INTERNATIONAL COMMISSION FOR ACOUSTICS

# International Year of Sound

# 2020-2021


## Final Report

# The International Year of Sound 2020-2021

Importance of Sound for Society and the World

# FINAL REPORT

Legal Statements

This report on the International Year of Sound 2020-2021 (IYS 2020+) has been assembled from information and data provided by a large number of partners and contributors. While the Editors have taken care to ensure the accuracy, completeness and reliability of the information provided, the data that has been compiled in this report cannot be guaranteed to be complete and free of error. In addition, any ideas or opinions expressed are those of the report contributors and do not necessarily reflect the position of the Editors, the International Year of Sound partners or organizations involved.



ACKNOWLEDGMENTS

This volume was compiled and edited on behalf of the International Commission for Acoustics by the co-organizers of the International Year of Sound 2020-2021
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# Contents

# FORWARD

The **International Year of Sound 2020-2021** (IYS 2020+) was declared by the International Acoustic Commission (ICA) in 2019 as **the International Year of Sound 2020** (IYS 2020), following a long-term planning that began a decade ago. The French organization "La Semaine du Son" became a partner of this initiative in recent years. The motto of the celebration was "***Importance of sound for society and the world***" and reflects the message that ICA wanted to spread around the world. The celebration mobilized ICA member societies, international affiliates and many international partners to plan events and take initiatives to raise community awareness about the importance of sound for our lives.

The celebration officially began on 31 January 2020 in Paris. Shortly after, the Covid-19 pandemic spread all over the world, initially creating many problems in the celebration causing most scheduled events to be canceled or postponed. Still, the enthusiasm of the organizers and partners kept the spirit of IYS open so that with the implementation of innovative on-line solutions for the organization of the events, the majority of the planned events finally took place during 2020 and the following year, thus causing the ICA to extend the celebration until 2021 to redefine it as the International Year of Sound 2020-2021 (IYS 2020+). Fortunately, many planned events were held in late 2020 and 2021 with in-person participation. IYS 2020+ officially ended in 2021, but some events held in subsequent years directly related to IYS 2020+, were included in the celebration.

The events and products of IYS 2020+ were aimed at a wide audience and had many different characters. Specialized workshops, meetings, video productions, exhibitions, publications and on-line platforms were among the means developed or used to convey the message of IYS 2020+ to everyone, from young children to senior scientists. Of particular importance was the student competition that motivated the representatives of youth to become active contributors to the celebration.

The celebration is considered very successful, despite the problems we had with the limitations resulting from the Covid-19 pandemic. The message about the importance of sound reached every region of the planet, as events were organized all over the world. The IYS 2020+ website, which in addition to event announcements and detailed information on the productions and the evolution of the celebration, hosted numerous posts and applications related to sound, is still accessible to everyone. We believe that the celebration finally fulfilled all our expectations and gave rise to new collaborations that will take the science of acoustics to a higher level in the future.

This report aims to provide an overview of IYS 2020+ by presenting the history, the objectives and structure of the celebration and providing a summary of the events and activities held worldwide, and its main products. The report also contains details on the communication and outreach means adopted and information on the cooperation of the IYS 2020+ Steering Committee with other relevant organizations and includes in its Annexes articles presented specifically for IYS 2020+.

We hope that the report will remain in the future as a document illustrating the success of the celebration and as a guide for those wishing to organize a similar event in the future.

As co-organizers of IYS 2020+ we want to express our gratitude to the ICA Board for supporting the celebration and giving us the responsibility to act as its co-organizers. The International Year of Sound would not have started, nor would it have been successful in its mission, without the support of the ICA and its member societies and affiliated organizations. We would also like to thank the members of the committees that were set up to coordinate the celebration, the teams that enthusiastically participated in all its activities, the international partners who contributed to the organization of the events and the implementation of the IYS 2020+ related products, and especially all the students who participated in the student competition. Special thanks go to the

organizations that endorsed the celebration and of course to the founding members and sponsors of IYS 2020+.

**Marion Burgess**

**Michael Taroudakis**

**Co-organizers of the IYS 2020+**

April 2025

# MESSAGES FROM ICA PRESIDENTS

The initiative which in 2020 led to the inauguration of the International Year of Sound was motivated by the everyday significance of sound and the professional solutions relating to its optimal control. Whenever we speak to each other or enjoy music in real life or through audio technology we rely on sciences within acoustics and sound, and the technical fields supporting these. Usually, we only notice when the acoustics of a room isn't appropriate or when noise is loud or damaging. We often fail to acknowledge the efforts that lead to excellence in e.g. communication, noise control, ultrasonics, medical solutions, etc. We wanted more people to understand this and therefore took it upon ourselves to engage more actively in professional and public outreach.

The International Commission of Acoustics led and supported the efforts leading to the production of specific International Year of Sound material, website, and events along with other key societies in the field, which co-sponsored the initiative. When the initiative was inaugurated in 2020 many had already been consulted and contributed to the course of action over the preceding years. The material was made publicly available and has served as a platform for public outreach. We celebrate these efforts every year till 2033 with the International Year of Sound Outreach Award.

The success of the International Year of Sound can be attributed to the dedication of the ICA boards and in no small terms Past Presidents, Marion Burgess (2013-2016), and Michael Taroudakis (2016-2019), who eventually continued efforts in a dedicated task force including volunteers and other ICA board members. Special mention should also be made to Mike Stinson (ICA General Secretary, 2013-2019) for the creation and maintenance of the website, which was the main source of information about the IYS 2020+. These achievements are unique in ICA history, and continuity unprecedented. As current and subsequent Past Presidents we are enormously grateful for this work, and for the sponsorships from our sister

organizations in the field of acoustics. May the initiative continue to inspire our mediation and public outreach.

The presidents of ICA,

**Jorge Arenas**

2025-2028

**Dorte Hammershøi**

2022-2025

**Mark Hamilton**

2019-2022

# EXECUTIVE SUMMARY

## Background

The International Year of Sound 2020-2021 (IYS 2020+) was an initiative of the International Commission for Acoustics (ICA) aimed at highlighting the importance of sound in all aspects of life and leading towards an appreciation of sound-related issues at the national and international level. Plans for the organization of an International Year of Sound (IYS) started in 2011. The initial plan was for an International Year in 2019 under the auspices of the United Nations and UNESCO. The objectives of the IYS were defined by the ICA and were presented in brochures that were issued to convey the information on the intention of the ICA to work for an International Year of Sound (IYS).

Later on, it was decided that due to some organizational difficulties that would postpone the official lunching of an IYS under the UNESCO, the International Year of Sound would be declared by the ICA in collaboration with the French organization "La Semaine du Son" (The Week of Sound), towards the goals of the **UNESCO resolution 39 C/49 (2017) "The Importance of Sound in Today's World: Promoting Best Practices"**. Eventually, the ICA declared the year 2020 as the International Year of Sound 2020 (IYS 2020) and due to the restrictions posed by the pandemic the celebration was extended into 2021 and so became the International Year of Sound 2020-2021 (IYS 2020+). The original logo of the celebration was easily modified to indicate the extension. To avoid any confusion the abbreviation to be used thereafter in the report will be IYS 2020+

Founding partners of the IYS 2020+ were, besides ICA, the Acoustical Society of America (ASA), the European Acoustics Association (EAA), the International Institute of Acoustics and Vibration (IIAV) and the International Institute of Noise Control Engineering (I-INCE). ASA is a full member of the ICA, while the other organizations are affiliated members of the ICA. These organizations provided the

original funding required to proceed with preparatory actions and the realization of the IYS 2020+.


**The original logo of the IYS 2020**


**The modified logo of the IYS 2020+**

## Governance

In order to ensure proper and efficient coordination of the events, the projects and the products of the IYS 2020+, three committees were formed:

A **Steering Committee** with representatives from the three regions, Europe/Africa, Asia/Pacific and the Americas, to coordinate all activities of the IYS 2020+, including events managed by the Coordinating and the Liaison Committees

A **Coordinating Committee** with representation from all ICA Member Societies and International Affiliates. The role of the members of this Committee was to coordinate the events that were held in their countries organized by the corresponding Acoustical Societies/Associations and inform the Steering Committee accordingly.

A **Liaison Committee** to provide coordination between the ICA and the Semaine du Son.

**Marion Burgess** and **Michael Taroudakis,** former Presidents of the ICA, were appointed by the ICA Board as co-coordinators of the IYS 2020+.

The Steering Committee met in-person before the pandemic in connection with major Conferences on Acoustics and on-line during the celebration.

A website, https://sound2020.org, was created and maintained by **Michael Stinson,** former Secretary General of the ICA. This website remains accessible today and contains all the information on the IYS 2020+, its events and products.

The citizens around the world were encouraged to plan and carry out activities and products related to the IYS 2020+, acting as individuals or by means of formal organizations. The organizers were asked to inform the website manager about the nature and the details of the event/project. These activities became part of the IYS 2020 celebration after evaluation by the Steering Committee coordinators for relevance to the objectives of the IYS 2020+.

## Activities

The reaction of the international scientific community to the declaration of the IYS 2020+ was enthusiastic. The IYS 2020+ was endorsed by the International Science Council (ISC), the International Union of Pure and Applied Physics (IUPAP) and the International Union of Theoretical and Applied Mechanics (IUTAM), the three major scientific organizations with which ICA is associated. Also, the World Health Organization (WHO) and the Center for Hearing and Communication (CHC) decided to collaborate with the ICA in the framework of the IYS 2020+.

Two major projects were centrally organized by the IYS 2020+ Steering Committee. One was the production of a film illustrating the objectives of the IYS 2020+. The other was to involve the international youth through a student competition addressing students from elementary and middle schools, that would express their view on the importance of sound for our world in drawings or stanzas accompanying a musical composition that was composed exclusively for the IYS 2020. As the message on the IYS spread around the world, many organizations decided to organize events or make products for the IYS 2020+. Also, major Conferences on Acoustics to be held in 2020 decided to add outreach activities for the IYS 2020+. By the beginning of 2020, a great number of events were planned from various organizations around the world.

The IYS 2020+ started with a spectacular ceremony held at the Grand Amphitheatre de Sorbonne in Paris on 31 January 2020. **Jean-Dominique Polack,** member of the Steering and Liaison Committees, was instrumental in arranging for this spectacular location and the realization of the event.

Soon after the opening of the IYS 2020+, the Covid-19 pandemic spread around the world Due to the pandemic restrictions, most of the planned events could not proceed as planned, however the enthusiasm among the organizations remained. So, they soon adjusted their plans to utilize the range of virtual platforms that became widely available during 2020 to organize many events on-line.

Without hesitation, and realizing the benefits of the on-line events, the Steering Committee suggested, and the ICA approved the extension of the International Year of Sound 2020 through to 2021 as International Year of Sound 2020-2021 (IYS 2020+). This was a wise decision, as, since organizations became more skilled at using different on-line platforms, more events became available. Thus, the activities to promote the objectives of the International Year of Sound were not interrupted. In addition, and due to the extension of the students' competition to 2021, more students were involved in the competition and the messages of the IYS 2020+ reached a much wider audience. In total more than 15000 students from 80 schools in 16 countries participated in the competition.

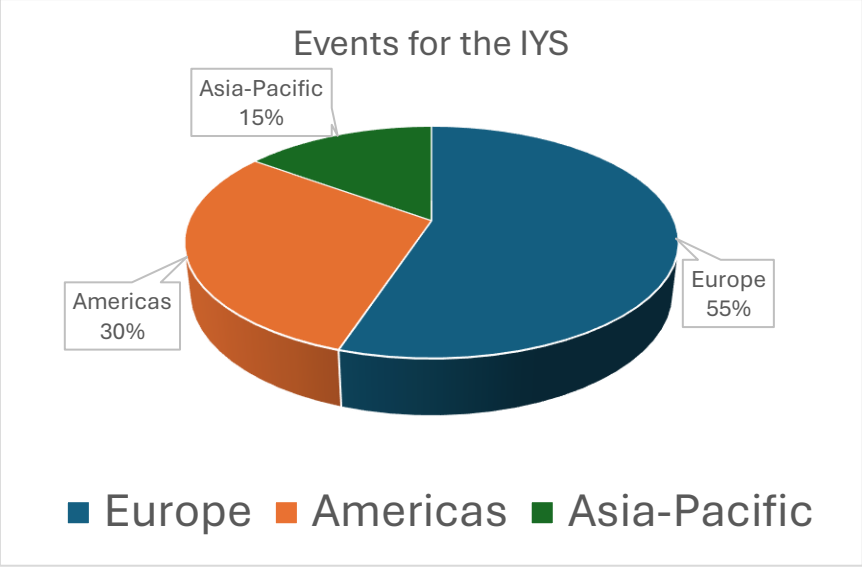
The IYS 2020+ website became even more important as the major means of promoting and raising awareness around the world of events dedicated to the celebration. Unfortunately, the restrictions due to the pandemic remained in effect for most of 2021 and it was difficult for the organizers to make definite plans for their activities. Some of the planned events were postponed to a later day or year. Due to this, the Steering Committee of the IYS 2020+ decided to keep identified as IYS 2020+ events, some of the activities held in 2022 if they were directly related to the celebration.

Overall, a total of **150 events** that were held in **31 countries** are listed in this report (Section: Events). It is interesting to note that these events were not necessarily organized by the ICA members societies or international affiliates. Many of these

events were organized by third parties which have a close liaison with sound and this clearly illustrates the impact that the IYS 2020+ had on the community and the fulfillment of its objectives. Additional events and outreach activities with reference to the IYS 2020+ were also held in the framework of standard activities of the ICA Member Societies and International Affiliates. These events, if not announced through the IYS 2020+ website, are not mentioned in this report.

Of particular interest are the educational activities/products that many organizations produced, which indicates the priority that these organizations show in informing the young generations on the importance of sound.

The figure below shows the percentage of events that were held in each one of the regions defined by the ICA: Europe/Africa, Americas and Asia Pacific. Events associated with the IYS 2020+ were held in all continents of the world.




**Distribution of the IYS 2020+ events within the three regions as defined by the ICA**

In addition to major events and products, the message of the IYS 2020+ was conveyed to the general public by means of special actions that included interviews with ICA and IYS 2020+ officials transmitted live through radio stations

or internet, and publications in electronic or conventional newspapers and journals. A summary of these additional outreach activities is included in this report.

