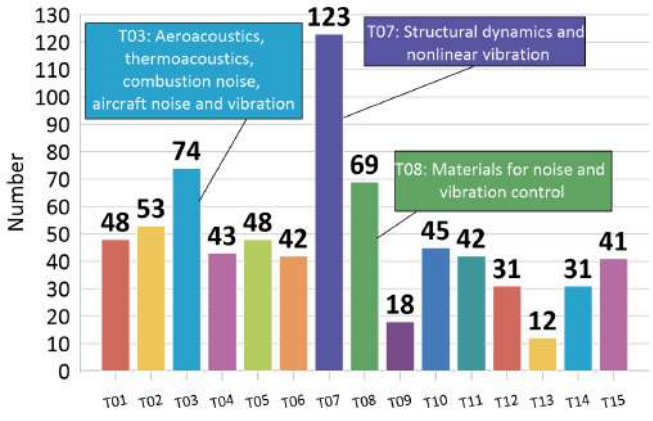

Figure 7: Distribution of presentations by theme area

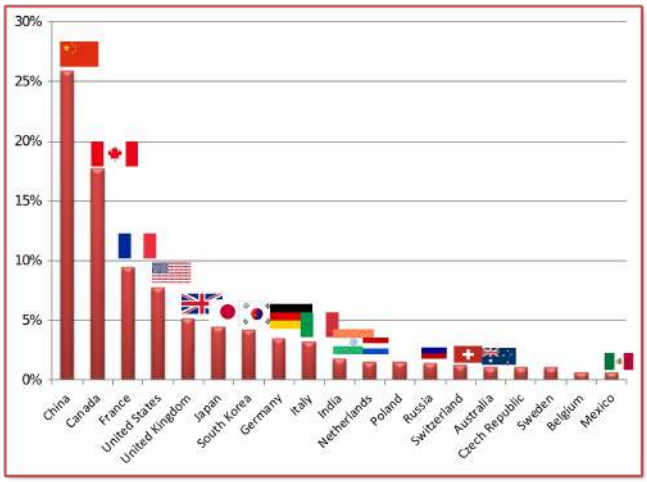

Figure 8: Countries and territories of origin of the ICSV26 delegate registrations.

3.3 The Awards Program

ICSV26 featured two Best Student Paper programs to recognise the best contributions from students presenting at the Congress. One was the usual Sir James Lighthill Best Student Paper Award, offered by IIAV for many years, and the other was a special one offered by IRSST.

Sir James Lighthill Best Student Paper Award

This Award was for the best paper published in the Proceedings of IIAV Annual International Congress on Sound and Vibration (ICSV) by a person in the early stages of his/her career. The Award was in the form of a certificate and backed by a cash sum of US$200. In addition, free membership of the IIAV, was to be given to the winners for one year. The author of the paper must either be a student or within the first five years of full-time employment. He/she need not be a member of the Institute. All papers had to be submitted by 31 March 2019. The criteria to be used by the Awards Committee were: the contribution to the advancement of scientific knowledge, originality, quality and industrial importance. The Award was presented at ICSV26 Award Ceremony for which the winners were gracefully invited by ICSV.

IRSST Best Student-Paper Award

The IRSST Best Student-Paper Award recognized the best papers related to noise and vibration in the field of Occupational Health and Safety (OHS), published within the Proceedings of the International Institute for Acoustics and Vibration (IIAV) Annual International Congress on Sound and Vibration (ICSV). Four (4) awards were to be won in the form of a cash prize of $500, for each selected paper. The author of the paper hod to be a regular student (undergraduate, graduate or postdoctoral candidate), enrolled at a Canadian academic institution and conducting research in the field of OHS. The author did not need to be a member of the IIAV. All papers had to be received by 31 March 2019, and satisfy the above eligibility criteria . The judging criteria for the papers were a) to be relevant to the field of occupational health and safety, b) to contribute to the advancement of scientific knowledge, c) to be deemed original, d) to be of good scientific quality and important for the field. The Award were handed out mainly on the basis of the quality of the written paper, and, to a lesser extent, on the quality of the oral presentation. This allowed the judging process to be completed before the start of the Congress. However, members of the Honours and Awards Committee verified that the quality of the oral presentation of the proposed winner was acceptable. Furthermore, candidates had to demonstrate by the way they presented the paper and answered audience's questions that they had made a substantial technical contribution to the presented paper.

The Award was presented at the ICSV26 Award Ceremony for which the winners were gracefully invited by ICSV.

Figure 9: Recipients of the Best Student-Paper Award with (from left to right) Mr. Simon Benacchio, Mr. Fabien Bonnet, Mr. Yu Luan and Mrs. Laurence Martin, surrounding Mr. Kannan Krishnan, IRSST's chief scientific officer (center).

3.4 The Volunteers

A total of 27 volunteers were recruited mostly within graduate students of faculty members from the Local Scientific Committee but also included two secondary students from a local summer internship program entitled "Classe Affaires" by MontrealReleve.ca.

Figure 10: Group picture of the team of volunteers involved in ICSV26 organisation (Jacob Bouchard-Roy missing, as busy setting up the Executive Board Room at the time of this picture).

3.5 The Scientific Visits

Three scientific visits were organized for ICSV26 delegates.

Visit 1 : Exclusive tour of CIRMMT

The Centre for Interdisciplinary Research in Music Media and Technology (CIRMMT pronounced "kermit") is housed at the Schulich School of Music at McGill University, just a couple blocks north of the ICSV26 venue. CIRMMT is a multidisciplinary research group that seeks to develop innovative approaches to the scientific study of music media and technology, to promote the application of newer technologies in science and the creative arts, and to provide an advanced research training environment. CIRMMT occupies a unique position on the international stage having developed intense research partnerships with other academic and research institutions, as well as diverse industry partners throughout the world. Several volunteers of the ICSV26 local scientific committee are regular members of CIRMMT and a special tour was arranged to let ICSV26 delegates discover this unique center, discover Polak & Schulish halls, and visit its new Music Multimedia Room.

Visit 2: Exclusive tour—ICAR

The ICAR laboratories (Infrastructure commune en acoustique pour la recherche ÉTS-IRSST) are housed at ÉTS (École de technologie supérieure), just a couple blocks away from the ICSV26 venue. ICAR is a training and research laboratory for industrial Acoustics. Its creation results from the successful collaboration between ÉTS university and IRSST occupational health research institute. ICAR allows to test, improve and develop new products or processes that are more acoustically efficient: industrial machines, tools, transportation vehicles, household appliances, acoustic materials and hearing protection devices. The ultimate goal of ICAR activities is to increase the comfort, health and safety of workers (and the general public) through the operation of state-of-the-art acoustic testing facilities that meet the needs of both industry and academic researchers. For logistic reasons, this exclusive tour was limited to 2 groups of 15 persons each.

Visit 3: Exclusive tour— MOEB

Emile Berliner's research led to the development and patenting of a microphone that Alexander Graham Bell acquired to improve his invention - the telephone. Berliner went on to work in Bell laboratory for 6 years before returning to his own research. On November 12, 1887 he received the patent for his invention: the gramophone, as well as for the process of creating the master and duplicating his flat disks. Without yet knowing it, he had forever changed the world of music. The Mission of the Museum is to collect, preserve, curate, research, depict, and exhibit audio artifacts, interpreting their significance — scientific and technical, social and cultural, historic and economic — to Quebec, Canada and the world i.e. made available to the widest possible public. With the Expo '67, industrial design in Canada was in full swing. Many Canadians were among the designers, that blossomed during the summer of the "Man and his world". Now, 50 years later, the MOEB celebrates a comeback of this era, rich in dashing creations. From that moment on, stereo systems featured a futuristic vibe, and at the MOEB you can experience many of these beautiful pieces following this trend. There are renowned talents such as Gordon Duern and Keith McQuarrie, creators of the "Apollo" series for Electrohome in Kitchener, in Toronto works Hugh Spencer on the creation of the "Project G" for Clairtone, and here in Montreal, Andre Morin catapults with his "forma" design RCA Victor into the space age. These objects by Canadian designers are yet another contribution to the world heritage of the 20th century. For logistic reasons, this exclusive tour of MOEB was also limited to 2 groups of 15 persons each.

3.6 Social events

Chair Dinner

As a little token of appreciation for their hard work and dedication, the Local Organizing Committee of ICSV26 offered a fine reception and dinner to all its Theme Area Chair, Sessions Chairs, Keynote speakers, and Local Organizing Committee members as well as to IIAV Executives and Directors, their guests and observers, and their accompanying persons.

Young Members Event

ICSV26 offered all its student members to gather for a flamenkuchen and beer experience at "Les 3 brasseurs" nearby restaurant. Volunteers (over 18 years old) were also invited to be part of the party.

IIAV Member Event

This off-site event started with a multimedia shows and vibrant collective experience, called "Through the Echoes". First production by Guy Laliberté since 2015, "Through the Echoes" made its world debut in Montreal. This spectacular odyssey was -a loud- and immense 60 minute show

by Gabriel Coutu-Dumont projecting you into a multimedia universe where one discovers the power of human connection. Guided by the stars, IIAV members explored the thread of space and time as in a waking dream. This was followed by a cocktail and seated dinner with some fine French-Canadian cuisine at the restaurant "L'Arrivage" within Pointe-à-Callière museum (the largest and most frequently visited history museum in Montréal).