The summary of the events related to the IYS 2020+ were also presented in two International Conferences (The ASA Meeting in Seattle 2021 and the FORUM ACUSTICUM 2023 in Torino).

## Legacy

Among the objectives of the celebration of the IYS 2020+ was that the message of the importance of sound would continue after the end of the year.

The celebration encouraged institutions and groups working with sound to start collaboration between themselves to raise awareness on the importance of sound for our world to the general public. The experience gained, and the messages we keep receiving after the official end of the celebration indicate that these collaborations will continue and will strengthen cohesion among the acoustics community towards this important goal.

The website www.sound2020.org will play an important role in this respect. The ICA decided that it will be kept active, in order that all the resources, the projects and other information related to sound that were posted on the site will be freely accessible into the future. This will have a dual effect. The educational material presenting the various aspects of sound will be available for the youth and the educators to demonstrate the importance of sound. The details of the events presented will be acted as guides to institutions wishing to organize own activities promoting the science of sound.

Finally, to recognize and encourage member societies to continue the momentum for organizing outreach activities along the paths of the IYS 2020+, the ICA has established an annual award to recognize an outstanding outreach activity undertaken on behalf of an ICA Member Society. First recipient of this award was for the "**Keep your hearing, keep your health**" Symposium, organized in the context of the 28th International Noise Awareness Day 2023 (INAD 2023) "Sound that unite us"

event, on 26 April 2023, that involved the collaboration of three ICA members: the **Acoustical Society of Italy (AIA), the Acoustical Society of Spain (SEA), and the Acoustical Society of Turkey (TAKDER)**.


**The banner of the IYS 2020+ after its extension to 2021**

# IMPORTANCE OF SOUND

Sound is one of the most fundamental and influential elements in our everyday experiences and plays an important role in all human activities. Applications of acoustics are found in almost all aspects of modern society. Sound is an essential part of communication between humans - in the form of speech, in music and creative sounds. From the earliest days of human history, people have used sound to convey messages, emotions, and ideas and from this point of view it has been an inherent part of education and culture. Language, in its spoken form, is inherently based on sound. The act of speaking and listening to others forms the foundation of our social interactions. Throughout the centuries the creative and cultural aspects of sound have been integral to society. Traditions and laws have been passed down through generations via stories and dance. Even today oral histories play an important part in modern societies.

Beyond communication, sound can significantly affect our physical and mental health. Sound can be a pleasant experience. Some sounds, such as calming music, soothing nature sounds, or even the laughter of friends, can promote relaxation, reduce stress, and improve overall well-being. On the other hand, exposure to harmful or excessive sounds, such as loud music, noisy environments, or industrial sounds, because of their annoying and distracting character can lead to negative health effects and even cause damage to hearing. So, the creation and use of sound go hand in hand with the understanding of hearing, of the reaction of people to sound and of the control of annoying and damaging noise. The importance of protecting our ears from loud noises and the necessity for creating and living in areas with soundscapes compatible with well-being, is essential for maintaining both our physical and mental health. In this respect, as cities grow and become more crowded, the importance of creating spaces with reduced noise pollution and increased access to natural sounds becomes more evident.

Sound in its high frequency range has proven to be an essential means of medical diagnosis and treatment. Ultrasound tests are now an inherent part of medicine and provide harmless and reliable diagnosis of the human body condition. This area is under continuous research status, and it is expected that many more applications will appear in the near future.

References to sound can be found throughout history. Before 6000 B.C., water wave designs had already appeared on pottery of the Yangshao culture. Musical scales and instruments have been studied officially in China for 3000 years. One of the first references of sound as a wave is from Aristotle when he indicated that "air motion is generated by a source, thrusting forward so that the sound travels as far as the disturbance in the air manages to reach". Through the Middle Ages the need to control sound for the peace of communities was realized and measures such as laying straw on cobble stones were carried out to reduce the noise from wagons in the city streets and some trades known to create noise were located away from the residential areas.

Technological developments in the 19$^{th}$ and 20$^{th}$ centuries allowed for the collection of sound by microphones in the air and hydrophones under water. This opened opportunities for a deeper understanding of sound and how it is created, interacts with the environment and how it can be controlled not only to reduce noise but also as a tool itself.

The world was brought closer with the introduction of the telephone. The means to reproduce sound enhanced the opportunities for creativity and cultural activities. Into the 21$^{st}$ century, exciting new applications continue to open, for example the use of High Intensity Focused Ultasound (HIFU) in medicine and detection of low frequency sound from space.

The importance of sound in our world was the motivation of the International Commission for Acoustics (ICA) to initiate an International Year of Sound (IYS) to create a worldwide awareness of all these facts. Thus, the IYS aimed to promote the importance of using sound for the benefit of man and society while controlling noise and protecting hearing for the benefit of the community.

# SOME MILESTONES IN THE HISTORY OF ACOUSTICS

Acoustics has been an increasingly active field over the last several decades. But with speech and hearing and music being a part of humanity for millennia, it is not surprising that examples of acoustic research can be found dating back centuries.

Here are some examples of milestones in the development of the understanding of sound:

- **6000 BC**: Water wave designs appear on potteries of the Yangshao culture.
- **2000 BC**: Musical scales and instruments studied in China.
- **500 BC**: Greek philosopher **Pythagoras** investigates the properties of vibrating strings that produce pleasing musical intervals.
- **350 BC**: Greek philosopher and polymath **Aristotle** correctly suggests that a sound wave propagates in air through motion of the air and notes that marine mammals are using sound.
- **20 BC**: **Marcus Vitruvius Pollio** (known as Vitruvius), a Roman architect, determined the correct mechanism for the movement of sound waves, and he contributed substantially to the acoustic design of theaters.
- **1030 AD**: **Abū Rayhān al-Bīrūnī**, an Iranian Polymath, posits that the speed of sound is much less than the speed of light.
- **1490**: Italian polymath **Leonardo Da Vinci** states that sound propagates at long distances in the sea. He also ascertained that wave motion of a sound has a definite value of velocity,
- **1635**: French scientist and philosopher **Pierre Gassendi** makes the earliest known attempt at measuring the speed of sound in air.

- **1636**: French polymath **Marin Mersenne's**, studies of the vibration of stretched strings culminates in the three Mersenne's laws and his *Harmonicorum Libri* provides the basis for modern musical acoustics.
- **1681**: **Robert Boyle** and **Robert Hooke**, English physicists, are the first to produce a sound wave of known frequency, using a rotating cog wheel as a measuring device.
- **1678**: **Robert Hooke** announced his law, relating force to deformation, which established the foundations of vibration and elasticity theories.
- **1696**: French physicist and mathematician **Joseph Sauveur** suggested the term acoustique (acoustics in English) for the "science of sound".
- **1787**: **Ernst Chladni** a German physicist and musician author of the highly acclaimed *Die Akustik*, introduces a technique of observing standing-wave patterns on vibrating plates by sprinkling sand onto the plates. He also calculated the speed of sound for different gases.
- **1807**: The analysis of a complex periodic wave into its spectral components is theoretically established by **Jean-Baptiste-Joseph Fourier** of France. This is now commonly referred to as the Fourier theorem.
- **1816**: The first stethoscope, for the amplification of body sounds, is invented by a French physician, **René Laënnec.**
- **1826**: The speed of sound in water is measured by **Jean-Daniel Colladon**, a Swiss physicist and **Charles-Francois Sturm** a French mathematician.
- **1858**: American scientist **John LeConte** develops a technique for observing the existence of ultrasonic waves with a gas flame, initiating the study of ultrasonics.
- **1877**: The first device to record and play back sounds, the *phonograph*, is developed by American inventor **Thomas Alva Edison**.
- **1877**: The English physical scientist **John William Strutt**, **3rd Baron Rayleigh**, publishes his two-volume treatise *The Theory of Sound* after

carrying out an enormous variety of acoustic research. This publication marks the beginning of modern acoustics.

- **1880:** The finding by the French brothers **Paul-Jacques** and **Pierre Curie** that electric charges result on the surfaces of certain crystals subjected to pressure or tension provided the means of detecting ultrasonic signals.
- **1898**: **Wallace Sabine** an American physicist, determines the relationship between reverberation time of a room and the room volume, surface wall area and wall absorption — this relationship is now known as the Sabine formula. He elevated architectural acoustics to scientific status.
- **1914:** Canadian **Reginald A. Fessenden** patents the first functioning echo ranger system in the United States.
- **1917**: **Paul Langevin** a French physicist uses high-frequency acoustic waves and quartz resonators for submarine detection.
- **1928**: **Sergei Sokolov** a Soviet scientist, explored using ultrasonic waves for detecting metal objects and flaws in solids.
- **1931**: **Harvey Fletcher**, an American physicist regarded as the father of psychoacoustics, developed the first electronic hearing aid and invented stereophonic reproduction.
- **1960**: Decades of experimentation on the ear and hearing by Hungarian-born American physicist **Georg von Békésy**, laying the foundation for the field of cochlear mechanics, culminates in his book *Experiments in Hearing*.
- **1978: Walter Munk** an American Oceanographer introduces the concept of Ocean Acoustic Tomography as a tool for acoustically monitoring the marine environment.

These are some of the key steps in the evolution of the science of acoustics, that have laid the foundations that have been built upon at a rapid pace in the following decades and will continue into the future.

# THE INTERDISCIPLINARY CHARACTER OF ACOUSTICS

## Bridging Science, Art, and Technology

Acoustics is the scientific area dealing with the study of sound and its applications. The term was introduced by the French Physicist **Joseph Sauveur** in 1696. Given the fact that sound is a means of communication, education and cultural expression, acoustics is one of the most interdisciplinary fields, weaving together a variety of scientific, artistic, and engineering domains. Thus, acoustics is crucial not only in physics and engineering but also in fields such as music, medicine, architecture, psychology, and environmental science. Acousticians are scientists with basic background in one or more of several fields (physics, mathematics, engineering, medicine, psychology, education) who study complex real-world problems exploring both theoretical and applied dimensions of sound.

## The Role of Physics and Engineering in Acoustics

At its core, acoustics is deeply rooted in physics and mathematics, particularly in the study of waves, energy propagation, and vibrations. As sound travels in waves, the physics and mathematics of wave propagation in real bounded domains are of profound importance in understanding how sound is emitted from a specific source, propagates and interacts with the boundaries and determine the “sound field” in given domains.

The engineering aspects of acoustics focus on applying these principles to design, on one hand spaces that are characterized by optimum acoustical characteristics and on the other hand systems that control or manipulate sound to ensure its optimum perception.

For the design and construction of buildings/spaces with desired acoustic characteristics (e.g. concert halls, amphitheaters, classrooms) architects should

collaborate with structural engineers, material scientists and of course acousticians and choose shapes, volumes and material specifically appropriate for the project in hand.

For optimum use of sound in our everyday life, the design of loudspeakers, microphones, hearing aids, and sophisticated sound reproduction systems are of profound interest, and they mark the meeting point of electrical and electronic engineers, computer scientists, medical doctors with acousticians.

## Acoustics in Music and the Arts

The intersection of acoustics with music and the arts is equally significant. Music, a universal art form and major means of cultural expression, is absolutely relevant to the principles of sound production, transmission, and reception. Working with musical tones, harmonics, and textures, brings together acousticians with composers and performers.

The design of musical instruments that emit high quality sound is another area where acoustics play a critical role. Acousticians work with musicians and craftsmen to understand how the physical properties of the instrument's materials (such as wood, metal, or synthetic composites) influence its sound emission.

Needless to highlight the importance of designing performance spaces, such as concert halls or theaters. The collaboration of acousticians with architects is essential to design spaces that optimize sound distribution and minimize undesirable acoustical effects. In this respect we should not neglect the role of mathematicians in the development of reliable sound field prediction models in complicated spaces and of the computer scientists in the visualization of the outcome.

## Acoustics and Medicine: Diagnostic and Therapeutic Applications

Sound is an efficient carrier of information on the composition of the medium through which it has propagated. Exploiting measurements of the acoustic field that has been created by a known acoustic source and using mathematics for inversion tools and computer science for the visualization of the inversion results, the user can estimate properties of the medium through which the sound has propagated. In recent decades this principle has been extensively used in the medical sector. Ultrasound is nowadays very common as a diagnostic tool from pregnancy monitoring to detecting tumors or vascular abnormalities. The ability to manipulate sound waves to create detailed internal images of the human body is an additional testament to the intersection of acoustics, mathematics engineering, and medicine.

Acoustic therapy also has important applications, particularly in the treatment of hearing impairments. Hearing aids and cochlear implants rely on advances in acoustics to help individuals with hearing loss regain access to sound.

## Acoustics in Environmental Science and Engineering

Living in areas where the sound is appropriate for the purpose of space is essential for our well-being. As sound is important for communication, the design of buildings and gathering areas with optimum characteristics for sound perception is of profound importance. In this respect, mitigating noise is essential. The first step is to implement control measures that will reduce noise at the source. The next is to reduce the noise between the source and the people with the aid of noise barriers and appropriate material in the building enclosure. Once those controls are in place, it is important to optimize the acoustics within the spaces to maintain the desired sound. Successfully achieving this outcome involves the collaboration of a wide range of professionals such as acousticians, environmental scientists, engineers, landscape architects and psychologists.

## Acoustics and Biology

In natural environments, acoustics helps us study wildlife communication and the health of ecosystems. Many species rely on sound for communication, navigation, and mating, so the study of bioacoustics can inform conservation efforts and provide insight into the effects of human-generated noise on wildlife populations. This is an area of collaboration between acousticians, biologists and oceanographers the latter being involved in the study of the underwater sound.

## Acoustics and Geology

Sound waves can play an important role in estimating properties of earth structures or objects, in more or less the same way as in the medical sector. Acoustics are nowadays used for underwater archaeology, detection of objects in the sea and the characterization of the sea-bed structure. Sonar technology and related applications bring together acousticians with engineers, geologists and oceanographers to collaborate and find solutions to the problems of ocean acoustic tomography and geoacoustic inversions.

Acoustics plays an important role in monitoring the seismic activity especially underwater. Earthquakes are often associated with emitted noise and the characterization of earthquakes using acoustics is recently an additional area of collaboration between seismologists, geologists with acousticians and known as “seismoacoustics”.

## Psychology and Acoustics: Understanding Perception

Psychology, particularly cognitive psychology, is another important field for acoustics. Psychoacoustics, the study of how humans perceive sound, bridges the gap between physical acoustics and human perception. Researchers in this field investigate how factors like sound frequency, intensity, and duration influence our experience of sound. For example, understanding how humans perceive speech can lead to improvements in communication technologies, including hearing aids, speech recognition software, and virtual assistants.

Acoustics also plays a role in understanding the psychological and emotional effects of sound. Music therapy, for example, leverages the therapeutic potential of sound to address mental health challenges. Similarly, soundscapes are created in urban design to enhance well-being, promote relaxation and reduce stress through carefully curated sound environments.

## Conclusion

By drawing on principles from physics, engineering, psychology, as well as the arts, acoustics continue to evolve and contribute to solving some of the most pressing challenges in society, from public health to environmental sustainability.

In this way, acoustics is inherently interdisciplinary, requiring knowledge of both the theoretical principles of sound and the practical techniques needed to make optimum use of it in favor of the community.

# SCIENTIFIC AREAS OF ACOUSTICS

With sound touching our lives in so many ways, it is no surprise that acoustics, the study of sound and vibration, address a great variety of issues. The areas of study can be grouped in different ways, though most groupings are similar to the definition of technical committees in the Acoustical Society of America (ASA). Using the ASA approach as a starting point, (see Appendix A of the ASA Rules) the following areas of acoustics can be defined:

**Acoustical Oceanography**

Concerned with the use of acoustic techniques to measure and understand physical, biological, geological, and chemical parameters and processes of the sea.

**Animal Bioacoustics**

Concerned with:

1. Animal communication, biosonar, and associated behavior.
2. Sound production anatomy and neurophysiology of animals.
3. Auditory capacities and mechanisms, anatomy, and neurophysiology of animals.
4. Acoustic methods for use in population assessment, identification, and behavior.
5. Acoustic ecology and effects of sound on animals.
6. Instrumentation, algorithms and analysis methods for animal acoustics.

**Architectural Acoustics**

Encompasses the following areas of interest as applied to sound in and around buildings:

1. Room surface treatments, surface shaping, volumes, and geometries.
2. Airborne and structure-borne sound isolation and noise control.
3. Noise and vibration control of building systems.
4. Electroacoustic and media systems.
5. Perception and psychoacoustics.

**Biomedical Acoustics**

Concerning the study of the interactions of acoustic waves with biological materials, including cells, tissues, organ systems and entire organisms. Relevant areas of interest include but are not limited to:

1. Diagnostic and therapeutic applications of acoustics in medicine.
2. Biological effects of exposure to mechanical vibration and acoustic waves.
3. Acoustic propagation in biological materials.
4. Instrumentation.
5. Ultrasound field calibration, exposimetry and dosimetry.
6. Ultrasound contrast agents.
7. Medical image and signal processing.
8. Characterization and processing of biological materials.
9. Physiological measurements.

**Engineering Acoustics**

Encompasses the theory and practice of creating tools for investigating acoustical phenomena and applying knowledge of acoustics to practical utility. This includes:

1. The design and modeling of acoustical and vibrational transducers, arrays, and transduction systems in all media and frequency ranges.
2. Instrumentation, metrology, and calibration.
3. Measurement and computational techniques as they relate to acoustical phenomena and their utility.
4. The engineering of materials and devices.

**Musical Acoustics**

Concerned with the application of science and technology to the field of music. Of particular current interest are the following topics:

1. Physics of musical sound production.
2. Music perception and cognition.
3. Analysis and synthesis of musical sounds and compositions.

**Noise**

Involves increasing and diffusing the knowledge of noise generation and propagation, passive and active noise control, perception and the effects of noise, and the management of exposure to noise. Activities embrace the practical and theoretical aspects of noise in all areas of acoustics. Specific topics of interest include:

1. Measurement, prediction, and modeling of noise and vibration.
2. Soundscapes, urban and natural.
3. Product sound quality.
4. Classroom acoustics.
5. Quite system design.
6. Occupational and recreational exposure to noise.
7. Speech privacy.
8. Legal aspects of noise.
9. Codes and standards.

**Physical Acoustics**

Concerned with fundamental acoustic wave phenomena from infrasonic to ultrasonic frequencies. Theoretical, computational, and experimental approaches are used. Topics being investigated include:

1. Use of acoustics in probing the physical properties of materials and other systems with relevance to physics and geophysics.
2. Sound and vibrations in fluid-filled media, including porous media.
3. Thermoacoustics.
4. Propagation of sound in planetary atmospheres.
5. Nonlinear acoustics and shock waves in gases, liquids, and solids.
6. Cavitation phenomena in physical and biological media.
7. Interaction of sound with light and other forms of radiation.
8. Attenuative processes and dispersion of sound.

**Psychological and Physiological Acoustics**

1. Concerned with the investigation and the dissemination of information about psychological and physiological responses to sound in humans and other species. Areas of interest include, but are not limited to:
2. Perception and perceptual organization of simple and complex sounds, including speech.

3. Anatomy and function of the auditory pathways, including all physical and biological responses to auditory stimulation.
4. Hearing disorders, hearing loss, and auditory prostheses.
5. Vibrotactile and vestibular sensation, and the interaction of hearing with other sensory modalities.
6. Developmental, aging, learning and plasticity effects in auditory function.
7. Theories and models of auditory processes.

**Signal Processing in Acoustics**

Signal processing is the acquisition and generation of signals and the extraction of information from signals. It is an important tool in all areas of acoustics. Using signal processing algorithms, acousticians are able to extract signals from noise, to compress information for more efficient storage or transmission, to perform active noise cancellation, etc. The continuing technological advances in high-speed processing and memory will open more avenues of investigation in acoustics.

**Speech Communication**

Concerned with the study of production, transmission, and perception of speech, including the following:

1. Speech production: physiology, mechanics, and acoustics of speech and voice production; models of speech production; first-language and second-language speech production.
2. Acoustic phonetics, including segmental and suprasegmental aspects of speech.
3. Speech perception: physiological and psychological aspects of speech perception; voice quality perception; models of speech perception; first-language, cross-language, and second-language speech perception.
4. Speech acquisition: acquisition of speech production and perception; first-language and second-language speech acquisition; models of speech acquisition.
5. Speech and hearing disorders: effects of speech production disorders on the articulation, acoustics, and perception of speech; effects of hearing impairment on speech perception and production; effects of aided hearing or speech (e.g., hearing aids, cochlear implants, electrolarynx) on speech perception and production.
6. Neuroscience of speech production and perception.

7. Speech intelligibility: perception and intelligibility of accented, disordered, and synthetic speech, and of speech degraded by noise or transmission channel; production and perception of speech in acoustically adverse environments.
8. Communicative aspects of singing: production and perception of phonetic or emotional content in song.
9. Speaker classification and speaker identity: articulatory, acoustic, and perceptual properties of speech linked to a speaker's sex, gender, age, and emotional state; sociophonetics; speaker, language, and dialect recognition by humans and machines; forensic voice comparison.
10. Audiovisual and other multimodal speech perception.
11. Speech processing and speech technology: signal processing of speech; speech synthesis; automatic speech recognition.

**Structural Acoustics and Vibration**

Structural Acoustics is the study of the interaction of vibrating structures with adjacent fluid along with the accompanying radiated or scattered sound. Structural Vibrations is the study of the linear and nonlinear vibration of structural components and waves in solid media. Applications of research outlined in the technical areas of SAV are found in a number of compelling and important applications that affect our health, safety, as well as the effectiveness of the products we engineer. Topics of interest include:

1. Prediction of structural acoustics and vibration using analytic techniques, numerical approaches (e.g., finite element methods, boundary element methods, and statistical energy analysis), and benchmark comparisons of predictions to experiments.
2. Inverse methods (e.g., estimating structural response from the measured sound field and the radiated/scattered field from structural measurements) including nearfield acoustical holography (NAH) /Statistically optimized NAH (SONAH) and finite element model updating (using measurements to update the FE model).
3. Control of structural acoustics and vibration using active control, passive control with optimization, treatments, and material selection, design methodology for vibration control, smart structural methods.
4. Advanced instrumentation for structural acoustics and vibration, including microphone/hydrophones and arrays, optical (e.g., laser Doppler velocimetry), accelerometers, geophones, and structural intensity sensors, and power harvesting.

5. Constitutive modeling and the influence of the material behavior on the response (e.g., piezoelectricity, friction, damping and viscoelasticity).
6. Waves in solid media.

**Underwater Acoustics**

1. Sound-wave phenomena in the ocean and seabed, with primary emphasis on the following topics:
2. Propagation phenomena: steady-state and transient solutions of the wave equation, including boundary effects, and seismoacoustics.
3. Scattering and reverberation: characterization and quantification.
4. Ambient noise: noise sources, spectra, directionality, and spatial/temporal fluctuations.
5. Signal processing and sonar algorithms, with emphasis on the detection of signals in noise and statistical analysis.

# THE INTERNATIONAL COMMISSION FOR ACOUSTICS


The **International Commission for Acoustics** (**ICA**) comprises 52 national acoustical societies around the world. 47 of these societies are full members of the ICA, and 5 are observers. Each of these national societies comprises individual members who work in the many different areas of acoustics. The membership of the individual national societies ranges from hundreds to thousands. Also, the ICA represents 8 international affiliated organizations involved directly with sound. All these affiliated organizations have their own membership and further expand the involvement of the ICA activities. The board of the ICA consisting of individuals representing the member societies is elected during the General Assembly which is held every third year in association with the International Congress on Acoustics.

The mission of the ICA is to promote international development and collaboration in all fields of acoustics including research, development, education, and standardization. Its vision is to be the reference point for the acoustic community, becoming more inclusive and proactive in our global outreach, increasing coordination and support for the growing international interest and activity in acoustics.

The means for the Commission to fulfill its mission are:

1. to maintain close contacts with national and regional acoustical societies and associations as well as other relevant professional Organizations and seek consensus on matters of mutual interest.
2. to provide information services on societies, congresses, symposia, etc., research and education organizations in the field of acoustics.
3. to take a pro-active role in coordinating the main international meetings within acoustics.
4. to convene the International Congresses on Acoustics every third year in accordance with the Commission's guidelines and to act as the International Advisory Committee for these congresses.
5. to sponsor or co-sponsor other local and special international conferences normally in close cooperation with national and/or regional organizations and to give financial support (grants or guarantees), as a grant to organizing committees for such meetings or as a travel grant to participants.

The ICA was instituted in 1951 as a subcommittee to the **International Union of Pure and Applied Physics** (IUPAP). New Statutes were adopted by the International Commission on Acoustics in Antwerp on 31 March 1996 and were approved by the IUPAP General Assembly in Uppsala Sweden on 20 September 1996. The new ICA held its first General Assembly on 25 June 1998, during the 16th Congress in Seattle where the By-laws of the new organization were adopted by the Member Societies. Since then, the organization became an independent Commission keeping links with IUPAP as an Affiliated Commission.

The ICA became an Affiliated Commission of the **International Union of Applied and Theoretical Mechanics** (IUTAM) in 1998 and a Scientific Associate to the International Council for Science ICSU, now International **Science Council** (ISC), in 2006. The ICA is legally based in Madrid (Spain).

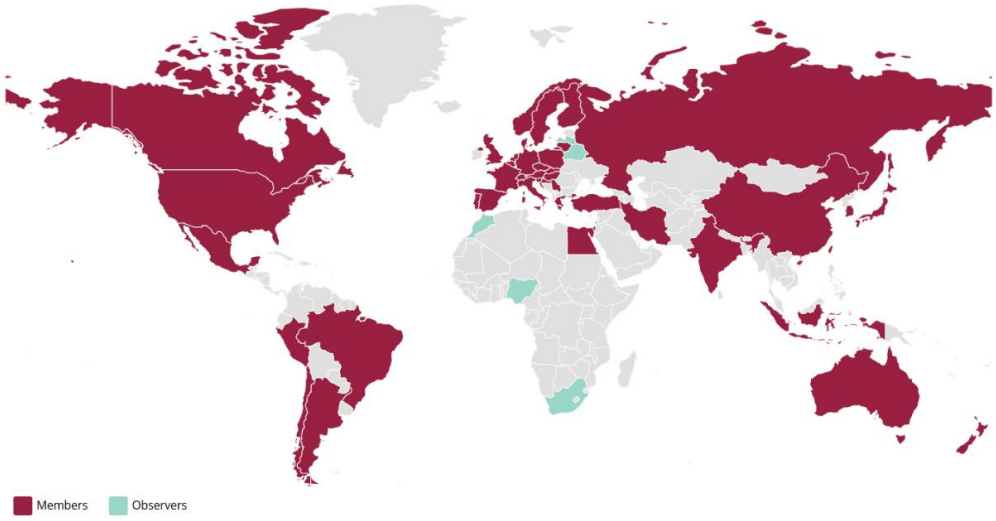
The Countries with their national Acoustical Societies/Institutes/Associations being Members and Observers of the ICA with full membership status, appear at the next table.

| **National Member Societies of the ICA** | | |
|---|---|---|
| Argentina | Australia | Austria |
| Belgium | Brazil | Canada |
| Chile | China | Croatia |
| Czechia | Denmark | Egypt |
| Finland | France | Germany |
| Greece | Hong Kong | Hungary |
| Iceland | India | Indonesia |
| Iran | Israel | Italy |
| Japan | Korea | Lithuania |
| Mexico | Netherlands | New Zealand |
| Norway | Peru | Poland |
| Portugal | Russia | Serbia |
| Singapore | Slovakia | Slovenia |
| Spain | Sweden | Switzerland |
| Taiwan | Turkey | USA (ASA) |
| USA (INCE-USA) | United Kingdom | |

| National Observer Societies of the ICA | | |
|---|---|---|
| Belarus | Latvia | Morocco |
| Nigeria | South Africa | |

| International Affiliate Organizations | | |
|---|---|---|
| Audio Engineering Society | European Acoustics Association | Federação/Federación Iberoamericana de Acústica |
| International Commission on Biological Effects of Noise | International Congress on Ultrasonics | International Institute Acoustics and Vibration |
| International Institute Noise Control Engineering | Western Pacific Acoustics Commission | |

Member Societies of the ICA



# HOW THE INTERNATIONAL YEAR OF SOUND STARTED

Here are some of the key events leading up to the declaration of 2020 as the International Year of Sound:

- **Year 2011**

The ICA Board agrees on the concept of an International Year of Sound before the end of the decade. The original idea was that the International Year of Sound should be declared by UNESCO and the United Nations, following all the procedures required.