Gala Banquet

After a funky aperitif with a lot of surprises, the fine seated dinner included the following speeches and award ceremonies: ICSV26 greetings (Prof Jérémie Voix, ICSV26 General Chair), The Doak Award for most successful paper in the Journal of Sound and Vibration (Awarded to Dr Eli Leinov by Prof. Andrei Metrikine, Editor-in-Chief, JSV), The IRSST Best Student-Paper Award (awarded by Mr. Kannan Krishnan, IRSST Scientific Director), the IIAV Student Travel Awards and Sir James Lighthill Best Student Paper Award (awarded by Prof. Eleonora Carletti, President IIAV) and the IIAV Honorary Fellowship (Awarded to Prof. Jean Nicolas by Prof. Alain Berry), and finally ICSV26 Thank You by Mr. Julien Biboud (CTO, Mecanum), ICSV26 Exhibition and Sponsors Manager, Dr. Franck Sgard, ICSV26 Scientific Chair, and Prof. Jérémie Voix, ICSV26 General Chair.

3.7 Business meetings

An event like ICSV26 is a unique opportunity to gather researchers, scientists, engineers, writers, policy makers in one central location over several days in the very versatile and functional venue. To maximise the efficient use of time of ICSV26 delegates, the ICSV26 Organizing Committee offered to existing and recognised working groups to hold their business meetings concurrently with the regular breakout scientific sessions. Business meetings were ideally to be open to all ICSV26 participants, pending proper online registration for the business meeting through the ICSV26 registration website. The executive boardroom utilized for these business meetings, was conveniently located at the heart of the Hotel Bonaventure, and featured a large executive table that can seat 15 persons and a second row of chair that can accommodate 20 others, for a total maximum of 35 persons (see Figure 11) as well as a screen and projector (not visible on picture in Figure 11).

Figure 11: The executive business room within Hotel Bonaventure dedicated for Business Meetings offered to existing and recognized working groups by ICSV26 Organizing Committee.

Conveners of business meetings could also decide to restrict access to their events, by "invitation only". In such case, a special code was to be keyed in by participants to register online to such private satellite meetings. Finally, a special registration package was made available on ICSV26 online system for participants that were not registered for the full ICSV26 conference, and wanted to only attend one of these satellite meetings. The "business meeting registration" for non ICSV26 attendees included access to ICSV26 exhibitors' space, as well as either a morning coffee break, a buffet lunch or an afternoon coffee break. Several groups, such as the Journal of Sound and Vibration Editorial Advisory Board, the Department of National Defence impulse noise community of practice, and the IIAV Publications Committee Meeting, took advantage of that offer and unanimously reported a great satisfaction with the convenience of such arrangement.

3.8 Conference Sustainability Initiatives

Because we all care for the future of our planet, ICSV26 event featured several environmentally friendly initiatives, such as the reduced use of disposable and single-use items (electronic program, reusable dishes, etc.), the reduction of food waste (on-demand provisioning, leftovers to charities, etc.) and the general subscription to a carbon-offsetting program to limit the impact on the greenhouse-gas emission caused by our numerous jet travels. The organizers were confident that participants would support these initiatives and adapt their expectations accordingly. The Conference environmentally friendly initiatives were as follows:

- Use of an electronic program app, developed by company Sched.com, featuring detailed schedule, all abstracts, as well as direct links to conference proceedings
- Reduced use of disposable and single-use items (reusable dishes, no plastic bottles, electronic program, downloadable proceedings, etc.)
- Reduction of food waste (on demand provisioning, leftovers to Tablée des chefs charitable organization, etc.)
- Careful food and menu selection; use of fair-trade coffee beans
- Airport greeting team (from Tourisme Montreal) to facilitate the use of public transportation
- Subscription to "Fondation Gold Standard" certified carbon-offsetting program for all delegates travels (Certificate P-2019-10008, issued on 2019/09/19 by Planetair.ca)
- Eco-responsible Delegate Bags: locally made organic bag in 8 ounces polycoton twill, containing a notebook made from recycled fibers with organic soya-based ink, recycled plastic pen ecoresponsably produced, and a glass bottle of pure local maple syrup!
- Lanyards for badges generously lent by École de technologie supérieure and returned after the conference for reuse.

4 The Post-Mortem

The lessons learned are numerous and despite ICSV26 great success across the board, several things could have been done differently. They are presented below, together with the most important lesson to remember: "It's all about Pareto rule!"

4.1 Some lessons learned

- Set the deadlines wisely, avoiding overlaps with vacations or statutory holidays (who does really want to review abstracts on New Year's Eve?)
- Give specific criteria for reviewers (theme area chairs and session chairs) to make sure they are homogeneous
- Make sure from the very beginning that the scientific committees, theme area chairs and session chairs are aware of the incentives and rules regarding discounted registration rates
- Make sure that scientific chair can delegate sufficiently to theme area chairs
- Avoid database duplication, by having scientific submission (abstracts, articles), registration (payments), scheduling (app and online program) and presentation management system (for on-site presentation upload) be run -ideally- from the same system

4.2 It's all about Pareto rule

The biggest lesson of all, phrased in our words is that: **things have to be set early, but will only evolve at the last minute... and will be slightly late.**

The graph in Fig. 12 plots the cumulative number of abstracts received over time. It clearly shows that most of the submissions are made only a couple days before the first abstract submission deadline (Dec. 1st) and that an extra bundle is received a couple days before the extended deadline (Jan. 31st), that was announced mid-December 2018.

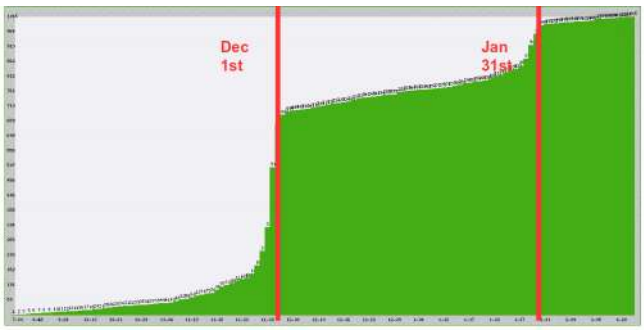

Figure 12: Cumulative number of received papers for ICSV26 conference, with first submission deadline (Dec. 1st) and extended one (Jan. 31st)

The "last minute" effect can be illustrated with the Pareto rule, also known as the 80/20 rule. Here the power law distribution of the number of abstracts received follows pretty tightly a Pareto distribution resulting an 85/15 outcome: on 299 papers received for the first deadline, 48 papers (or 16.05% of the total) were received over the first 90 days (or 84.99% of the 106 days period between opening and closing of the paper management system) and the remaining 251 papers were received in the remaining 16 days. It is also interesting to note that "85/15 rule" just defined is something felt by ICSV26 Local Organizing Committee in a lot of their duties: 85% of the registration difficulties are experienced by 15% of the participants; 85% of the program schedule changes are required by 15% of the chairs, etc.

The "slight delay" is the time period following the hard deadline (set here originally on Dec. 1st). The number of received paper will peak on that exact date, and then exponentially decrease over a couple of days, reaching no more submission after roughly 7 days. This suggests that attendees assume that "a couple of days" to "one week" late submissions are possible.

These two -very human- aspect are of key importance for proper conference organization and can not be overlooked: things get done at the last minute, but conference organizers should plan -long in advance- for it.

Acknowledgments

The authors would like to acknowledge the support received from IRSST, the Quebec Occupational Health and Safety Institute, for the substantial amount of time that Franck Sgard was able to allocate to ICSV26 as its Scientific Chair. The support of IRSST Communication Department for media relations and photo coverage during the events was also greatly appreciated. The authors would also like to thanks the Board of Directors of the Canadian Acoustical Association for supporting its President in his role of General Chair for ICSV26. The authors thank Mrs. Vera Ganicheva, ICSV26 site coordinator, for her help in the final edits on this report.

ACOUSTICS WEEK IN CANADA 2019 – Edmonton AB

FINAL REPORT

Acoustics Week in Canada 2019
Oct 9–11, Sutton Place Hotel, Edmonton, Alberta

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1 Overview

Acoustics Week in Canada 2019 was held at the Sutton Place Hotel in Edmonton, Alberta on Wednesday–Friday, Oct. 9–11. There was no theme assigned to the conference this year. The conference attracted 76 registrants and 61 contributed talks. In addition, there were 12 exhibitors and 4 sponsors. Highlights included a welcome reception at MacEwan University's Allard Hall and a conference dinner at the Edmonton Conference Center's Riverview Room. Many volunteers were recruited from among the University of Alberta student population. Total attendance was approximately 109. Net proceeds were $6,899.55 after the addition of reimbursed student travel awards and deduction of seed money. Photos from the conference can be found at:

https://www.flickr.com/photos/185082514@N06/albums/72157711399310242

Contacts/Organizing Committee

Conference Chair:	Benjamin V. Tucker, University of Alberta
Treasurer:	Corjan Buma, University of Alberta/ACI
Technical Chairs:	Tara Vongpaisal, MacEwan University
	Daniel Aalto, University of Alberta

Exhibit/Sponsor

Coordinators:	Ellen Buchan, Alberta Government
Student Prizes and Subsidies:	Mary Ingraham, University of Alberta
Website:	Matthew Kelley, University of Alberta

The Organizing Committee held several meetings starting in January of 2019 and met roughly once per month until mid-August of 2019 when meetings were held bi-weekly. Meeting were frequently held at the University of Alberta. Finances and budgeting were largely handled by Benjamin Tucker and Corjan Buma. All committee work was done on a volunteer basis and Committee members paid conference registration fees. The success of the conference was largely due to the efforts of volunteers who performed an outstanding job of ensuring the smooth functioning of every aspect of the meeting. In addition to the committee members, support staff from the Sound Studies Institute from the University of Alberta and several students from the Department of Linguistics at the University of Alberta were responsible for onsite registration, technical support during the talks, and answering questions from attendees.