- **Year 2012**

Initial planning started and preference was given for the year 2019 as year 2015 had already declared as the International Year of Light.

- **Year 2013**

The ICA General Assembly approved the plan for an International Year of Sound. A Planning Committee was formed to initiate discussions with UNESCO, following the same path as for the International Year of Light seeking ultimately the UN approval.

- **Year 2014**

Discussions with UNESCO started via Physical Sciences sector.

- **Year 2015**

A competition was launched for the design of the International Year of Sound logo. This competition was open to all student acousticians, who were student members of their national acoustical society.

The basic requirements for the logo design are that it should:

  - Be identifiable as related to sound

- Be clear when reproduced in a small size
- Be clear when reproduced in black and white

The evaluation was carried out by a jury consisting of members of the ICA Board and the winner was **Niels Hoekstra** of the Technical University in Eindhoven, Netherlands. Below the original logo is shown. Note that the year displayed is 2019. Later the year changed to 2020 and eventually to 2020+.


Discussions with UNESCO and ambassadors continued.

- **Year 2016**

Seed funding received from the founding supporters who were members of the ICA or affiliated organizations. Founding Members of the International Year of Sound are besides **ICA**, the **Acoustical Society of America** (ASA), the **European Acoustics Association** (EAA), the **International Institute of Acoustics and Vibration** (IIAV) and the **International Institute of Noise Control Engineering** (I-INCE).

- **Year 2017**

UNESCO decided on an International Year of Periodic Table 2019, so plans changed and the planning was for an International Year of Sound in 2020 (IYS 2020).

Same year, the **Resolution 39C/49 on "The Importance of Sound in Today's world, Promoting Best Practices"**, was approved by UNESCO Executive Board via the communication sector. This Resolution was promoted by the French

organization "**La Semaine du Son**" (LSdS) – english translation "The Week of Sound"

Recognizing the common goals of the ICA and LSdS to promote to the general public the importance of sound in our lives, the ICA board decided to establish collaboration with La Semaine du Son in order for the two bodies to join forces and fight together for the official proclamation of the International Year of Sound by UNESCO and the UN.

- **Year 2018**

Discussions with UNESCO and La Semaine du Son continued. The officials of UNESCO expressed interest for collaboration in the framework of an International Year of Sound. However, it became uncertain if the time would permit an official International Year of Sound to be declared by the United Nations for 2020

- **Year 2019**

The ICA board decided to organize the International Year of Sound in 2020, based on the UNESCO Resolution but outside the official umbrella of the United Nations. The abbreviation of the celebration would be **IYS 2020** and the moto "**Importance of Sound for Society and the World**".

La Semaine du Son agreed to collaborate with ICA under the new goal and a Memorandum of Understanding was signed between the two organizations for collaboration to create an International Year of Sound for 2020. To seal the cooperation between the two bodies, **Michael Taroudakis**, (President of the ICA) and **Marion Burgess** (Past President of the ICA) attended the opening of the 2019 edition of La Semain du Son, held at the amphitheater of UNESCO in Paris and the first events of La Semaine du Son 2019.

The ICA, under its capacity as organizer of the IYS 2020, established an administrative structure to coordinate the celebration, organize central events and mobilize the international affiliates and member societies to organize outreach events for the IYS 2020. A Steering Committee was formed chaired by Marion Burgess and Michael Taroudakis. It was decided that the opening

ceremony would be in Paris and **Prof. Jean-Dominique Polack**, a member of the ICA board and Professor at Sorbonne University, undertook the task to confirm the Grand Amphitheatre de Sorbonne as the host venue of the Opening Ceremony.

A website (www.sound2020.org) was created by **Michael Stinson**, former General Secretary of the ICA and started functioning well before 2020. Michael Stinson undertook the responsibility for the ongoing maintenance of the site.

The IYS 2020 Steering Committee decided the production of a film to promote the objectives of the IYS 2020, and the organization of a students' competition to bring the message of the IYS 2020 to the young generations and motivate them to participate in the celebration.

- **Year 2020**

Opening of the International Year of Sound in Paris. Due to the restrictions imposed by the Covid-19 pandemic, the International Year of Sound 2020 was extended to 2021 as **International Year of Sound 2020-2021 (IYS 2021+**).

# THE OBJECTIVES OF THE INTERNATIONAL YEAR OF SOUND

The objectives of the International Year of Sound as stated from the very beginning were tuned towards the coordination of international and national activities to achieve the following goals:

- Improve the public understanding, and, in particular, by young people, of the wide application and importance of sound in our daily life.
- Highlight the link between sound, music and culture.
- Identify and maintain soundscapes as part of cultural heritage.
- Highlight the importance of the use and benefits of sound while controlling the unwanted noise.
- Raise understanding of those in society with hearing or speech impairment.
- Promote the importance of protecting hearing – especially in the workplace and in recreational activities.
- Promote the use of sound as the basis for creating interest and enthusiasm for Science, Technology, Engineering and Mathematics (STEM).
- Increase worldwide education with activities targeted on science and technology for young people.
- Enhance international cooperation between learned societies, educational establishments and industry.
- Promote the important role that sound plays in medicine and the improvement that brings to the health of the community.
- Raise the knowledge of the applications and impact of sound underwater.
- Maintain these goals and achievements into the future beyond the International Year of Sound.

- Raise the awareness of the young people about the importance of sound in society.

An International Year of Sound aims to contribute significantly to fulfilling the mission of UNESCO in building peace and understanding around the world, sustainable development and intercultural dialogue through education, science, culture and communication.

# COLLABORATION WITH "LA SEMAINE DU SONE"

Founded in December 1998 by **Christian Hugonnet**, acoustic engineer and expert witness in court, the association **"La Semaine du Son"** (**The Week of Sound**) aims to introduce and raise awareness among the public and stakeholders of the importance of the quality of our sound environment. The association, which is an NGO (Non Government Organization) and official partner of **UNESCO**, brings together around more than two hundred active members, individuals and legal entities including representatives from universities, institutions, associations, cities, teachers, professionals and companies in the sound sectors, as well as sound enthusiasts.

Since 2004, "La Semaine du Son" has organized a "Week of Sound" in Paris in January each year called "The Week of Sound of UNESCO". These events focus on aspects of sound environment and aim to encourage cross-disciplinary discussion. The topics covered include hearing health, acoustics and the sound environment, recording and reproduction techniques, image and sound relationship, musical expression and teaching. The events encourage a national and international network of professionals from all sectors of sound and promotes the popularization of this knowledge in the wider community including schools. Today, 23 countries in the worlds have already organized an "Week of Sound of UNESCO" at different moments of the year.

The association La Semaine du Son adopted the **Charter of La Semaine du Son** at its general meeting on 3 June 2014. This charter specifies the objectives to be achieved in the five areas of sound and the best practices to be implemented. The

charter was presented on 18 January 2016, at UNESCO, in the presence of the Director-General, Irina Bokova, the ambassadors of France and Lebanon, and Dr. Shelly Chadha, head of the Deafness and Hearing Impairment Prevention Program at the World Health Organization (WHO). Resolution 39C/59, **"The importance of sound in today's world: promoting good practices"** was approved by the UNESCO Executive Board on 5 May 2017 and adopted on 31 October 2017 at the UNESCO General Conference.

On 25 October 2019, the resolution 207 EX/46 was unanimously adopted by the UNESCO Executive Board and the event **" The Week of Sound"** took the name of **" The Week of Sound of UNESCO".** This was officially relayed to the 195 member states at the initiative of their delegations to UNESCO and further promoted.

La Semaine du Son (LSdS) collaborated formally with the ICA in the initial plans for an International Year of Sound (IYS) that would be formally accepted by the UNESCO and the UN. Following the difficulties in achieving that goal the two organizations agreed to create the International Year of Sound (IYS 2020) that would refer to the Resolution 39C/59. Thus ICA and LSdS became partners in the organization of the IYS. Christian Hugonnet and Nicolas Louniss represented LSdS in the IYS Liaison Committee while, Jean Dominique Polack was member of the Liaison Committee representing both ICA and LSdS. Christian Hugonnet was present during the Opening Ceremony of the IYS and presented a warm greeting underlying the importance of sound and the significance of the collaboration between the ICA and LSdS. Following the agreement between LSdS and the ICA, activities of LSdS organized during 2020 and 2021 were associated with the IYS and vice versa.

# ORGANIZATIONAL STRUCTURE

The coordination and promotion of events was an important part of the International Year of Sound, to keep everyone informed about what is being done across the world as well as to publicize the events. In this regard, three Committees were formed, each one dedicated to specific tasks.

- **Steering Committee**
- **Coordinating Committee**
- **Liaison Committee**

Co-Coordinators of the IYS 2020+ and all the Committees were appointed by the ICA and were **Marion Burgess** (Australia), President of the ICA for the term 2013-2016 and **Michael Taroudakis** (Greece), President of the ICA for the term 2016-2019.

## Steering Committee

The ICA-IYS 2020+ Steering Committee was in place to coordinate all the activities of the IYS 2020+, which included events managed by ICA Member Societies and supporting Organizations. Members of this Committee were representatives from all the ICA Regions and many were current or previous members of the ICA Board.

**Jean-Dominique Polack (**France**)** assisted Marion Burgess and Michael Taroudakis in the coordination of the Steering Committee and in particular collaboration with La Semaine du Son.

**Europe/Africa:** Antonino Di Bella (Italy), Sergio Luzzi (Italy), Antonio-Perez Lopez (Spain), Martin Ochmann (Germany), Michael Vorländer (Germany).

**Asia/Pacific:** Akio Ando (Japan), Jeong-Guon Ih (Republic of Korea), Michel Rosmolen (Singapore)

**Americas:** Julio Cordioli (Brazil), Mark Hamilton (USA), Fausto E. Rodriguez-Manzo (Mexico), Mike Stinson (Canada)

## Coordinating Committee

The IYS 2020+ Coordinating Committee was comprised of representatives from each ICA Member Society and ICA International Affiliate. The mission of the coordinating committee was to discuss with the organizations and societies the events/activities that could be undertaken during 2020 (initially) and 2021 (eventually after the extension of the IYS 2020 to IYS 2020+) and that would help to promote one or more aspects of acoustics. The table below presents the composition of the Coordinating Committee.

| **Country (Society)** | **Representative** |
|---|---|
| Argentina (AdAA) | Gustavo Basso, Maria Andrea Farina, Nilda Vechiatti |
| Australia (AAS) | Marion Burgess |
| Austria (AAA) | Manfred Kaltenbacher |
| Belgium (ABAV) | Secretary of ABAV |
| Brazil (SOBRAC) | Stelamaris Rolla Bertoli |
| Canada (CAA) | Jérémie Voix |
| Chile (SOCHA) | Jorge P. Arenas |
| China (ASC) | Li Fenghua |
| Croatia (HAD) | Kristian Jambrošić |
| Czech Republic (CsAS) | Ondřej Jiříček |
| Denmark (DAS) | Lars Bramsløw |
| Finland (ASF) | Panu Maijala |

| | |
|---|---|
| France (SFA) | Jean-Dominique Polack |
| Germany (DEGA) | Brigitte Schulte-Fortkamp |
| Greece (HELINA) | Andreas Floros |
| Hong Kong (HKIOA) | C.W. Law |
| Hungary (OPAKFI) | Gergely Borsi |
| Iceland (IAS) | Kristín Ómarsdóttir |
| India (ASI) | Dinesh Kumar Aswal |
| Indonesia (AAVI) | Ardhana Putra |
| Iran (ISAV) | Milad Jahani |
| Italy (AIA) | Sergio Luzzi |
| Japan (ASJ) | Akio Ando |
| Morocco (SMA) | Mohammed Garoum |
| Netherlands (NAG) | Erik Roelofsen |
| New Zealand (ASNZ) | James Whitlock |
| Norway (NAS) | Alain Bradette |
| Poland (PTA) | Jerzy Wiciak |
| Portugal (SPA) | Vincent Debut, Jorge Patricio |
| Republic of Korea (ASK) | Sung-Hwan Shin |
| Serbia (ASY) | Miomir Mijić |
| Singapore (SAS) | Woon Siong Gan |
| Slovenia (SDA) | Mateja Dovjak |
| Spain (SEA) | Antonio Pedrero |
| Sweden (SAS) | Krister Larsson |

| | |
|---|---|
| Switzerland (SGA) | Kurt Eggenschwiler |
| Turkey (TAKDER) | Konca Saher |
| United Kingdom (IoA) | Paul Lepper |
| United States of America (ASA) | Keeta Jones |

| **International Affiliate** | **Representative** |
|---|---|
| United States of America (INCE) | Michael Bahtiarian |
| Audio Engineering Society (AES) | Magdalena Piotrowska |
| European Acoustics Association (EAA) | Manell Zakharia |
| IberoAmerican Federation of Acoustics (FIA) | Jorge Moreno Ruiz |
| Intl. Institute of Noise Control Engineering (I-INCE) | Patricia Davis |
| Intl. Congress of Ultrasound (ICU) | Sigrun Hirsekorn |
| Intl. Commission on Biological Effects of Sound (ICBEN) | Michael Smith |
| Intl. Institute of Acoustics and Vibration (IIAV) | Rupert Thornely-Taylor |

## Liaison Committee

The coordinators of the International Year of Sound worked closely with La Semaine du Son (LSdS) with the goal to expand the opportunities for joint activities of LSdS as part of the IYS 2020+. A Liaison Committee was formed and included **Marion Burgess** and **Michael Taroudakis,** representing the ICA and **Christian Hugonnet** and **Nicolas Louniss** representing LSdS. **Jean Dominique Polack** was member of the Liaison Committee representing both ICA and LSdS.

The main work of the Liaison committee was during the opening of the IYS 2020+ and the 2020 Week of Sound in Paris.

# COMMUNICATION

## The IYS 2020+ Website

In order that the information, updates and resources of the IYS 2020+ were available to everybody a website was developed and maintained by **Michael Stinson**, former Secretary General of the ICA. The website, www.sound2020.org which is still functioning, was structured in such a way that interested visitors could be informed not only on the upcoming events, but also about the history of the IYS 2020+, and its organizational structure. In addition, visitors could learn about the character of sound, the relationship of acoustics with other disciplines and many applications of sound and noise related issues in our everyday life.