2 Venue

The Conference was held at the Sutton Place Hotel. The committee contacted several hotels in the downtown region with a Requests for Proposals and several sites were visited. A contract was signed with Sutton Place Hotel in November of 2018. The decision was based on cost and the space the hotel was able to provide—the rental space for the sessions was considerably less expensive than others as well as the food and beverage estimates, most importantly the hotel did not require that a certain number of rooms be booked as part of the contract.

- Guest rooms were $144/night available Oct 8–11 as well as three days prior and following. Wi-Fi was complimentary.
- Meeting room space consisted of
    - three main rooms for oral presentations. The William Tomison room was used for the plenary talks and for lunches. It was set up with rounds for the duration of the conference. The remaining two rooms (Winterlake and Rowand) were set up for the two simultaneous sessions. The space was extremely convenient as all of the breaks and meals could be held in the foyer outside of the rooms and the foyer had enough space for the exhibitions to be set-up.
    - Lunches were served in the foyer and participants were able to eat in the William Tomison room where the plenaries were also held.
    - The Board of Directors meeting was held in an the Rowand room (4:00-6:00 PM, Tue. Oct. 8)
- The initial contract itself did not include details regarding lunches or breaks which were determined at a later date. In total, there were three lunches (Wed., Thu., Fri.), three morning coffee breaks and only two afternoon coffee breaks (Wed. and Thu.) as the meeting adjourned at 1:00pm on Friday.

3 Technical Program

The technical program consisted of 61 contributed papers organized into 14 technical sessions covering all areas of acoustics divided into two parallel sessions running throughout the duration of the conference with the exception of the plenary talks and breaks. Each of the three days began with a plenary talk at 9:00 AM (The final plenary talk started at 9:20 AM). Plenary speakers were chosen to cover a wide range of topics of interest to acousticians and included:

- Hildegard Westerkamp (Grounded in Listening - Messages from Inside the Soundscape)
- Michelle Vigeant (Perceptual and Physiological Responses to Room Acoustics and Noise)
- Sonya Bird (Documenting the phonetic structures of Canada's Indigenous languages)

These women provided engaging talks and excellent overviews of their field. There was also an ASTC Workshop hosted by the National Research Council Canada on the Wednesday evening. In addition, 34 two-page summaries were published in the CAA Journal, *Canadian Acoustics* (47:3), in the October 2019 issue.

4 Social Program

The Social Program consisted of a Welcome Reception in Allard Hall at the MacEwan University. The event was held from 6:00–8:00pm, Tue., Oct. 9 and the location was a 10 minute walk from the primary venue. The reception featured complimentary food and a cash bar. Four students from MacEwan University provided a jazz ensemble and played several pieces in one of the performance halls. During the event, the consulting acoustician Kelly Kruger and MacEwan's project manager Frank Salopek, gave an overview and brief tour of the building and spaces of acoustic interest.

The Conference Dinner was held at the Edmonton Conference Center in the Riverview Room about a 10-minute walk from the primary venue. The Riverview Room provides an excellent view of the Edmonton river valley and in the all is an excellent venue for dinners. A cash bar was available and wine was provided by LogiSon. Dinner was an informal affair and went from 6:30-8:30 PM with dinner served at roughly 7:00pm. A local quartet was hired and they provided music during the dinner. The dinner was included as part of the registration fee for all three-day conference attendees (including students).

5 Registration/Attendance

Registration rates were as follows:

Registration Type	Early	Regular
Three-Day Registration (Members of CAA)	495	595
Three-Day Registration (Non-members of CAA)	615	715
Three-Day Registration (Student Members of CAA)	100	200
Three-Day Registration (Student Non-members of CAA)	150	250
Wednesday Registration (Members of CAA)	285	345
Wednesday Registration (Non-members of CAA)	320	380
Thursday Registration (Members of CAA)	285	345
Thursday Registration (Non-members of CAA)	320	380
Friday Registration (Members of CAA)	180	240
Friday Registration (Non-members of CAA)	215	275

The cutoff date for early registration was Sep. 11, 2019. In total there were 76 conference registrants with 33 full three-day registrations and 23 three-day student registrations for the conference plus an additional 20 single day registrations. There were an additional 8 student volunteers, who were given free registration for the conference, giving a total of 31 students in attendance at the conference which was 28% of the total conference attendance. The total attendance was approximately 109, including exhibitors and sponsors. The proportion of attendees who met the early registration cutoff was 82%. The total revenue from registration was $29,625 including additional Dinner tickets, excluding registration of sponsors and exhibitors. The organizing committee substantially reduced the cost for student registrations and included in the student fee the cost of a banquet ticket. This was done to better recognize the significant cost of conference attendance for students and put students on more equal footing with all conference attendees.

At the conference itself, the on-site registration desk was staffed by volunteers throughout the duration of the meeting during the day. Registrants received a name badge (provided by the University of Alberta Sound Studies Institute) and a short conference proceedings. The organizing committee decided to not provide any other “swag” to reduce the environmental impact of our event.

6 Exhibition

The Exhibition was held on Thursday, October 10 from 8:30 AM to 5:00 PM in the foyer of the meeting space, which was also the location of the Thursday coffee breaks. The schedule was modified so that attendees had more time during the coffee breaks in Thursday to facilitate attendance at the exhibits. The foyer was large enough for all the exhibitors as well as the lunch buffet and coffee stations. Exhibitor fees were set at $700 for early registration and $900 for late registration. For this fee, exhibitors received a table with electricity and complimentary one-day conference registration. A complete list of exhibitors is given in Appendix B.

7 Sponsorship

The following sponsorship opportunities were advertised and a flyer was sent directly to prospective sponsors.

- Dinner ($4500)
- Wine for Dinner ($1000)
- Lunches ($900, 3 opportunities)
- Coffee Breaks ($600, 5 opportunities)
- Plenary Sessions ($600, 3 opportunities)
- Technical Session Room, Daily Rate ($500 for one room, 400 each for 2 or more, 9 opportunities)
- Student Presentation Awards ($750 each, 3 opportunities)
- Student Support - 20 opportunities ($600)
- Logo in Conference Program & Brochure in Conference Package ($250)

8 Signage

Signage was printed by the Sound Studies Institute as an in-kind contribution. Sponsorship of coffee breaks and lunches was acknowledged with 17”x11” sheets on stands provided by the hotel. Daily programs for each room were also printed and displayed outside meeting rooms.

Canadian Acoustical Association
Association Canadienne d'Acoustique

2019 PRIZE WINNERS• RECIPIENDAIRES DES PRIX 2019

CANADIAN ASSOCIATION
ACOUSTICAL CANADIENNE
ASSOCIATION D'ACOUSTIQUE

BELL GRADUATE STUDENT PRIZE IN SPEECH COMMUNICATION AND HEARING /
PRIX ETUDIANT BELL EN COMMUNICATION VERBALE ET AUDITION

Farid Moshgelani (Western University)

ECKEL GRADUATE STUDENT PRIZE IN NOISE CONTROL /
PRIX ETUDIANT ECKEL EN CONTROLE DU BRUIT

Olivier Valentin (Université de Sherbrooke)

ALBERT S. BREGMAN GRADUATE STUDENT PRIZE IN PSYCHOLOGICAL ACOUSTICS /
PRIX ETUDIANT ALBERT S. BREGMAN EN PSYCHOACOUSTIQUE

Abdelghani Benghanem (Université de Sherbrooke)

RAYMOND HÉTU STUDENT PRIZE IN ACOUSTICS /
PRIX ETUDIANT RAYMOND HÉTU EN ACOUSTIQUE

April Pereira (University of Toronto)

CONGRATULATIONS / FÉLICITATIONS

PRIZE ANNOUNCEMENT• ANNONCE DE PRIX

CANADIAN ASSOCIATION
ACOUSTICAL CANADIENNE
ASSOCIATION D'ACOUSTIQUE

Prize

EDGAR AND MILLICENT SHAW POSTDOCTORAL PRIZE IN ACOUSTICS

ALEXANDER G. BELL GRADUATE STUDENT PRIZE IN SPEECH COMMUNICATION AND HEARING

ECKEL GRADUATE STUDENT PRIZE IN NOISE CONTROL

FESSENDEN GRADUATE STUDENT PRIZE IN UNDERWATER ACOUSTICS

RAYMOND HÉTU UNDERGRADUATE STUDENT PRIZE IN ACOUSTICS

THOMAS D. NORTHWOOD GRADUATE STUDENT PRIZE IN ARCHITECTURAL AND ROOM ACOUSTICS

ALBERT S. BREGMAN GRADUATE STUDENT PRIZE IN PSYCHOLOGICAL ACOUSTICS

Prix

PRIX POST-DOCTORAL EDGAR ET MILLICENT SHAW EN ACOUSTIQUE

PRIX ETUDIANT ALEXANDER G. BELL EN COMMUNICATION VERBALE ET AUDITION (2^E OU 3^E CYCLE)

PRIX ETUDIANT ECKEL EN CONTROLE DU BRUIT (2^E OU 3^E CYCLE)

PRIX ETUDIANT FESSENDEN EN ACOUSTIQUE SOUS-MARINE (2^E OU 3^E CYCLE)

PRIX ETUDIANT RAYMOND HÉTU EN ACOUSTIQUE (1ER CYCLE)

PRIX ETUDIANT THOMAS D. NORTHWOOD EN ACOUSTIQUE ARCHITECTURALE ET ACOUSTIQUE DES SALLES (2^E OU 3^E CYCLE)

PRIX ETUDIANT ALBERT S. BREGMAN EN PSYCHOACOUSTIQUE (2^E OU 3^E CYCLE)

Deadline for Applications:
April 30th 2020

Date limite de soumission des demandes:
30 Avril 2020

Consult CAA website for more information
Consultez le site Internet de l'ACA pour de plus amples renseignements
(http://www.caa-aca.ca)

Announcement

ACOUSTICS WEEK IN CANADA

Sherbrooke (Québec) October 7-9, 2020

View of Mont-Orford from downtown Sherbrooke

Acoustics Week in Canada 2020 will be held on October 7-9, in Sherbrooke, Québec.

You are invited to be part of this three-day conference featuring the latest developments in Canadian acoustics and vibration. Sherbrooke is well known in acoustics for the Groupe d'Acoustique de l'Université de Sherbrooke (GAUS) founded in 1984.

The conference will be an excellent opportunity to visit or rediscover the GAUS during the International Year of Sound!

The keynote talks and technical sessions will be framed by a welcome reception, conference banquet, Acoustical Standards Committee meeting, technical tour and an exhibition of products and services related to the field of acoustics and vibration.

Take a few days before or after the conference to enjoy the area and the cultural activities! Especially have a look to the beautiful surrounding nature during Fall colors with Mont-Bellevue downtown and the nearby 'Mont-Orford' National Park. Three other parks can also be found within a radius of 100 km.

Various demos and activities will be held at the Groupe d'Acoustique de l'Université de Sherbrooke (GAUS) and at Université de Sherbrooke campus - A series of innovative workshop activities will be a part of the program; we are open to proposals along this line (challenges, measurements, simulations).

Venue and Accommodation

The conference will be held at the Hotel Delta by Marriott in Sherbrooke. A block of rooms in the hotel will be available at a special rate of 155$/night. This rate is extended to stays two days prior and two days after the conference, and each room can be shared across up to 4 people. Complimentary city bus passes will be offered to all the participants to promote the use of public transport during the conference. A shuttle is also available to provide a direct link between International Montréal Trudeau Airport and the conference venue. Please refer to the conference website for further details and registration: https://awc.caa-aca.ca/index.php/AWC/AWC20

Plenary, Technical and Workshop Sessions

Plenary, technical and workshop sessions are planned throughout the conference. Each day will begin with a keynote talk of broader interest and relevance to the acoustics community. Technical sessions are planned to cover all areas of acoustics including:

AEROACOUSTICS / ARCHITECTURAL AND BUILDING ACOUSTICS / BIO-ACOUSTICS AND BIOMEDICAL ACOUSTICS / MUSICAL ACOUSTICS / NOISE AND NOISE CONTROL / PHYSICAL ACOUSTICS / PSYCHO- AND PHYSIO-ACOUSTICS / SHOCK AND VIBRATION / SIGNAL PROCESSING / SPEECH SCIENCES AND HEARING SCIENCES / STANDARDS AND GUIDELINES IN ACOUSTICS / ULTRASONICS / UNDERWATER ACOUSTICS

A General Public Session

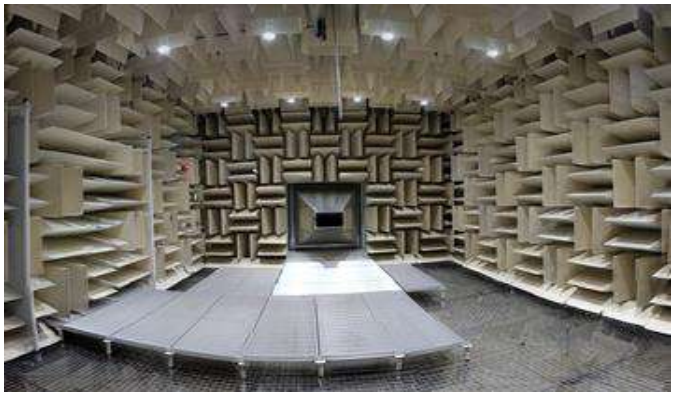
A general public session is currently planned on the afternoon of the last conference's day and linked to the International Year of Sound, a global initiative to highlight the importance of sound and related sciences and technologies for all in society

(https://sound2020.org/). This event will be held on Université de Sherbrooke campus and opened to scholars and to the population. The organizing committee welcomes any proposal for this session, a rare occasion of explaining our everyday job and implications for society.

Exhibition and Sponsorship

The conference offers opportunities for suppliers of products and services to engage the acoustic community through exhibition and sponsorship.

The tabletop exhibition facilitates in-person and hands-on interaction between suppliers and interested individuals. Companies and organizations that are interested in participating in the exhibition should contact the Exhibition and Sponsorship coordinator for an information package. Exhibitors are encouraged to book early for best selection.



Anechoic room and wind-tunnel opening at GAUS

The conference will be offering sponsorship opportunities of various conference features. In addition to the platinum, gold and silver levels, selected technical sessions, social events and coffee breaks will be available for sponsorship. Additional features and benefits of sponsorship can be obtained from the Exhibition and Sponsorship coordinator and on the conference website. Demos can also be organized at GAUS.

Students

Students are strongly encouraged to participate. Students presenting papers will be eligible for one of three 500$ Best Presentation Student prizes to be awarded. Conference travel bursaries will also be available to those students whose papers are accepted for presentation.

For Registration Details,

For registration details please refer to the conference web site: https://awc.caa-aca.ca/index.php/AWC/AWC20

Contacts

Conference Chair:
Olivier Robin
(Olivier.Robin@USherbrooke.ca)

Technical co-Chairs:
Patrice Masson and
Sebastian Ghinet
(Patrice.Masson@USherbrooke.ca)
(Sebastian.Ghinet@nrc-cnrc.gc.ca)

Exhibits and Sponsorships:
Julien Biboud
(Julien.Biboud@mecanum.com)

Enjoy the Mont Bellevue in the center of Sherbrooke during Fall

Appel à communication

SEMAINE CANADIENNE D'ACOUSTIQUE

Sherbrooke (Québec) 7-9 Octobre 2020

Vue du Mont-Orford depuis le centre-ville de Sherbrooke

La Semaine canadienne d'acoustique 2020 se tiendra du 7 au 9 octobre 2020 à Sherbrooke, Québec.

Nous vous invitons à prendre part à cette conférence de trois jours sur les derniers développements en matière d'acoustique et de vibrations au Canada. Sherbrooke est reconnue en acoustique pour le Groupe d'Acoustique de l'Université de Sherbrooke (GAUS) fondé en 1984.

La conférence sera le moment idéal pour visiter ou redécouvrir le GAUS durant l'Année Internationale du Son !

Les exposés principaux et les séances techniques seront encadrés par une réception de bienvenue, un banquet, une réunion du comité des normes acoustiques, une visite technique et une exposition de produits et services liés au domaine de l'acoustique et des vibrations.

Prenez quelques jours avant ou après la conférence pour profiter de la région et des activités culturelles ! Découvrez la nature environnante durant la flambée des couleurs d'automne, avec la proximité du Parc National du Mont-Orford. Trois autres parcs nationaux sont accessibles dans un rayon de 100 km.

Diverses démonstrations et activités seront organisées au sein du Groupe d'Acoustique de l'Université de Sherbrooke (GAUS) et sur le campus principal de l'université de Sherbrooke. Des ateliers participatifs seront intégrés dans le program-me; nous sommes ouverts à toute proposition (concours, mesures, simulations).

Lieu et hébergement

La conférence aura lieu au Centre de congrès de l'Hôtel Delta Sherbrooke par Marriott. Un bloc de chambres dans l'hôtel sera disponible à un tarif spécial de 155$ par nuit (valable deux jours avant et deux jours après la conférence, et chaque chambre peut être partagée par 4 personnes au maximum). Des passes de bus seront offertes à tous les participants afin de favoriser l'usage du transport en commun durant la conférence. Une navette directe entre l'aéroport international Trudeau de Montréal et le lieu de la conférence est également accessible sur demande. Veuillez consulter le site Web de la conférence pour plus de détails et pour l'inscription: http://awc.caa-aca.ca/AWC/AWC20

Séances plénières, techniques et ateliers

Des séances plénières, techniques et des ateliers sont prévus tout au long de la conférence. Chaque journée débutera par une plénière d'un intérêt et d'une pertinence plus larges pour la communauté de l'acoustique. Des sessions techniques sont prévues pour couvrir tous les domaines de l'acoustique, y compris :

AÉROACOUSTIQUE / ACOUSTIQUE DU BÂTIMENT ET ARCHITECTURALE / BIOACOUSTIQUE / ACOUSTIQUE BIOMÉDICALE / ACOUSTIQUE MUSICALE / BRUIT ET CONTRÔLE DU BRUIT / ACOUSTIQUE PHYSIQUE / PSYCHOACOUSTIQUE / CHOCS ET VIBRATION / LINGUISTIQUE / AUDIOLOGIE / ULTRASONS / ACOUSTIQUE SOUS-MARINE / NORMES EN ACOUSTIQUE

Une session grand public

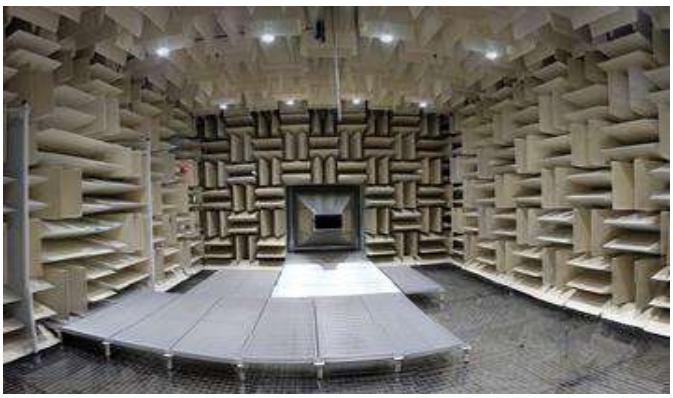
Une session grand public est planifiée en après-midi du dernier jour de la conférence, et liée à l'année internationale du son, une initiative globale destinée à illustrer l'importance du son et de ses sciences et technologies dans la société

(https://sound2020.org/). Cet évènement se déroulera sur le campus de l'Université de Sherbrooke et sera ouvert aux scolaires et à la population. Le comité organisateur est ouvert à toute proposition pour cette session, une rare occasion d'expliquer notre travail et ses implications pour la société.