Links to the main events organized by the IYS 2020+ Steering Committee such as the opening ceremony and the IYS 2020+ products such as the film "Sounds of our Life" were provided in the IYS 2020+ website. The website hosted the details of the various events held by the national societies and allied groups along with educational material developed during the time of the IYS 2020+. Thus, the IYS 2020+ website was an accessible stand-alone platform bringing all the necessary information on the importance of sound to the general audience.

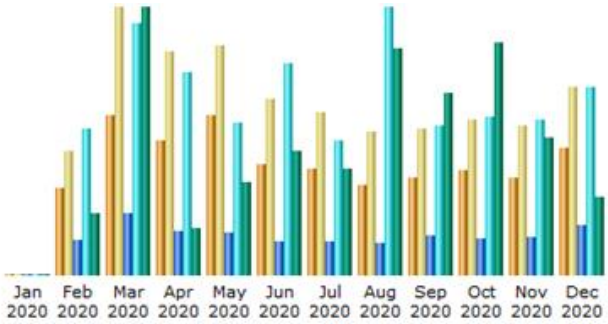
A "Top Story" page regularly hosted articles from members of the IYS 2020+ Steering Committee and ICA partners. This helped to important international days associated in some manner with sound. Summaries of the on-going activities for IYS were subjects of the Top Stories as well. A selection of these "Top Stories" appears in the "Publications" section of this report.

The most extensive was the section devoted to the IYS 2020+ events. Announcements of the events were requested from their organizers and posted to the website after reviewing their adherence to the objectives of the IYS 2020+. Links to the websites of the individual events provided the visitors of the IYS 2020+ website with additional information. The visitor could filter the information available by country or by past or forthcoming events.

Detailed reference to the Student Competition was made with updated information on its realization and final outcome. The IYS 2020+ website was, in fact, the official platform for the participation of the students in the competition.

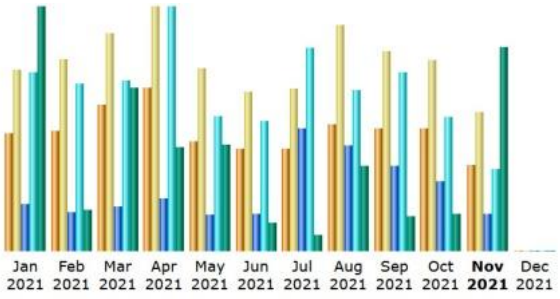
The website has been pivotal to the success of the IYS 2020+. The number of visits to the site reached a high of 8,880 for March 2020 and this visitation rate continued at between 4,000 and 6,000 visits per month throughout 2020 and 2021.


**Snapshot of the home page from the website**




| Month | Unique visitors | Number of visits | Pages | Hits | Bandwidth |
|---|---|---|---|---|---|
| Jan 2020 | 0 | 0 | 0 | 0 | 0 |
| Feb 2020 | 2,864 | 4,135 | 16,460 | 68,085 | 59.87 GB |
| Mar 2020 | 5,295 | 8,880 | 29,111 | 117,444 | 260.10 GB |
| Apr 2020 | 4,472 | 7,430 | 20,178 | 94,632 | 45.14 GB |
| May 2020 | 5,280 | 7,620 | 19,509 | 70,993 | 89.69 GB |
| Jun 2020 | 3,694 | 5,847 | 15,915 | 99,031 | 121.20 GB |
| Jul 2020 | 3,539 | 5,405 | 15,298 | 63,072 | 103.54 GB |
| Aug 2020 | 2,983 | 4,764 | 15,091 | 125,001 | 220.45 GB |
| Sep 2020 | 3,221 | 4,840 | 18,510 | 69,627 | 177.27 GB |
| Oct 2020 | 3,470 | 5,176 | 17,023 | 73,923 | 226.53 GB |
| Nov 2020 | 3,240 | 4,945 | 17,677 | 72,474 | 134.31 GB |
| Dec 2020 | 4,212 | 6,256 | 23,152 | 87,614 | 75.25 GB |
| Total | 42,270 | 65,298 | 207,924 | 941,896 | 1513.35 GB |

**Record of visits to the website during 2020**




| Month | Unique visitors | Number of visits | Pages | Hits | Bandwidth |
|---|---|---|---|---|---|
| Jan 2021 | 2,787 | 4,328 | 15,500 | 58,704 | 236.09 GB |
| Feb 2021 | 2,876 | 4,592 | 12,572 | 54,857 | 40.61 GB |
| Mar 2021 | 3,477 | 5,190 | 14,624 | 55,705 | 158.70 GB |
| Apr 2021 | 3,889 | 5,824 | 17,090 | 80,162 | 100.96 GB |
| May 2021 | 2,612 | 4,358 | 11,838 | 44,400 | 102.51 GB |
| Jun 2021 | 2,429 | 3,795 | 12,046 | 42,470 | 27.37 GB |
| Jul 2021 | 2,430 | 3,874 | 40,475 | 66,502 | 15.19 GB |
| Aug 2021 | 3,019 | 5,387 | 34,299 | 52,962 | 82.10 GB |
| Sep 2021 | 2,940 | 4,788 | 27,992 | 58,350 | 33.14 GB |
| Oct 2021 | 2,925 | 4,530 | 23,122 | 43,705 | 36.56 GB |
| **Nov 2021** | 2,068 | 3,310 | 12,157 | 26,967 | 197.97 GB |
| Dec 2021 | 0 | 0 | 0 | 0 | 0 |
| Total | 31,452 | 49,976 | 221,715 | 584,784 | 1.01 TB |

**Record of visits to the website up to November 2021**

## Other Communication Means

Information regarding the IYS 2020+ and all communication between the Steering Committee and partners was facilitated through a continuous exchange of messages and announcements. To optimize this process, several mailing lists were established, tailored to the recipients' roles and responsibilities within the organization. The IYS 2020+ co-coordinators and Michael Stinson were in continuous contact to ensure the proper flow of information

In addition, the ICA Newsletter, which was posted on the ICA website and distributed to member societies, contained information and updates of the celebration, and was considered an additional means of communication for the IYS 2020+.

# CENTRALLY ORGANIZED IYS 2020+ ACTIVITIES

## Opening Ceremony

**Grand Amphithéâtre of Sorbonne University**

The International Year of Sound 2020-2021 was formally launched during a spectacular opening ceremony in the Grand **Amphithéâtre of Sorbonne University** on **31 January 2020**, just before the outbreak of the pandemic. This monumental amphitheatre was inaugurated in 1889 and was registered as a historic monument in 1975. It was indeed a fitting location for the opening of the Year of Sound and the IYS 2020+ organization is grateful to **Prof. Jean-Dominique Polack** (co-organizer) who was instrumental in the arrangements for the use of this venue.

The event was broadcasted with live streaming (Courtesy of Sorbonne University), and many people around the globe were able to follow the ceremony.

The moderator for the opening ceremony was **Prof. Michael Taroudakis**, Past President of the ICA and co-coordinator of the IYS 2020+. He commenced his welcome in French, as a respect to the location in Paris, then repeated in English.

**Prof. Michael Taroudakis**

On behalf of the President of Sorbonne University, **Prof. Nathalie Drach-Temam**, Vice-President Research of Sorbonne University, welcomed all to the Grand Amphithéâtre and congratulated the ICA on initiating the International Year of Sound and bringing it to fruition in 2020.

**Prof. Nathalie Drach-Teman**

Then followed **Prof. Mark Hamilton**, President of the ICA during the years of the IYS 2020+, who thanked the efforts of his predecessors and provided an overview of the mission and activities of the ICA.

**Prof. Mark Hamilton**

**Christian Hugonnet**, President of La Semaine du Son (LSdS), explained the five primary topics for weeks of sound worldwide. He also explained the achievements of LSdS not just in France but around the world, the endorsement of UNESCO and of the agreement between LSdS and the ICA regarding the IYS 2020+.

**Prof. Vincent Gibiat** President, of Société Française d'Acoustique (SFA), a member society of the ICA, advised that the SFA was enthusiastic about the IYS 2020+ and was honored that the opening was being held in Paris.

**Prof. Michel Spiro** President, of th International Union of Pure and Applied Physics (IUPAP), followed and emphasized the support of the Union for the initiative of the ICA.

**Christian Hugonnet**

**Prof. Vincent Gibiat**

**Prof. Michel Spiro**

**Dr. Shelly Chadha** from the World Health Organization (WHO) spoke in her video presentation on the opportunities that the IYS 2020+ would offer to highlight the importance of preserving hearing.


**Dr. Shelly Chadha (from her video presentation)**

A musical interlude, sponsored by the **French Acoustical Society (SFA),** followed these welcomes. **Maxime Perrin** and **Jean Brice Godet** produced an excellent fusion of their two instruments: piano accordion and bass-clarinet. The applause indicated the appreciation of the audience.

**Maxime Perrin** and **Jean Brice Godet**

Following this interlude, **Marion Burgess** (former President of the ICA and IYS 2020+ co-coordinator) spoke on the "**Importance of Sound in our World**". This presentation highlighted how sound in some form influences all parts of our life. She explained that all sound starts from vibration and that our human hearing range is just a small part of the spectrum. Within our hearing range there is the need to ensure that sound does not become annoying or excess noise. Below this

range is infrasound and above is ultrasound which is a very powerful tool with wide ranging applications. She emphasized that the study of sound is a truly multidisciplinary topic.

**Marion Burgess**

**Prof. Jean-Dominique Polack** (IYS 2020+ co-organizer) then provided a summary of the activities planned for the IYS 2020+. He explained the centrally organised activities included the opening, a film and an international student competition. He added that all the ICA member organizations had been mobilized to host special outreach activities during 2020 that would be announced in the IYS 2020+ website (www.sound2020.org). At the time of the opening ceremony there were 80 separate events listed with more being added every day. Many freely available resources would be available during and after the closing of the year as one of the many outcomes of the year.


**Prof. Jean-Dominique Polack**

After these presentations, the first showing of the film “Sounds of our Life” then followed. This 9-minute film, produced by the International Commission for Acoustics as a product of the International Year of Sound with sponsorship from the y **International Institute of Noise Control Engineering (I-INCE)** was directed by **Antonio Fischetti.** The film aims to highlight the importance of sound in all aspects of our life. More details of this film are mentioned in the corresponding section of this report.

The final segment of the opening was a ‘concert’ by “Révolutions Vocales” sponsored by **Acoustics First Corporation**. In the form of a burlesque conference, Révolutions Vocales presented multiple compositions for the voice written since the 1960’s. The three characters embarked upon vocal and theatrical contests which slipped into the interpretation of works reflecting an unprecedented range of vocal emotions and productions. These shed light on the scores and effectively analysed the various styles. For many present this was an unexpected ‘concert’ but a wonderful way to show the power of the human voice and of communication. The round of applause demonstrated the appreciation of the audience.

**Révolutions Vocales.**
*Soprano, actress :* ***Irène BOURDAT***
*Mezzo soprano, actress:* ***Nathalie DUONG***
*Baritone, actif, translator:* ***Jean-Michel SERENI***

The ceremony was attended among others by many members of the IYS 2020+ Steering Committee, representatives of the ICA Member Societies and International Affiliates, members of Sorbonne University and by many French acousticians. It was also transmitted by live video streaming offered by Sorbonne University.

In conclusion, Michael Taroudakis thanked those involved with the opening ceremony as well as the various organizations who had provided kind support to allow this event to occur. He also thanked those who had sponsored parts of the ceremony and the sponsors for the IYS 2020+ as without their support the year would not be occurring. He sincerely thanked the international audience who had gathered from around the world in the Grand Amphithéâtre for this opening of the IYS 2020+. He advised that the event had been live-streamed and that soon an edited version would be available from the website.

This edited version (Courtesy of Sorbonne University) is now available on the following site :

**https://sorbonne-universite.cloud.panopto.eu/Panopto/Pages/Viewer.aspx?tid=3228cd7f-38a1-47db-9575-ab6000e8889f**


From left to right with their position at the time of the opening of the IYS 2020+ in 2020 **Sergio Luzzi,** organiser of the student competition**; Christian Hugonnet,** President LSdS**; Michael Vorlander,** Former President ICA**; Marion Burgess,** Former President ICA**; Michael Taroudakis,** Past President ICA**; Mark Hamilton,** President ICA**, Jean-Dominique Polack,** Board Member ICA

The early attendees of the Opening Ceremony could experience the two installations in the foyer of multi-zone sound field reproduction. They were created by researchers from the Institute of Sound and Vibration Research (ISVR – University of Southampton, UK) and the installation arranged by the UK Acoustics Network (UKAN).


**One of the two installations, with students from the University of Southampton who had been responsible for their development**

## Program

**1900-1950 Welcome and Introductions**

| | |
|---|---|
| *Prof. Jean Chambaz* | *President, Sorbonne Université* |
| *Prof. Mark Hamilton* | *President, International Commission for Acoustics* |
| *Christian Hugonnet* | *President, La Semaine du Son* |
| *Prof. Vincent Gibiat* | *President, Société Française d'Acoustique* |
| *Prof. Michel Spiro* | *President, International Union of Pure and Applied Physics* |
| *Dr. Shelly Chanda* | *World Health Organization Representative* |

**1950-2000 Musical Interlude** ***Maxime Perrin and Samuel Thézé*** *Sponsored by SFA*

**2000-2020 "Importance of Sound in our World"** ***Marion Burgess, IYS 2020 co-organizer***

**2020-2030 Activities-IYS 2020** ***Prof. Jean-Dominique Polack, IYS 2020 co-organizer***

**2030-2040 Film : "Sounds of our Life"** *Sponsored by I-INCE*

**2040-2120 Concert : "Révolutions Vocales"** ***Compagnie VocAliques***
*Sponsored by Acoustics First*

**Moderator:** ***Prof. Michael Taroudakis, IYS 2020 co-organizer***

**The program of the opening ceremony.**

**Sponsors of the Opening Ceremony**

SORBONNE UNIVERSITÉ

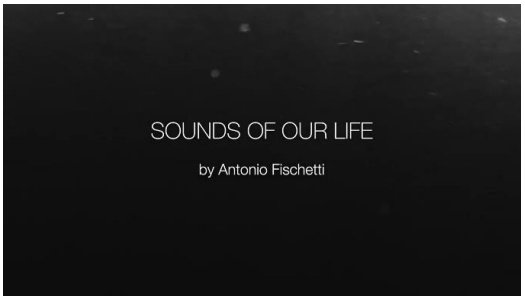
AcousticsFirst CORPORATION

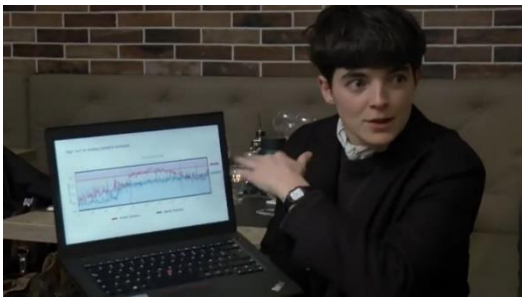
Sfa

## The film "Sounds of our Life”

The first centrally produced product of the IYS 2020+ was the film entitled “Sounds of our life”. It was produced by ICA especially for the IYS 2020+, was directed by **Antonio Fischetti** and sponsored by the **International Institute of Noise Control Engineering (I-INCE)**. The film outlines the various uses of sound in our lives, giving emphasis to its proper exploitation for communication, education and entertainment.