Exposition et parrainage

La conférence offre aux fournisseurs de produits et de services la possibilité de faire participer la communauté acoustique par l'exposition et le parrainage.

L'exposition sur le plateau facilite l'interaction en personne des fournisseurs et des personnes intéressées. Les entreprises et organisations désirant participer à l'exposition doivent contacter le coordonnateur de l'exposition et du parrainage pour obtenir un dossier d'information. Les exposants sont encouragés à réserver tôt pour obtenir de meilleures opportunités.



Salle anéchoïque et soufflerie au GAUS

La conférence offrira des possibilités de parrainage de divers évènements de la conférence. Outre les niveaux platine, or et argent, des séances techniques, des événements sociaux et des pauses café seront disponibles pour le parrainage. Les commanditaires peuvent placer leur logo sur le site Web de la conférence dans les 10 jours suivant leur parrainage. Les caractéristiques et avantages supplémentaires du parrainage peuvent être obtenus auprès du coordonnateur des expositions et des commandites ou sur le site Web de la conférence. Des démonstrations pourront aussi être organisées au GAUS.

Les étudiants

Les étudiants sont fortement encouragés à participer. Les étudiants qui présenteront seront admissibles à l'un des trois prix de 500 $ pour les meilleures présentations. Des subventions de voyage seront également offertes aux étudiants dont les communications sont acceptées pour présentation.

Plus d'informations

Pour plus d'information sur l'inscription veuillez consulter le site Web de la conférence : http://awc.caa-aca.ca/AWC/AWC20.

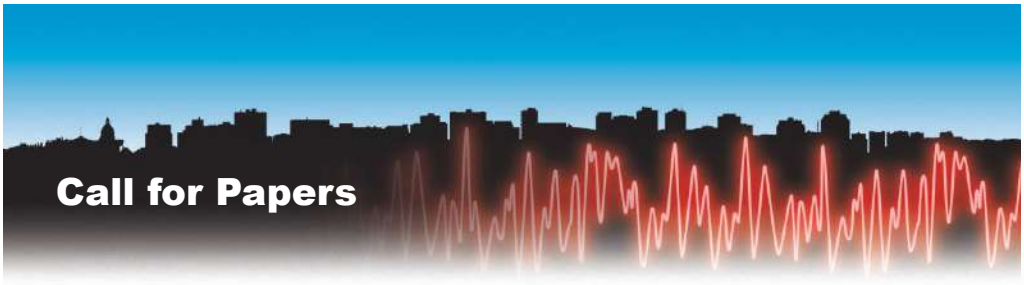
Contacts

Président de la conférence :
Olivier Robin
(Olivier.Robin@USherbrooke.ca)

Présidents techniques :
Patrice Masson and
Sebastian Ghinet
(Patrice.Masson@USherbrooke.ca)
(Sebastian.Ghinet@nrc-cnrc.gc.ca)

Exposants et commandites :
Julien Biboud
(Julien.Biboud@mecanum.com)

Appréciez le Mont Bellevue au centre de Sherbrooke durant l'automne



Special Albertan issues with regional topics and articles

Acoustics is a broad subject matter, as you know, that currently employs hundreds of us across the country in fields as different as teaching, research, consulting and others. To reflect such diversity and to -maybe- help each of us discover a new professional in the neighborhood, the Canadian Acoustics journal is currently inviting submissions for a series of special "regional" journal issues from individuals, groups and companies located within the greater-areas of major cities in Canada.

Special issues of the Canadian Acoustics journal have been successfully conducted in the past, in June 2015 (Montreal), June 2016 (Toronto), June 2017 (Halifax), June 2018 (British Columbia) and it is now time in 2020 for the Province of Alberta to take advantage of that offer!

How to be part of it?

To contribute to these special "regional" journal issues, authors are invited to submit their manuscript (2 pages maximum, using the "Proceedings Paper" template, but without abstract), in English or in French, under "Special Issue" section through the online system at http://jcaa.caa-aca.ca before **April 1st 2020**. The first author must be located in the Province of Alberta. Two versions of the same article can be published in the two official languages.

Each manuscript will be reviewed by the Canadian Acoustics Editorial Board that will enforce the journal publication policies (original content, non-commercialism, etc., refer to Journal Policies section online for further details) while welcoming promotion of authors' expertise, companies services, and consultants' success stories and the like.

A true "regional directory" you want to appear in!

Each of these regional local issues of the journal can be considered as a local directory book for acoustics. They will be published in hardcopies, sent to all CAA national and international members, while electronic copies will be made available in open-access on the journal website. The content of these issues will be entirely searchable and comprehensively indexed by scholar engines as well as by major internet search engines (Google, Bing, etc.). Authors are invited to carefully select their keywords to maximize the visibility of their articles, while ad-hoc advertisement opportunities will be given to pair each article with a one-page full advertisement.

For any questions, please contact Jessie Roy (jessie.roy@rwdi.com), Benjamin Tucker (bvtucker@ualberta.ca), or Corja Buma (meanu@ualberta.ca). To secure an advertisement for this special issue, please contact our coordinator (advertisement@caa-aca.ca).

Such an offer will only repeat in 7 to 9 years – be sure to submit now!

Numéros spéciaux portant sur des sujets régionaux

Comme vous le savez, l'acoustique donne matière à plusieurs sujets d'ordre général qui créé des centaines d'emplois au Canada et ce, dans différents secteurs tels que l'éducation, la recherche, la consultation professionnelle ou d'autres. Afin de bien refléter cette diversité et en vue de faire connaître d'avantage les professionnels de notre région qui œuvrent dans ce domaines, l'Acoustique canadienne fait un appel à soumettre une série d'articles provenant de personnes, groupes ou compagnies qui font partie d'une même grande région du Canada.

À l'heure actuelle, les numéros spéciaux régionaux de l'Acoustique canadienne ont eu lieu en juin 2015 (Montréal), juin 2016 (Toronto), juin 2017 (Halifax) et juin 2018 (Colombie Britannique), tandis que juin 2020 sera consacré à la province de l'Alberta!

Comment en faire partie?

Pour contribuer à un de ces numéros « régionaux », les auteurs sont invités à soumettre un article (de 2 pages maximum), sous la rubrique « Numéro spécial » dans notre système en ligne au http://jcaa.caa-aca.ca avant le **1er avril 2020**. Le premier auteur devra faire partie de la province d'Alberta. Il est possible de soumettre un même article dans les 2 langues officielles.

Chaque article sera révisé par le comité éditorial de l'Acoustique canadienne qui veillera à ce que les politiques de publications de la revue soient respectées (contenu original, contenu non commercial, etc. – voir les politiques de la revue pour de plus amples détails) tout en accueillant les articles qui font la promotion de l'expertise des auteurs, des services offerts par les compagnies, les réussites de consultants et autres sujets du même ordre.

Un vrai « répertoire régional » dans lequel vous voulez paraître!

Chacun de ces numéros spéciaux régionaux pourra être considéré comme un répertoire des noms et services locaux liés à l'acoustique. Ils seront publiés en format papier et envoyés à tous les membres nationaux et internationaux de l'ACA. Une version électronique sera aussi disponible en ligne sur le site internet de la revue. Le contenu de ces numéros sera indexé, donc facilement trouvable au moyen de moteurs de recherche majeurs, tels Google, Bing, etc.). Les auteurs sont invités à bien choisir les mots clefs pour maximiser la visibilité de leur article. Des opportunités de publicité ad hoc seront offertes pour jumeler chaque article avec une page complète de publicité.

Pour toutes questions, vous pouvez communiquer avec Jessie Roy (jessie.roy@rwdi.com), Benjamin Tucker (bvtucker@ualberta.ca), or Corja Buma (meanu@ualberta.ca). Pour réserver un espace de publicité dans un de ces numéros spéciaux, veuillez communiquer avec notre coordonnateur (advertisement@caa-aca.ca).

Une telle offre ne se reproduira pas avant 7 ou 9 ans, assurez-vous d'en profiter maintenant!

CANADIAN ACOUSTICAL ASSOCIATION

Minutes of the Board of Directors Meeting
Tuesday, October 8th, 2019 4:00 PM – 7:00 PM
Edmonton, Alberta, Canada

1. Call to Order

Meeting called to order 16:10

Present in room: Jérémie Voix, Umberto Berardi, Dalila Giusti, Alberto Behar, Bill Gastmeier, Joana Rocha, Michael Kiefte, Mehrzad Salkordeh, Roberto Racca, Andy Metelka, Bryan Gick, Benjamin Tucker [guest]
Remote: Frank Russo, Olivier Robin [guest]

Agenda approved: Moved by Jérémie.

2. President's Report (Jérémie)

ICSV (International Congress on Sound and Vibration) 26, which CAA co-organized, was a success; CAA's portion of the profits was slightly over $11,000 – Jérémie submitted a cheque to CAA's treasurer.

Local Chapters – CAA will support any initiative to operate a local chapter, albeit not financially; the Association will promote and advertise the chapter through its web site; the chapter will collect its own dues as sees fit.

Canada Wide Science Fair – The Board deemed not financially feasible to support a booth at this annual event, unless a local university can run it as will be the case in 2020 for Edmonton with Prof. Tucker.

Membership task force – Task force members had just completed a 90 min meeting to discuss ideas for boosting membership and had agreed to continue collaborating online and focus on three top priority initiatives: a) enhance a practitioners' corner in the journal welcoming non- peer reviewed contributions; b) create a permanent Social Media Editor position that would greatly enhance the CAA outreach, and c) involve the CAA in organizing student competitions and having a presence at science fairs to engage young participants.

Jérémie formally proposed the formation of a Social Media Editor position, per the Statement of Work circulated earlier to the BoD, and recommended appointing to it Romain Dumoulin (Research Professional at McGill). Jérémie asked the Board to grant Mr. Dumoulin free registration to the annual conference and cover travel & accommodation costs as compensation for his work. Dalila as treasurer encouraged restraint in the financing of this position. Michael suggested that the support would be especially needed if the position were held by a student or young member. Frank proposed that the position and support be set up as a two-year trial period. Dalila and Johana recommended looking at several social media platforms for popularity and reach. Jérémie suggested the appointing of a formal performance evaluation committee to review the coordinator's performance; this committee would be composed of the current treasurer (Dalila), executive secretary (Roberto) and past president (Frank).
- With the conditions above, a motion to create the position was made by Jérémie and seconded by Roberto; carried unanimously.

CAA online subscription site – The Linux server operating system hosting the site has been upgraded and migration to OJS 3.1 has been completed; a new sysadmin Sélim Izrar is now looking after CAA hosted systems.

Jérémie suggested that the Editor of the CAA journal Canadian Acoustics sign the Declaration on Research Assessment (DORA) to increase the journal's exposure and ranking in indexing systems.

3. Social media outreach (Frank)

No information to add to discussion; will pass along the social media credentials to Romain Dumoulin to carry forward.

4. Awards Report (Joana)

Joana provided a full summary of awarded prizes; she also thanked Alberto as new coordinator for Hétu prize, reviewed the contents of the updated application form and recommended that better coverage of open awards be given in the social media to increase interest in potential applicants.

In subsequent discussion, Dalila suggested that the Board consider increasing the value of some of the smaller awards; others remarked that it is not so much the monetary value as the prestige of receiving an award that matters to winners, though the prize money can be an important benefit especially for postgraduates struggling to fund their research.

Joana commented on the fact that some awards are poorly canvassed or cater to very niche sectors, so may not be highly subscribed.

A suggestion was made to expand eligible candidates from just students to junior members of industry; this was deemed worth considering but would be a major shift of paradigm. Johana encouraged Board members to formulate ideas for new or modified awards in consultation with other Directors so that proposals could be presented at the next BoD meeting.

It was also suggested to issue plaques or other tangible trophies and to generate broader online coverage of the awarding of prizes with the support of the newly appointed Social Media Editor.

5. Past and Upcoming Meetings

ICSV26: Montreal

Information was already provided by Jérémie as part of the President's report.

AWC 2019: Edmonton

Benjamin Tucker provided some numbers for the conference about to begin: 73 registrants both full and day (23 of them students); ~15 exhibitors; 65 people expected to attend the banquet (full conference student registrations include banquet, unlike other years)

AWC 2020: Sherbrooke

Olivier Robin provided an updated to the Board. Philippe-Aubert Gauthier, the original convener, left his position at Sherbrooke University and Olivier has taken up the role. Call for the conference has gone out; Delta hotel has been chosen as venue and most of contract details worked out; still working on guaranteed minimum (Dalila suggested trying to cap at $7500 based on 70-person attendance and no dinner on hotel premises). Olivier was optimistic on having a strong attendance. He asked for input from the Board with suggestions for keynote speakers; there will also be a public lecture on the last day of the conference with media outreach (as an aside, Olivier advocated greater outreach and publicizing of acoustics and suggested an award for acoustic science popularization). Site visit planned at Sherbrooke University with cocktail reception and visit of acoustics research labs or music department; gala dinner at Bombardier Museum (30-minute prearranged bus ride to reach it). Some discussion took place about logistics for delegates to reach Sherbrooke; likely many from Ontario will drive.

AWC 2021: St-John's

Frank indicated that no information had yet been provided by conveners Benjamin Zendel & Len Zedel about setup of conference framework (such as bank account and hotel contract); he undertook to follow up with the two organizers to check on status. Some concerns were voiced about inclement autumn weather in Newfoundland at the usual time of year for the conference, but it would be problematic in terms of hotels etc. to try for a much earlier date.

Conference manual

Jérémie and Frank gave a status update on the development of a reference document for organizers of future congresses. A draft was circulated to the Board for editorial feedback. Much of the information has been incorporated from Christian Giguère's original manual from 2001. Screen shots of all relevant steps in setting up the annual conference web site will be included as an Annex. Mehrzad committed to contributing insight on contacting and canvassing potential exhibitors and sponsors.

6. Treasurer's Report (Dalida)

The CAA funds invested made a good amount of return, which along with other revenue gives the Association a solid financial position to continue supporting the journal, awards and other activities and benefits for its members.

A total of $5,650 were to be distributed in awards at the conference.

As mentioned previously by Jérémie, the CAA received nearly $12,000 from its co-participation in the organizing of ICSV26. The forecast budget for Journal expenses was reduced to $25K from $30K, as costs in recent years have been regularly below $20K. Umberto noted that in 2018 there was no proceedings issue, so that year posted a much lower cost; 2019 however will be a full run. Dalila confirmed that she did take that into account and that $25K would comfortably cover all costs.

The number of sustaining subscribers has remained stagnant at a low of 17; advertising revenue on the other hand has improved. Actuals for 2019 were $9K in surplus revenue over proposed, and $20K less in expenditures. Journal costs were substantially lower than was proposed, and only $2,000 were disbursed in student travel support vs $10,000 budgeted.

The proposed budget for 2020 shows a shortfall of $8,200 for the year mostly due to expected low income from the conference based on a conservative estimate.

Regular membership fees can be maintained at $120 following last year's increase.

Dalila pointed out that the $10K allocated for student travel subsidies cannot be used to offset general conference expenses, i.e. it is not a grant to the conference. She asked the Board for opinions on whether we should change that and allocate $10K to the conference to be used as they see fit (or stay with $500/student for travel but let the conference use any leftover for other expenses). Board discussed the matter and it was agreed to leave things as they are – only subsidies for actual student travel will be disbursed.

Alberto moved to approve budget; Umberto seconded. Carried unanimously.

7. Secretary's Report (Roberto)

The membership numbers have essentially stabilized at around 150 regular and 20 students after the tapering of a surge brought about by the automatic memberships conferred by non-member registrations at the 2017 annual conference. The policy of granting membership as a benefit of conference registration at non-member rates has now been discontinued by resolution of the Board of Directors starting with the 2018 CAA/ASA joint conference, which should avoid in the future these fluctuations likely due to "conference inductees" not renewing a paid membership at the expiry of the included one.

The number of sustaining subscribers remains unchanged at 17, which is a low point in this category so important to the support of the Association. Roberto noted that he kept up the practice of following up on every new or renewed sustaining subscription with a personal note of thanks and offer of assistance with networked journal access etc., and of reviewing the user profile of every new or renewing member for any missing or incomplete data. This has avoided potential delivery problems and maintained a steady level of personal support and communication with members and subscribers which hopefully strengthens their sense of relationship with the Association.

Previously reported difficulties with the online payment system for memberships, caused by a complex requirement by PayPal to re-qualify the Association's merchant account, have likely resulted in missed or delayed renewals. An additional problem arose from an upgrade of the Online Journal System that took place in summer 2019 and triggered a glitch preventing the online purchase of new memberships. Roberto remarked that he had intervened with a workaround solution whenever contacted by a potential new member unable to complete the process, but that the glitch might have impacted the uptake.

Roberto also reported that an ongoing problem with some institutional subscribers (especially those represented by subscription agencies) reporting missing issues of the Journal, due to delays in billing cycles or postal anomalies, was now being better managed thanks to the increased involvement of the Journal's production team in the handling of these circulation matters.

8. Editor's Report (Umberto)

The Editor reported that 2019 was a strong year for the journal in quality and diversity of content; in March it produced a special issue dedicated to Murray Hodgson, and in June a topical issue on audiology and neuroscience; the September issue carried the conference proceedings, and December would feature a collection of regular contributed papers.

No regional issue was produced in 2019 after a lukewarm experience with Halifax the previous year, but Umberto noted that it does not have to be a regular feature. For the next instance of a regional issue a featured location with strong activity in acoustics would be considered, such as Alberta.

A new copyeditor, Pierre Grandjean from Sherbrooke University, has been engaged to replace Olivier Valentin and has undertaken the duty quite successfully.

A new version of the online platform for submitting and reviewing papers, OJS 3.1, has been introduced; this makes the editorial process consistent with that used by several other journals.

There are plans to work on a special issue targeting topics of interest to acoustics practitioners, with emphasis on noise control consulting engineering. Umberto noted that the challenge was to find an optimal guest editor to solicit and manage the contributions and to ensure a consistent format for the article submissions. Mehrzad pointed out that formatting guidelines can be difficult to follow; Dalila noted that many consultants can't make the time to format papers and expect the journal to do that.

9. Varia

Jérémie asked Directors who ran the length of their term whether they would be willing to stay on; all agreed to stand and be nominated at the AGM.

Umberto acknowledged publicly the Early Career Award given by the ICA to Jérémie.

10. Next meeting : May. 12th, 2020 @ 2pm(MDT), online

Spring meeting of Board of Director to be held on 12 May 2020 2:00 PM – 4:00 PM (Eastern Time) as an online conference.