The first showing of the film “Sounds of our Life” was on 31 January 2020 during the Opening Ceremony of the IYS 2020+. Antonio Fischetti, the film director, presented the objectives of the production. The film has a duration of 9 minutes. A 2-minute shortened version was also produced.




**Scenes from the film**

Details of the various versions of the film and terms for its use can be found at https://www.sound2020.org/resources/online/

See also Annex II of this report.

**Antonio Fischetti**

## Student Competition

The main part of the text is provided by **Sergio Luzzi** and his team who coordinated the competition.

### Overview

During the school year 2020-21 and 2021-22, inspired by the motto of the IYS 2020+, students from all over the world were invited to interpret what this meant to them via images or lyrics for the song "**The sound of the world**".

Despite the pandemic restrictions, the competition has been successful, attracted many participants and involved students from many schools. The students addressed and actively involved were approximately 15.000 from 80 schools in 16 countries.

More than 650 drawings were collected in the competition category I which was for primary schools and 150 lyrics of the song for category II for middle and secondary schools.

The final results of the competition and the final version of the videoclip of the song composed by students of several countries have been presented as a part of the special IYS 2020+ closing session at Forum Acusticum 2023 Congress.

### Details of the Organization

The decision to hold a Student Competition was taken by the ICA Board during its meeting in Aachen in 2019, following the proposal from the IYS Steering Committee. The implementation was assigned to **Sergio Luzzi** and his team following their success with a similar competition carried out by the European Acoustics Association for the International Noise Awareness Day 2017.

The IYS 2020+ Competition Office was established in Italy and members of ICA were asked to nominate a national representative for managing the competition tasks in their countries or regions.

Several on-line meetings were held to address and solve the challenges created by the restrictions during the time of the pandemic. These restrictions stopped the students gathering in classes to prepare the entries for the competition. The promotion and management of the competition also took place mainly through video conferences. And in a similar manner to all undertakings during the time, many schools embraced the challenge to find new and creative ways to engage the children.

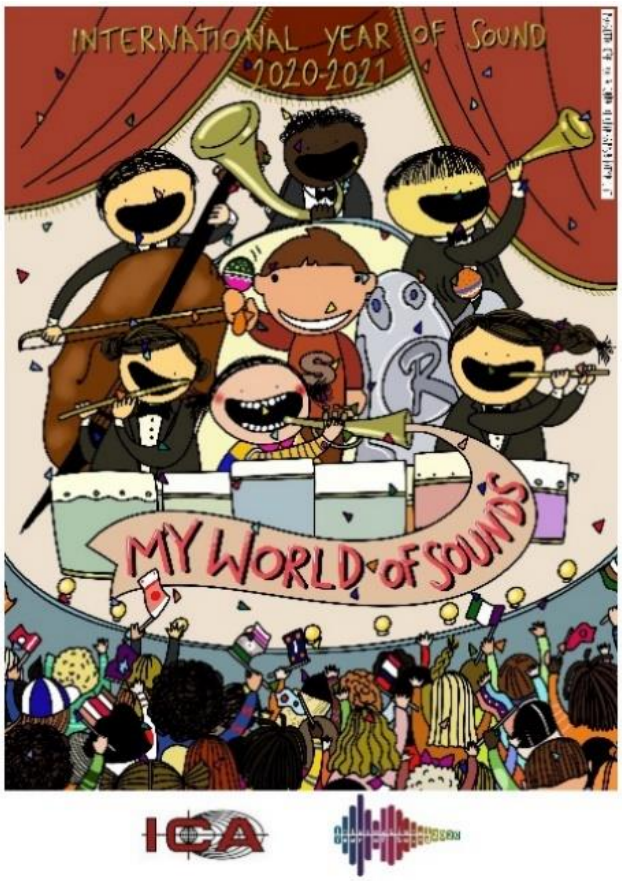
The original deadlines were postponed as the IYS 2020 became IYS 2020+. For schools in many regions this meant the competition extended into the school year of 2021-2022.


**Screenshot of an on linemeeting involving the members of the IYS 2020+ Competition Central Office to promote the student competition is shown.**

During competition, the IYS 2020+ Competition Central Office:

- wrote the competition regulation,
- composed and presented the videos of the music for “Sounds of our world",
- promoted the competition on IYS website sound2020.org and in social networks, producing original promotional video, posts, etc.,
- coordinated activities, directly and via National Representatives,

- archived the materials received,
- organized the evaluation process,
- produced the videoclip of the documentary featuring the entries.




**Poster of the IYS 2020+ Student Competition "My world of sounds".**

## Competition and participants

The IYS 2020+ Student Competition addressed two categories of students:

- Students of primary and middle schools (from 5 to 12 years old) were asked to produce a graphic work (drawing, painting, collage, computer art, comic strip, etc.....) inspired by the motto of IYS 2020+ “Importance

of Sound for Society and the World" and by melody and refrain of the song "We are the sounds of our world".

- Students of secondary schools (from 13 to 18 years old) were asked to write the lyrics of the song "We are the sounds of our world", whose music and refrain had been composed by **Cesare Manganelli**, a young musician contacted by the Central Office; the required format was a stanza of 4 verses (in mother language or in English language), following the composed metric and fitting with the refrain of the song.

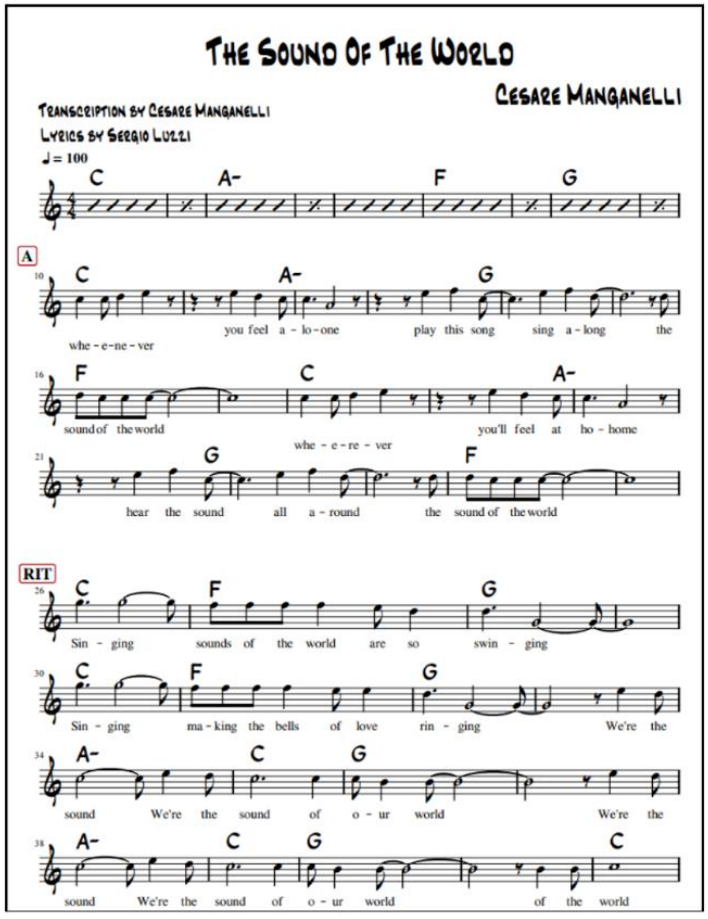
In the competition for students of category I (primary schools) more than 650 items were sent to National Representatives. In the competition for students of category II (middle and secondary schools) more than 50 items were sent to National Representatives. Overall contributions were received from 39 countries. Students actively involved in the competition were approximately 15.000 .


**Selection of drawings made by participants (cat. I)**

The musical theme of the song was composed by the Italian young musician **Cesare Manganelli**. The text of the refrain was composed by the Central Office. From sound2020.org website it was possible to download the backing track on

which the students composed the verses of the song. The backing track was also used to play and sing along to the many versions of the song, the recordings of which were then sent to the Central Office and assembled into the video documentary.

Many audio or video recordings of student groups singing their own verses and playing the melody of the song on different instruments were also sent directly to the Central Office. A selection of these materials became part of the official videoclip of the song (https://www.youtube.com/watch?v=tsytfjWAffc), and of the documentary titled “Drawing and singing the sound of the world” (https://www.youtube.com/watch?v=XYKqdUEFwVA ).




**Manuscript of the song for the students of category II**

**Screen shots of recorded materials (video, cat. II)**

## Juries, winners, awards

The IYS 2020+ Student Competition selection of winners was made by two juries: the experts' jury and the people's jury.

The expert's jury was composed of members of ICA IYS 2020+ Steering Committee. They gave preferences with scores from 1 to 5 in a questionnaire that considered several criteria for both drawings and stanzas.

The popular jury was based on social networks: preferences were given (one person = one vote) by putting 'likes' on the anonymous items uploaded on Facebook and Linkedin IYS 2020+ dedicated pages. The outcome from the popular jury was excellent: overall 4833 likes for the category I and 5170 likes for the category II entries.

The final ranking was generated by a weighted combination of both the preferences expressed by expert jury and popular jury. Next figure presents a summary of the final ranking for category I and for category II. Special mentions were given by the expert jury in both categories. In category I, a special mention

was given to interactive materials provided with the drawings, in particular to an app that turns noise into sounds. In category II the special mention was assigned to authors of video/audio material provided with the stanzas.

Category I – Primary Schools - DRAWINGS

| Ranking | Country | Overall score [1-39]* | Award** |
|---|---|---|---|
| 1 | Turkey | 37.3 | 300 € |
| 2 | Chile | 35.4 | 200 € |
| 3 | Hong Kong | 35.1 | 100 € |

* 39 finalist items
** for books and school supplies

Çekmeköy Final Middle School
1)

Colegio Melipilla
2)

Ching Chung Hau Po Woon Primary School
3)

IC "Puccini"
Florence-Italy
1)

THE SOUND OF THE WORLD
Wherever , wonderful sound
Storm and rain, waves and falls
the sound of the world
Footsteps on the brown leaves
chirping birds, river and woods ...
the sound of the world
Singing! Sound of the world are so swinging!
Singing! Making the bells of love ringing!
We are the sound, we are the sound of our world! (2 volte)
Remember, all magic sounds,
you had heard and loved these
the sounds of the world.
Oh listen! My heart beating
you can find in your mind
the sound of the world.
Singing! Sound of the world are so swinging!
Singing! Making the bells of love ringing!
We are the sound, we are the sound of our world! (2 volte)

Category II – Middle and Secondary schools - LYRICS

| Ranking | Country | Overall score [1-33]* | Award** |
|---|---|---|---|
| 1 | Italy - Spain | 31.5 – 31.5 | 300 € each |
| | | | |
| 3 | Spain | 30.6 | 100 € |

* 33 finalist items
** for books and school supplies

Institut Escola Salvador Vilarrasa
1)

Each small voice can, change the world
each small voice, is the sound, the sound of the world
Each animal, person
have different mind , they are the sound, the sound of the world
Each sound is unique, take care of them
because not disappear, the sound of the world
Each music are different
and has many, types to sing, the sound of the world

I.E.S. La Merced
3)

Together, raising our voices
Loud and clear, hear them with, the sound of the world
Words of love, are shields to our sorrows
Healing sounds sing them with, the sound of the world!

**Summary of the final rankings**

## Noisella Short Stories

In addition to the Student Competition, for the International Year of Sound, two series, for a total of 11 cartoons titled "Noisella teaches acoustics" and "Hearing sounds with Noisella" were produced for both the International Day of Sound and the IYS 2020+. These are freely available via YouTube on the link to "Noisella Short Stories".


**“The Noisella’s Adventures” cartoon.**

In the various episodes of the series, Noisella, together with her cat Marisa and her friends, illustrate some basic concepts concerning acoustics. The material produced is aimed at raising awareness among children and young people on the following topics: the concept of sound, acoustic propagation in indoor and outdoor spaces, the difference between sound and noise, the effects of noise on health, the concept of prevention, the "quiet diet," the meaning of soundscapes (urban and non-urban), and the role of the acoustic designer.

The project was produced by Vie en.ro. se. Ingegneria with the support of the **Head Genuit Foundation** and is distributed on the dedicated YouTube channel "The Noisella's Adventures" :

(https://www.youtube.com/channel/UCLtjS0aBKeXURsGqm8_0J9g).

IYS 2020+ National representatives and National Societies of Acoustics (i.e. AIA in Italy and DEGA in Germany) subtitled in their respective languages on the cartoon series.

In conclusion, the International Year of Sound Student Competition provided important professional and emotional experience for those who have worked in the Steering Committee and the IYS 2020+ Competition Central Office, like the authors of this

article. We hope that the memory of this beautiful initiative will remain as a source of inspiration for other projects aimed at raising awareness of the importance of sound for communities and especially for young people.

The two videos (the song videoclip and the documentary and the series of cartoons) were made with the fundamental support given by the **Head-Genuit-Foundation** to whom the authors address their gratitude on behalf of the IYS 2020+ Steering Committee and of the Competition Central Office.

## The winners

### Drawings

**1st Place**

**Turkey (Istanbul) Neslÿ Ergün – School: Çekmeköy Final Middle School**

**2nd Place**

**Chile (Melipilla) – Laura Isabel Paredes Catalan – School: Colegio Melipilla**

**3rd Place**

**Hong Kong (Tung Chung) — Cheung Han Ching – School: Ching Chung Hau Po Woom**

## Stanzas

**1st Place (tie)**

**Italy (Florence) – class 3°E – School: IC "Puccini"**

### THE SOUND OF THE WORLD

Wherever, wonderful sound

Storm and rain, waves and falls

the sound of the world

Singing! Sound of the world are so swinging!

Singing! Making the bells of love ringing!

We are the sound, we are the sound of our world! (2 volte)

Remember, all magic sounds,

you had heard and loved these

the sounds of the world.

Oh listen! My heart beating

you can find in your mind

the sound of the world.

Singing! Sound of the world are so swinging!

Singing! Making the bells of love ringing!

We are the sound, we are the sound of our world! (2 volte)

**1st Place (tie)**

**Spain (Besalù) – Roger Cortés, Laia Cuesta, and Coral Coll – School: Institut Escola Salvador Vilarrasa**

Each small voice can, change the world

each small voice, is the sound, the sound of the world

Each animal, person,

have different mind, they are the sound, the sound of the world

Each sound is unique, take care of them

because not disappear, the sound of the world

Each music are different

and has many, types to sing, the sound of the world

**3rd Place**

**Spain (Valladolid) – Leader Alba Sánchez Domínguez – Class 3rd D/E.S.O. – School: I.E.S. La Merced**

Together, raising our voices

Loud and clear, hear them with, the sound of the world

Words of love, are shields to our sorrows

Healing sounds sing them with, the sound of the world!

# ACTIVITIES FROM ICA MEMBERS AND PARTNERS

The structure of the IYS 2020+ included the centrally organized events previously described but from the outset the intention was to involve the ICA member societies and affiliated organizations to initiate their own regional activities. The organization of events for the IYS 2020+ was open to other organizations that wished to contribute to the celebration. The planning for these events started before the opening even though there was beginning to be the hint of a major pandemic. Unfortunately, soon after the opening of the IYS 2020+, in February 2020, the pandemic was declared and the restrictions on movements and gatherings meant that those planned for early in the year could not be held. However, the enthusiasm for the IYS 2020+ was maintained and modern technology utilized. Many novel and innovative activities replaced some of the planned events while others utilized platforms such as zoom to host a wide range of events. Overall, approximately 200 events identified as related to the IYS 2020+ were held across 31 countries.

This Section presents events which have been officially recognized by the IYS 2020+ and were organized by members of the ICA, national acoustical societies and international affiliates, as well as allied organizations.

The events are presented according to the host country in alphabetical order. Next to the country name is the flag of the country and the logo of the national acoustical society. Note that the Acoustical Societies of Argentina, Germany, Italy, Japan, Singapore, Slovenia and the USA provided the Editors with a consolidated report on their activities.

The editors are grateful to these societies for their contribution to the compilation of this report. The reports received from these societies have been included in this Section with minimal editing.

All the other events are listed following their appearance in the website under the condition that they were eventually held. Additional events associated with the IYS were scheduled in India, Ireland, Mexico, and The Netherlands. However, most of these events were cancelled due to the Covid-19 pandemic or were postponed to a later day without any further information.

# ARGENTINA

## Report provided by the Acoustical Society of Argentina (AAA)

The actions that aim to relate noise and sound to society in Argentina have a long tradition. Since the 1970s, the Asociación de Acústicos Argentinos has periodically carried out diverse activities related to acoustic environment care, hearing conservation, and highlighting the problems and harm caused by noise exposure. In 2013, Argentina hosted its inaugural Week of Sound, aligning with the French Organization “La Semaine du Son” initiative, which sought to foster dialogue between experts and the public regarding noise and its impact. In the local context, the guidelines of the International Year of Sound 2020+ naturally complemented these existing activities. However, like the rest of the world, Argentina’s IYS 2020+ faced disruptions due to the COVID-19 pandemic. Many of the planned activities were either suspended or shifted to online platforms. In this context, the International Competition "My world of sounds" provided a platform for primary and secondary students, serving as a meeting point for different actors in the post-confinement context.

**General activities**

Among the events held in our country in line with the objectives of the IYS2020+, we can highlight the V Music and Education Meeting of MOMUSI (Movimiento de Música para niños y niñas) in the Province of San Juan. The event, held in November 2020, was organized by the Departamento de Música and the Facultad de Filosofía, Humanidades y Artes (FFHA) of the Universidad Nacional de San Juan (UNSJ), along with the Área de Supervisión de Educación Musical of the Ministry of Education of the Province. The objective of the movement is to work actively in the recovery of sounds, voices, songs and games dedicated to childhood. The event included presentations,

discussion tables, and workshops aimed at the general public and, in particular, at teachers, to guide actions to face the challenges of the complex scenario of the pandemic.

The Museo de La Plata of the Facultad de Ciencias Naturales y Museo of the Universidad Nacional de La Plata organized a series of six presentations broadcast on social networks from November 2020 to July 2021. These presentations focused on the sounds of nature and native sounds. The didactic sequence on the sounds of nature covered four subjects: dinosaurs, the blue whale, the thrush, and insects. The sequences on native sounds included topics such as whistling vessels, archaeological materials from Pre-Columbian Cultures, and the Kultrún, a Mapuche ceremonial drum."

**International Competition "My world of sounds"**

Elementary school students between the ages of 5 and 12 participated in the contest. While most of the works were created individually, some were collaborative group projects. The participants presented handmade drawings and collages inspired by the IYS 2020+ motto 'Importance of sound for society and the world'. These artworks reflected their perception of sound in their environment.

The works addressed a variety of topics, including the sounds of the city, sounds at home, technology, and music.

The contest was a meeting point for the educational and family environment, since both the school and the families were involved in the activity. Personal experiences were expressed, awareness of the sounds of the environment was raised, and the importance of health care and the environment could be put into words and drawings. Among the works presented from all over the country, the jury selected seven finalists.


**Drawings from the participants.**

## Final comments

The International Year of Sound 2020-2021 initiative was directly linked to the scientific dissemination actions carried out in Argentina. The International Competition "My world of sounds" served to channel personal experiences resulting from the pandemic, confinement and post-confinement. In the future, the intention is to continue promoting similar initiatives at the local level.

# AUSTRALIA

**October 2018-October 2021**

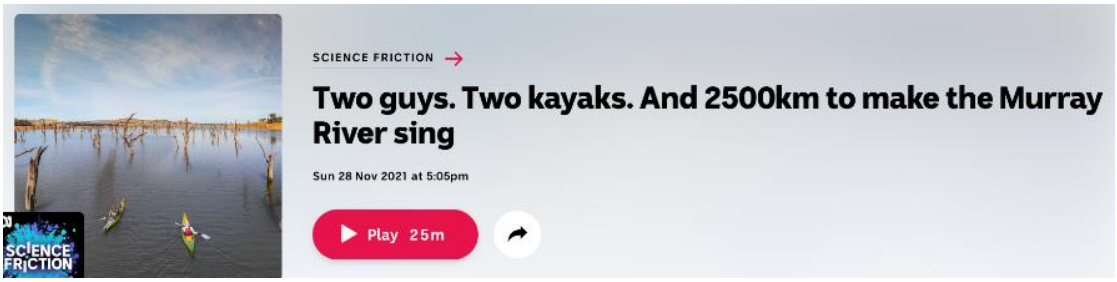
**Helping the River Sing – an innovative approach to communicating river health**

The 'helping the river sing' project, showcased the beauty of the famous Murray River, and helped re-frame the discussion about the waterway's health using sound. The project created an aural fingerprint of the river by sonifying publicly available data for sites along the Murray – like flow rate, water temperature, salinity and depth – for the first time.

Over the Australian summer, scientists and audio specialists teamed up to travel the entire length of the river by kayak, starting in Kosciuszko National Park in southeast NSW and ending in South Australia. The imagery and natural sounds collected on this trip were combined with the "aural fingerprint" to create an interactive museum exhibition. The work aimed to bring the river to the public. The project showcased the river's central role in regional Australia and helped people all over Australia connect with this extraordinary waterway.

The Helping the River Sing project was a collaboration between the ANU Fenner School of Environment Society and the ANU School of Music.

In December 2021, the ABC, the national broadcaster, in collaboration with Jordyn Beazley, has created a podcast on the project accessible at https://www.abc.net.au/listen/programs/sciencefriction/murray-river-sound-sonification/13647928




**21 March 2020**

**Translating Ambiance: Designing Sound, Light and Air in Urban Spaces**

Ambiance design creates small, localized environments that provide sites of restoration and experiential difference from the everyday noises and hubbub of the city. The event that was held in Melbourne and was organized by the Design Week, the M-Pavilion and the Australian Research Council included a curated set of conversations running concurrently with an in-situ installation. A talk from sound-artist Jordan Lacey, and Shanti Sumartojo (MADA), on the meaning of ambiance in a design and architecture context was followed by a live ambiance installation by Jordan Lacey, Philip Samartzis, Polly Stanton and Malte Wagenfeld. This event was funded and curated by Jordan Lacey (DECRA Fellow, School of Art / School of Design, RMIT University).

**2 September 2020**

**EPA Victoria's Environmental Science Series: Sound-thinking for a quieter environment – managing noise around us.**

Sound is all around us, but when it is loud and intrusive or annoying, we refer to it as noise. Noise can be present everywhere—in our homes, in our workplaces, in public spaces, and near roads. Noise pollution can impact on our health and environmental quality. Unfortunately, as our cities grow, so does exposure to noise pollution. But there are a few things you can do to help reduce and minimize noise pollution in your life.

Marion Burgess, acoustics researcher at the University of New South Wales, co-organizer of the International Year of Sound, presented via live stream, the main types of noise pollution in our urban areas. She explained how we can use science to help to determine the effects, including on our health, as well as in the broader environment and to minimize or manage the impacts of noise. Attendees had the opportunity to ask live questions via the Microsoft Teams Q&A function.

The event was organized by the Environmental Protection Authority Victoria (EPA Victoria).

**15 - 28 April 2021**

**Record a sound for International Noise Awareness Day.**

As a contribution to both the IYS 2020+ and the INAD 2021, the Australian Acoustical Society encouraged all Australians to participate in recording sounds around the time of INAD and to contribute these to Covid-19-Sound-Map of the World (https://www.petestollery.com/covid) The sounds and the commentary provided a record of the sound/noise that we notice as Australia gradually returned to almost normal life after Covid -19.

## AUSTRIA

**15-18 August 2021**

**47th Annual German Conference on Acoustics**

Vienna, Music Capital and UNESCO world heritage city, once again hosted the Annual German Conference on Acoustics (DAGA), having first organized the conference in 1990. The 47th annual took place at Messe Wien Exhibition and Congress Center – next to the Viennese Prater between 15 and 18 August 2021.

The Conference was associated with the International Year of Sound 2020+ and was among the first to be organized in the hybrid format. The experience gained during the previous year enabled the organization of the event to allow for the physical presence of many participants. Thus, the scientists had the opportunity to finally get together physically again, to examine the work of other colleagues, to get to know the products of the exhibiting companies, to participate in the extensive excursion program, and to establish and maintain contacts in a relaxed environment at the two planned evening events.

DAGA 2021 was organized primarily by the Acoustics Research Institute (ARI) of the Austrian Academy of Sciences (OeAW). The ARI's 43 employees conduct application-oriented interdisciplinary pure research in acoustics, synergizing findings in the fields of physics, psychology, phonetics, telecommunications, biology and mathematics.

# BRAZIL

**29 April -31 October 2020**

**#SONSQUEAMO: The sounds between hearts and minds**

The ProAcústica Brazilian Association for Acoustic Quality launched #SonsQueAmo campaign as a form of expression and freedom in the face of the stillness and silence of the times during Covid-19 lockdown. The campaign #SonsQueAmo commenced on International Noise Awareness Day – INAD, 29 April 2020 and became part of the IYS 2020+ . The campaign #SonsQueAmo was a participatory and collaborative platform of initiatives created using sound as a tool and open to all.

The videos are available from https://www.proacustica.org.br/inad/2020/

**15 - 18 September 2020**

**Feicon Batimat & ProAcústica activities for the International Year of Sound in São Paulo, Brazil**

ProAcústica Space in the Feicon Batimat Fair. For the fourth consecutive year, ProAcústica was represented by associated companies in an exhibition and relationship area. ProAcústica Board and Administrative Council invited all to live the experience of the sound around: The event was rescheduled from 1 April 2020 and promoted the IYS 2020+.

**5 - 9 October 2020**

**FIMUCA ÁUDIO – International Festival of Music at Home (Audio Edition)**

Fimuca was an online Music Festival, totally free in its 3rd edition, with an emphasis on acoustics and audio. This is an example of the type of event that was promoted by the acoustical organizations in Brazil as part of their contributions to the IYS 2020+. https://fimuca.musica.ufrn.br/

**26 - 28 April 2021**

**International Noise Awareness Day (INAD) –**The Brazilian Branch of the International Noise Awareness Day (INAD) carried out virtual activities on Instagram and Facebook to raise awareness about sound and its role in our daily lives in accord with the theme of INAD' "Protect Your Hearing, Protect Your Health! A similar event scheduled for 2020 had been cancelled due to Covid-19 pandemic.

**28 - 31 August 2022**

**Ibero-American Acoustics Congress.** The Ibero-American Acoustics Congress is a series of biannual events organized by FIA (Ibero-American Acoustics Federation), which seeks to promote the exchange of experiences between researchers, academics, students and professionals from Ibero-American countries working in Acoustics, Vibrations and related areas. The event seeks to create an environment for discussion among people involved in the production, dissemination and application of techniques and processes in the area of Acoustics. Due to the pandemic restrictions, the 12th Ibero-American Acoustics Congress (FIA2020) was re-scheduled from 2020 to 2021 and re-scheduled again to 28 to 31 August 2022. It was organized by the Brazilian Acoustical Society (Sociedade Brasileira de Acústica) and featured a scientific program, as well as an exhibition and a special program alluding to the International Year of Sound.