11. Motion to Adjourn

Moved by Jérémy and seconded by Umberto. Adjourned at 18:50.

CANADIAN ACOUSTICAL ASSOCIATION

Minutes of the Annual General Meeting

Thursday, October 10th, 2019 4:30 PM – 5:30 PM (MST)
William Tomison Room, Sutton Place Hotel, Edmonton, Alberta, Canada

1. Call to Order

Meeting called to order 16:35 by Jérémie Voix (President).

25 people in attendance.

Agenda adoption moved by Jérémie Voix, seconded by Dalila Giusti.

2. President's Report (Jérémie Voix)

Brief report about ICSV 26, including announcement of a revenue of over 11K$ for CAA which co-organized the conference. CAA will support local chapters (including through visibility on the website, relay of announcements, etc.) but will not provide ongoing financial support; chapters are to raise their own funds.

Sponsoring Canada Wide Science Fair at $1000 level; in 2020 local representation in Edmonton for which Prof. Ben Tucker volunteered to be present.

Task force on membership will be proposing ways to increase membership numbers and involvement – both regular members and sustaining subscribers. Survey sent to 250 people received 46 answers; detailed answers were collected. Results will be published in the Canadian Acoustics journal. Proposals for ideas were vetted and selection was for a) enhance practitioners' corner in the journal, featuring non peer reviewed contributions; b) create a permanent Social Media Editor position that will greatly enhance our outreach, and c) involve CAA in organizing student competition and having a presence at science fairs to engage young participants.

Presented the Statement of Work for the social media editor position, including list of topics to be covered and publicized.

Overview of servers' upgrade (including a new system administrator appointment) and implementation of new OJS 3.1 version.

Discussed indexing of the Journal by various services like Scopus and ways to increase its relevance and ranking. Ben Tucker suggested implementation of Direct Object Identifier for Journal articles; this will be undertaken.

3. Past and Upcoming Meetings

ICSV26: Montreal (Jérémie Voix)

As mentioned earlier.

AWC 2019: Edmonton (Benjamin Tucker)

Acknowledgement by audience of organizers' efforts.

Attendance about 90 overall (including exhibitors and volunteers); 23 students – a record, thanks to ways to make participation affordable.

Announced banquet at conference centre; will include musical entertainment by a classical quartet.

AWC 2020: Sherbrooke (Olivier Robin)

Call for papers is out.

Organized by Sherbrooke GAUS acoustics group members.

Special events including gala dinner at Bombardier Museum are being planned.

AWC 2021: St-John's (Benjamin Zendel & Len Zedel) – To be confirmed

Proposal still pending but near finalized.

Conference manual (Jérémie Voix & Frank Russo)

Mentioned that it is in progress.

4. Awards Report (Joana)

New version of award application form has been expanded to make it more informative and easier to complete.

New coordinator for Hétu award, Alberto Behar.

Student award winners announced; a few awards were not granted this year due to lack of applicants (Shaw, Fessenden, Northwood).

Directors' Awards not being granted at this time.

5. Treasurer's Report (Dalida)

Summary of Assets, Awards Summary, Comparison of proposed vs actual for 2019 budget; proposed budget for 2020.

Summary of 5 GIC's for a total of $370,000 with high return rate, all of them with principal guaranteed.

$5,650 to be distributed in awards.

ICSV 26 earned over $11K.

Received a GST rebate from tax filing.

Sustaining subscribers steady; advertising income increased.

Commented on a few highlights of operating funds comparison for 2019 (budgeted vs actuals).

Presented the proposed budget for 2020, showing a shortfall of $8,200 for the year mostly due to expected low income from the conference (conservative).

Fees remaining fixed.

6. Secretary's Report (Roberto)

Membership numbers stable at around 150 regular and 20 students; number of sustaining subscribers remains unchanged at 17.

Previously reported difficulties with the online payment system for memberships, caused by a complex re-qualification requirement by PayPal, have likely resulted in missed or delayed renewals. A glitch in the latest Online Journal System update, which impeded the online purchase of new memberships and required a manual workaround, may also have impacted the uptake. Secretary has been addressing these matters through proactive interaction with members experiencing difficulties.

Occasional anomalies in Journal circulation are now being better managed thanks to increased involvement of the production team in the handling of these matters.

7. Editor's Report (Umberto)

The March 2019 issue in memoriam Murray Hodgson was a success with readership and was well received by Murray's family; a special topic issue on audiology and neuroscience was produced in June 2019; the current issue (September 2019) is dedicated to AWC19 conference proceedings; the December 2019 issue will feature a collection of peer reviewed and other contributed articles.

No regional issue was considered this year, but next year there will be a special issue focused on Alberta (simplified submission process with a local guest editor).

Transitioned to new OJS 3.1 online submission system; some frustration initially but will be a much better platform moving forward.

Practitioners' corner will be revitalized. Difficulties with layout encountered in the past will be eased thanks to a simplified template being developed by the journal's editorial team.

The journal will still have a strong academic and peer reviewed component, but strongly promote wide participation and relevance.

Agreement with EBSCO will increase dissemination of journal at no direct cost. Journal remains open access after 12 months of publication. The goal is to keep the journal affordable as a publication medium by avoiding extra fees for authors.

8. Election of the Board

Jérémie Voix presented the list of 12 current directors indicating that all were willing to stand for another term; he then asked for any new nominations from the floor. None being made, the current Board members were confirmed in their role.

9. Varia

A member of the audience mentioned that next year is the International Year of Sound. CAA as a member of the ICA will be involved in initiatives.

The point was raised of the possibility of transitioning to a paperless journal; Jérémie Voix indicated that opting out of print is already possible by contacting the Secretary, but for now there is no differential in fees.

10. Motion to Adjourn

Moved by Jérémie Voix and seconded by Benjamin Tucker. Adjourned at 17:28 (MST).

The Canadian Acoustical Association - L'Association canadienne d'acoustique

CANADIAN ACOUSTICS ANNOUNCEMENTS - ANNONCES TÉLÉGRAPHIQUES DE L'ACOUSTIQUE CANADIENNE

Looking for a job in Acoustics?

There are many job offers listed on the website of the Canadian Acoustical Association!

You can see them online, under http://www.caa-aca.ca/jobs/

August 5th 2015

Acoustics Week in Canada 2020

AWC 2020 will be held October 7 – 9, 2020 in Sherbrooke (Québec) with Dr. Olivier Robin as General Chair, as well as Prof. Patrice Masson and Dr. Sebastian Ginet as Scientific Chairs. https://awc.caa-aca.ca/index.php/AWC/AWC20

May 3rd 2019

Acoustics Week in Canada 2021

AWC 2021 will be held in St-John's (Newfoundland) with Profs. Benjamin Zendel and Len Zedel as co-chairs. https://awc.caa-aca.ca/index.php/AWC/AWC21

May 3rd 2019

2020: International Year of Sound

The International Year of Sound (IYS 2020) is a global initiative to highlight the importance of sound in all aspects of life on earth and will lead towards an understanding of sound-related issues at the national and international level.

Inspired by the achievements of La Semaine du Son (The Week of Sound), and following naturally as an important contribution to UNESCO Resolution 39 C/49 25 September 2017 on "The Importance of Sound in Today's World: Promoting Best Practices", the International Commission for Acoustics (ICA) is mobilizing its Member Societies and International Affiliates to promote best practices in sound during the year of 2020 to create an International Year of Sound (IYS 2020). For more info, visit http://sound2020.org/

May 3rd 2019

9th Forum Acusticum - April 20 to 24 2020 -Lyon, France.

The European Acoustical Association together with the French Acoustical Society is pleased to invite you to the 9th Forum Acusticum to be held in world heritage city of Lyon-France April 20-24, 2020.

The 9th Forum Acusticum will take place from April 20 to 24 2020 in Lyon, France. More than 1100 delegates from all over the world are expected to participate in more than 100 structured sessions. An exhibition area is available for companies to display their skills and products in noise and vibration. Several sponsorship formulas are also possible. We would like to draw your attention to the next deadline of 1st December for early registration to the exhibition at a reduced rate. Details are available in the sponsorship booklet on the exhibition web page of the congress: https://fa2020.universite-lyon.fr/ Abstract submission deadline Dec 1st 2019 Notification of acceptance Jan 15th 2019 Early bird registration Feb 15th 2019

October 28th 2019

À la recherche d'un emploi en acoustique ?

De nombreuses offre d'emploi sont affichées sur le site de l'Association canadienne d'acoustique !

Vous pouvez les consulter en ligne à l'adresse http://www.caa-aca.ca/jobs/

August 5th 2015

Semaine canadienne de l'acoustique 2020

L'AWC 2020 se tiendra du 7 au 9 octobre 2020 à Sherbrooke (Québec) avec le Dr Olivier Robin comme président général, ainsi que le Prof. Patrice Masson et le Dr Sebastian Ginet comme présidents scientifiques. https://awc.caa-aca.ca/index.php/AWC/AWC20

May 3rd 2019

Semaine canadienne de l'acoustique 2021

L'AWC 2021 aura lieu à St-John's (Terre-Neuve). Benjamin Zendel et Len Zedel sont co-présidents. https://awc.caa-aca.ca/index.php/AWC/AWC21

May 3rd 2019

9ème édition du Forum Acusticum - du 20 au 24 Avril 2020 - Lyon, France.

L'Association Européenne d'Acoustique et la Société Française d'Acoustique ont le plaisir de vous inviter à la 9ème édition du Forum Acusticum qui se déroulera à Lyon du 20 au 24 Avril 2020. C'est un congrès joint avec le 15ème Congrès Français d'Acoustique.

October 28th 2019

The purpose of the ICA is to promote international development and collaboration in all fields of acoustics including research, development, education, and standardisation.

http://www.icacommission.org/

Contacts:
ICAPresident@icacommission.org
ICASecGen@icacommission.org
ICATreasurer@icacommission.org

To: ICA Member Societies
and International Affiliates

Dear Colleagues,

As you know, the International Commission for Acoustics has started preparations for the celebration of an International Year of Sound for the 2020 (IYS 2020). The IYS 2020 will not be included in the UNESCO and the UN's official list of International Years but will have a similar format, with events centrally organized by an IYS 2020 Liaison Committee, events organized by the ICA National Societies and International Affiliates and possibly events organized by the Week of Sound (WoS) a French non-governmental organization which had the initiative to approach to convince UNESCO to approve the Resolution 39 C/49 25 September 2017 “THE IMPORTANCE OF SOUND IN TODAY’S WORLD” . The IYS 2020 will make reference to the necessity for promoting best practices in the framework of this resolution and we have already informed UNESCO about that.

The ICA and the WoS will create a Liaison Committee to coordinate the IYS 2020. For the time being the ICA representatives are Michael Taroudakis (President) and Marion Burgess (Past President). In addition, an ICA/IYS 2020 steering committee will be formed to coordinate all the events to be organized by the ICA Member Societies and will have representatives from all the regions.

In order to prepare the events of the IYS 2020 in the most efficient way, we are asking each of the ICA Members and our International Affiliates to appoint one representative to be in direct contact with the ICA/IYS 2020 steering committee. The contact person will have the responsibility to communicate all the planned events by his/her organization to the ICA/IYS 2020 steering committee and also to convey and discuss with them any ideas or suggestions about the events and activities to be included in the IYS 2020.

The attached file describes the main idea of the events to be included in the IYS 2020.

Please send the name and contact details of your representative to the ICA Secretary General Mike Stinson (ICASecGen@icacommission.org). If you have any questions or comments, please contact me (ICAPresident@icacommission.org).

I hope that with your collaboration, the importance of sound in today's world will reach every part of our planet in 2020.

With my best regards

Michael Taroudakis
President of the ICA

INTERNATIONAL YEAR OF SOUND 2020

National/International Coordinators

Education and Outreach on Sound for Society and the World

Culture – Creativity – Nature – Health – Science – Technology

Development – Education – History

Outcome of the UNESCO Charter of Sound

MISSION

The International Commission for Acoustics has decided to declare the Year 2020 as the International Year of Sound (IYS 2020). The IYS 2020 will not take the form of an official International year sponsored by UNESCO and the UN, but will have a structure similar to such an official International Year with many events to be organized centrally by the IYS 2020 steering committee or regionally by the ICA members Societies and the Week of Sound, which will be a partner to ICA in his celebration.

The International Year of Sound follows naturally as an important contribution to the UNESCO Charter of Sound. The year will be a global initiative to highlight the importance of sound in all aspects of life on earth and will work towards an understanding of sound-related issues at the international level.

ACTIVITIES/EVENTS IYS 2020

These will fall into three main categories:

- Centrally organized broad area events/outcomes funded by ICA and sponsors.
- Those organized and funded by ICA Member societies and organisations.
- Those organized by the Week of Sound (WoS) funded in the normal manner by the WoS (also referred to as La Semaine du Son).

LIAISON AND STEERING COMMITTEES

The ICA and the WoS will create a Liaison Committee to coordinate the IYS 2020. For the time being the ICA representatives are Michael Taroudakis (President) and Marion Burgess (Past President).

Also, an ICA IYS 2020 Steering Committee will be formed to coordinate all the activities of the IYS 2020, which will include events managed by ICA Member Societies and supporting Organisations. Members of this Committee will be representatives from all the ICA Regions.

STRUCTURE FOR ICA MEMBER ORGANISATIONS ACTIVITIES/EVENTS

Each member organisation/society is asked to nominate a coordinator to be the primary contact with the ICA IYS steering committee

The coordinator will discuss with the organization/society the events/activities that can be undertaken during 2020 and will help to promote one or more aspects of acoustics.

Once the activities are decided upon, the coordinator will provide a concise summary plus dates to the IYS steering committee for endorsement as an official IYS activity.

Each activity endorsed will have the authority to use the IYS 2020 logo and be included in the official IYS 2020 website calendar and other promotion.

All funding for the event/activity must be provided for the activity by the member society or organization and no central funding will be provided

The steering committee will provide some promotional material to the coordinator. The steering committee will also promote the activity internationally as appropriate.

At the completion of the activity, the coordinator will be responsible for providing a concise report plus photos and links to supplementary material. This will be loaded onto the IYS 2020 website as a future resource.

TYPES OF ICA MEMBER ORGANISATIONS ACTIVITIES/EVENTS

All activities that relate to the mission of the IYS 2020 would be relevant. While commercial sponsorship is encouraged, and hence there would be some advertisement, the coordinator is responsible to ensure that the activity is not solely aimed to promote the company or particular products.

This IYS 2020 is the opportunity to promote to the world the importance of sound to all aspects of our life. Organisations are encouraged to consider outreach activities and to be innovative.

The following are some suggestions but it is up to each organisation to consider what may be appropriate for their region/resources

Activities related to the annual meeting or conference.

Activities related to relevant "days" throughout the year such as

- International Noise Awareness Day - Wednesday, 29 April 2020.
- World Hearing Day - 3 March 2020.
- International Mother Language Day - Friday 21 February 2020.

Activities related to education.

These will naturally take longer but the outcome will be long lasting.

The package of activities could include production of any material (digital/video/audio) addressing a particular topic or area or age group.

Also it could include specific events dedicated to teachers and students in collaboration with educational institutes and especially with priparay and secondary level schools.

Activities addressed to the general public

The activation of the Public Media is essential in conveying the message of the International Year of sound to the general public. The National Societies and International Affiliates are encouraged to use all possible means of communication with the community to explain the important of sound for our lives to all the citizens.

TYPES of ICA ORGANIZED AND CENTRALLY FUNDED EVENTS:

The following is a provisional list of centrally organized events for the IYS 2020

- Design of promotional material (posters and leaflets) to be distributed electronically to ICA members and International Organizations. The ICA members will include this material in their web-sites. After printing, these leaflets will be available for distribution to all the events related to the IYS. Banners for the IYS 2020 will be produced to be displayed in the IYS 2020 focal events as well any other events of the ICA and The Week of Sound.
- Organization of the opening ceremony of the IYS 2010 in Paris in 2020. The details and the program of the opening event will be set later this year.
- Organization of world-wide competitions for students of primary and secondary schools respectively. The subject of the competitions will be decided by the IYS 2020 Liaison Committee.
- Development of a video to promote the objectives of the IYS 2020. The film should be of short duration, 5 min max, and will be shown to all conferences and events coordinated by ICA, and its Member Societies and associations as well as to the events of The Week of Sound. This film can also be used as promotional material for the IYS 2020.
- Development of a video for use in education on the importance of sound in our world and to provide guidance on the career opportunities.

MAJOR INTERNATIONL CONFERENCES ASSOCIATED WITH THE IYS 2020

The organisers of at least the following major events during 2020 will be asked to include some form of activity/event in recognition of IYS 2020. Additional International Conferences on Acoustics may be added in this list based on the approval of the ICA Steering Committee.

- FORUM ACUSTICUM (the EAA main conference) Lyon, France, 20-24 April 2020.
- 179th Meeting of the ASA Chicago, Illinois 11-15 May 2020.
- ICSV 27, Prague, Czech Republic, July 2020.
- Internoise 2020, Seoul, Korea, 23-26 August 2020.
- FIA 2020 - 12° Iberoamerican Congress on Acoustics, Florianopolis, Brazil, 27-20 September 2020.
- 180th Meeting of the ASA Cancun, Mexico 9-13 November 2020.

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- Une alternative intéressante pour une évaluation par les pairs, fournissant aux auteurs des commentaires pertinents, objectifs et constructifs

Application for Membership

CAA membership is open to all individuals who have an interest in acoustics. Annual dues total $120.00 for individual members and $50.00 for student members. This includes a subscription to ***Canadian Acoustics***, the journal of the Association, which is published 4 times/year, and voting privileges at the Annual General Meeting.

Subscriptions to *Canadian Acoustics* or Sustaining Subscriptions

Subscriptions to ***Canadian Acoustics*** are available to companies and institutions at a cost of $120.00 per year. Many organizations choose to become benefactors of the CAA by contributing as Sustaining Subscribers, paying $475.00 per year (no voting privileges at AGM). The list of Sustaining Subscribers is published in each issue of ***Canadian Acoustics*** and on the CAA website.

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Executive Secretary, Canadian Acoustical:
Dr. Roberto Racca
c/o JASCO Applied Sciences
2305–4464 Markham Street
Victoria, BC V8Z 7X8 Canada

Formulaire d'adhésion

L'adhésion à l'ACA est ouverte à tous ceux qui s'intéressent à l'acoustique. La cotisation annuelle est de 120.00$ pour les membres individuels, et de 50.00$ pour les étudiants. Tous les membres reçoivent ***l'Acoustique Canadienne***, la revue de l'association.

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Les abonnements pour la revue ***Acoustique Canadienne*** sont disponibles pour les compagnies et autres établissements au coût annuel de 120.00$. Des compagnies et établissements préfèrent souvent la cotisation de membre bienfaiteur, de 475.00$ par année, pour assister financièrement l'ACA. La liste des membres bienfaiteurs est publiée dans chaque issue de la revue ***Acoustique Canadienne***..

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c/o JASCO Applied Sciences
2305–4464 Markham Street
Victoria, BC V8Z 7X8 Canada

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