**9 October 2020**

**Acoustics Week in Canada**

Because of the COVID-19 situation, the Acoustics Week in Canada (AWC) originally planned for October 2020 in Sherbrooke (QC) was postponed to AWC21 in October 2021. Nevertheless, the Acoustical Society of Canada (CAA-ACA) with Sherbrooke's organizing committee has decided to set up a 1-day celebration on 9 October 2020.

This online event represented a unique opportunity for students to present (live or pre-recorded) their work in a Pecha-Kucha style and have a chance to win one of three Best Student Presentation awards. Several break-out sessions were also organized around the usual themes according to submitted abstracts. Other sessions include an "Acoustical Gems" luncheon (alluring educational resources, laboratory demonstrations or research results), one plenary session and a session dedicated to the COVID-19 pandemic associated impacts, challenges and opportunities for the CAA-ACA community. The addition of the award ceremony and a recorded concert made this a full day!

**5 – 7 October 2021**

**Acoustics Week in Canada**

The Acoustics Week in Canada organized by the Groupe d'acoustique de l'Université de Sherbrooke (GAUS) was eventually held online.

Three 'half-days' were structured around three general themes.

- 'Acoustics and structures' -> works mostly involving room acoustics, building acoustics, vibroacoustics, ultrasound, shock and vibration,

- 'Acoustics and living beings' -> works mostly involving psychoacoustics, hearing, bioacoustics, musical acoustics, education in acoustics,
- 'Acoustics and computers' ->works mostly involving computations, simulations, signal processing applied to any acoustics domain - The computation contribution should be prominent and can be transverse to the two previous themes.

The *gather* platform provided:

- A main room in which the plenary lectures and lightning sessions will be streamed,
- A virtual room dedicated to researchers, students and exhibitors to discuss/exchange after video presentations, including poster presentations, videos and face-to-face interactions.
- Open spaces to discuss/exchange.

**Hearing Care Platform measuring kiosk**

On the occasion of World Hearing Day (WHD), the Schulich School of Music of McGill University and the Centre for Interdisciplinary Research in Music Media and Technology (CIRMMT) announced the launch of their Hearing Care Platform (HCP). Conceived in partnership with the NSERC-EERS Industrial Research Chair in In-Ear Technologies (CRITIAS) at the École de technologie supérieure (ÉTS), this project is designed to assess the noise exposure experienced by McGill music students.

As part of the continued efforts by the school to provide healthy work environments, this project aims **to raise awareness of and promote hearing care**. With a calibrated custom mobile app and a “listening device” measuring kiosk, participants will be able to assess their weekly sound exposure from music and non-music activities, as well as the potential risks for their hearing health.

While a pilot program with music students began in October 2020, the HCP’s measuring kiosk is now accessible to all students. Using their own listening

devices and playlists, participants are asked to place their headphones on the artificial ears of a mannequin's head. After a series of questions, listening levels are assessed on a tablet and personalized information on hearing care is provided to the participant.

The kiosk was located on the fourth floor of the Elizabeth Wirth Music Building in the Marvin Duchow Music Library. (The library entrance is on the third floor.) Operating hours follow the library schedule. "Hearing protection awareness is crucial for our musicians. We are pleased to collaborate with CIRMMT who has provided the scientific and technological expertise to undertake the study and develop the measurement tools that will impact our students' lives," said Brenda Ravenscroft, Dean of the Schulich School of Music.

The project's originality lies in the assessment method, which calls upon users' active involvement by using their own devices. Anonymous datasets, generated by the future pilot study, will be also made available for research purposes. More information about this project is available at https://sites.google.com/view/hearing-care-platform/hearing-care-platform

CIRMMT is an interdisciplinary 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. The CIRMMT community is interested in research that spans a wide range of topics, including the creation of music in the composer's or performer's mind, the performance of music, music recording and/or transmission, and the reception of music by the listener. CIRMMT members also work in areas such as the science of performance and the ways in which senses, such as vision, touch and hearing, and haptics interact with music and sound.

# CHILE

**17 - 20 November 2020**

**INGEACUS2020. International Congress on Acoustics and Professional Audio**

INGEACUS was an online event for which the main objective was to bring students and academics belonging to the Acoustics area together for four days. The event included different sections such as workshops, plenary keynotes, and talks. Some of the areas covered at the congress included among others, Architectural Acoustics, Digital Signal Processing, Professional Audio, Environmental Acoustics.

The event was based in Valdivia and the organization responsible was University Austral of Chile. The program for this event can be found at https://www.acusticauach.cl/?page_id=15473


**The poster for the student competition which was produced especially for Chile and promoted widely**

## COSTA RICA

**18 May-18 July 2020**

**Sound Recording Contest: "Discovering the Sounds of Nature from my home"**
**Concurso de grabación de sonidos: "Descubriendo los sonidos de la naturaleza desde mi casa"**

An open contest for those who want to record and help build an archive of animal sounds and soundscapes in Costa Rica, using their cellphones from home. Audio files were uploaded to the "Colección BioSonidos", UNED. More than 100 entries were received, and recognition was given to those participants who won in different categories.

The organization responsible was Costa Rica Universidad Estatal a Distancia (UNED), Colección BioSonidos.

More information can be found in

https://www.facebook.com/CIENTEC.PAGE/posts/3978941268842503/


**Promotion of the contest and association with the IYS 2020+**

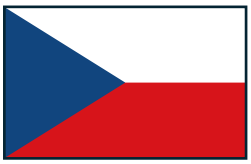
**11-12 March 2021**

**National Symposium on Bioacoustics**

A symposium on bioacoustics and acoustic ecology with experts from different institutions, was organized online in San José, Costa Rica. The experts shared academic and professional experiences, findings and techniques; with the common goal of promoting research, outreach and knowledge of the natural sounds and acoustic environments of Costa Rica. The Symposium was open to the public.

The organization responsible was Universidad Estatal a Distancia (UNED), Vicerrectoría de Investigación y Colección BioSonidos.

## CZECH REPUBLIC



**12-16 July 2021**

**The 27th International Congress on Sound and Vibration**

The International Institute on Acoustics and Vibration (IIAV) in cooperation with the Czech Acoustical Society, the Czech Academy of Sciences and the Czech Society for Mechanics, organized the annual event, the International Congress on Sound and Vibration (ICSV), which combines all areas of acoustics, noise and vibration. The 27th Congress on Sound and Vibration (ICSV27), originally scheduled for 12-16 July 2020, was held eventually in Prague (CZ) from 12-16 July 2021 and was organized completely virtually, based on pre-recorded presentations.

# DENMARK

**29 April 2020**

**Everyday Noise – how it affects our daily life and how to minimise impact and annoyance**

Noise in our daily life and how it affects our well-being was the subject of a Webinar that was organized by the Sound Hub Denmark A/S. The webinar was also associated with the 2020 International Noise Awareness Day. The objective of the webinar was to inform the participants about the psychological and physiological impact of noise on our quality of life. Experts and researchers presented on the theme and gave recommendations on how to measure, minimize impact – and in general live with noise without going crazy. The webinar was open for both general public and professionals.

The event was held in collaboration with Global Audiology Consulting, University of Copenhagen, Faculty of Social Science, Aalborg University and others.

# FINLAND

**24 - 25 November 2021**

**Acoustics Days**

The Acoustics Days was a workshop held in Turun AMK, Turku in Finland. The Organization responsible was the Panu Maijala on behalf of the Acoustical Society of Finland. This workshop is organized every alternate year and is open to all, with free participation for students. The workshop brought together Finnish professionals, researchers, students, authorities, consultants, media and business representatives, and others interested in sound, acoustics, and noise. During the Acoustics Days, timely presentations and posters were heard from experts in different subdisciplines of acoustics.

# FRANCE

**20 January –7 February 2020**

**Sound Installation-Tour Zamansky "The Cloudspeakers"**

'The Cloudspeakers' is a creative work by Michel Risse and Décor Sonore, a French company dedicated to sound productions for public space that challenge the way we listen to our everyday environment. This installation, on the top of the Tour Zamansky of Sorbonne University, was sponsored by NEXO with assistance from La Semaine du Son and Sorbonne University. Décor Sonore was experimenting with 'The Cloudspeakers' over the period of La Semaine du Son de l'UNESCO and the opening of the International Year of Sound.

More information on the installation can be found in :

https://www.decorsonore.org/wp-content/uploads/2024/02/The_Cloudspeakers-web_1.pdf

**31 January 2020**

**Sound Walk**

All those coming to Paris for the opening were invited to participate in a sound walk around the area near to Sorbonne University. The start location was at the entrance to Tour Zamansky, Campus Pierre et Marie Curie, Sorbonne, 4 Place Jussieu, 75005 Paris. Start time was 15:30 and completion time was approximately 16:30. The Organization responsible was ICA and the sound walk was coordinated by **Catherine Lavandier**.

**4 February - 12 March 2020**

**Draw your sound**

Draw your sound were workshops for adults and children. They provide information on everything that people always wanted to know about sound: how it is formed, how it spreads, how it is measured.

Several interactive experiments allowed the participants of the workshops to discover the applications of Fourier analysis developed more than 2 centuries ago. They would discover that Fourier is omnipresent at the heart of current digital technologies related to signal, image and telecommunications.

The Location was Ecully Media Library, and the presenters were Didier VRAY, Professor at the INSA of Lyon assisted by researchers from the CREATIS Laboratory – Research Center for Image Acquisition and Processing for Health – LabEx CeLyA.

The Organization Responsible was Centre Lyonnais d'Acoustique and CREATIS Laboratory. The event was scheduled as an outreach activity of the FORUM ACUSTICUM 2020 conference which eventually was held on-line.

**19 - 21 October 2020**

**Quiet Drones Symposium**

Noise emitted by drones (UASs, UAVs) is becoming a major issue in residential and environmentally sensitive areas. The Symposium provided a venue for researchers on drone noise to meet with manufacturers, users and those engaged in designing innovative applications for this new technology. It was originally scheduled to be held in Paris 26-27 May 2020 but due to the restrictions imposed by the Covid-19 Pandemic, it was eventually held as e-symposium with great success.

This symposium was supported by the Institute of Noise Control Engineering Europe (INCE/Europe) and endorsed by the International Commission for Acoustics and it was one of the events of the IYS. In France it was supported by Ministère de la Transition Ecologique et Solidaire the Direction Générale de l'Aviation Civile and the Centre Scientifique et Technique du Bâtiment and ONERA, the French Aerospace Lab.

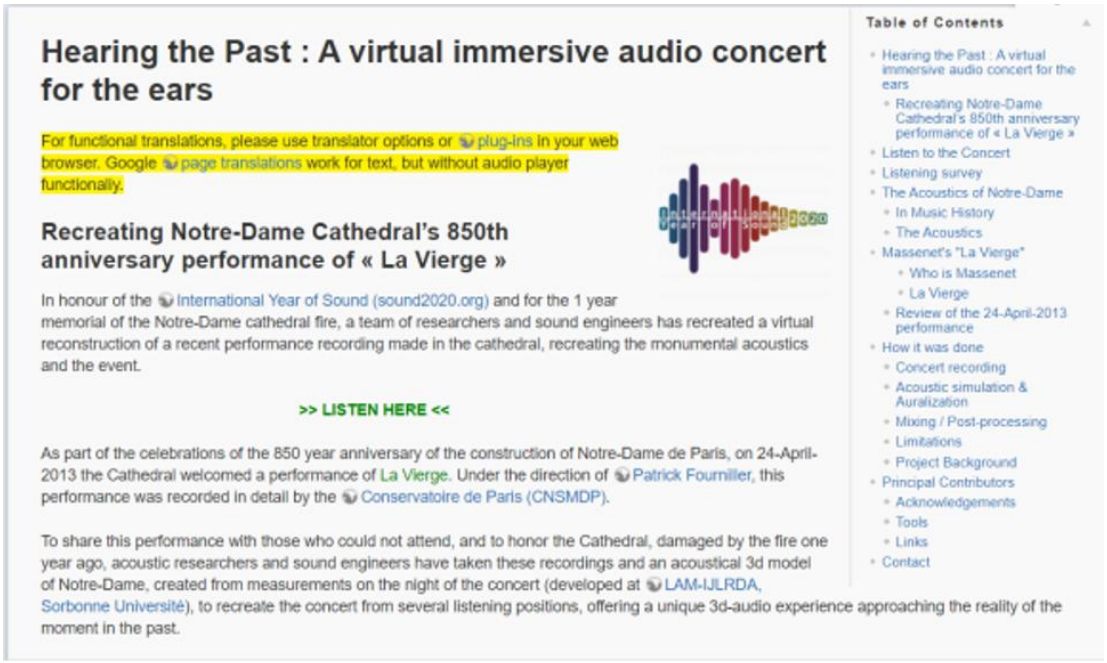
**Hearing the Past : A virtual immersive audio concert for the ears**

In honor of the International Year of Sound 2020-2021 and for the 1-year memorial of the Notre-Dame cathedral fire, a team of researchers and sound engineers recreated a virtual reconstruction of a performance recording made in the cathedral by the Conservatoire de Paris (CNSMDP) on 24-April-2013. This was a performance of La Vierge by Jules Massenet, under the direction of Patrick Fourniller.

To honor the monumental acoustics of the cathedral, a team of acoustic researchers and sound engineers have taken these recordings and coupled them to an acoustical 3D model of Notre-Dame, created from measurements on the night of the concert (developed at LAM-IJLRDA, Sorbonne Université). The result is a recreation of the concert that can be experienced from several listening positions, offering a unique 3D-audio experience approaching being transported into the past.

The virtual concert, as well as descriptions of the reconstruction process, are available at :

acoustic-task-force-notre-dame.dalembert.upmc.fr/doku.php?id=lavierge2020.



Hearing the Past : A virtual immersive audio concert for the ears

For functional translations, please use translator options or plug-ins in your web browser. Google page translations work for text, but without audio player functionality.

Recreating Notre-Dame Cathedral's 850th anniversary performance of « La Vierge »

In honour of the International Year of Sound (sound2020.org) and for the 1 year memorial of the Notre-Dame cathedral fire, a team of researchers and sound engineers has recreated a virtual reconstruction of a recent performance recording made in the cathedral, recreating the monumental acoustics and the event.

>> LISTEN HERE <<

As part of the celebrations of the 850 year anniversary of the construction of Notre-Dame de Paris, on 24-April-2013 the Cathedral welcomed a performance of La Vierge. Under the direction of Patrick Fourniller, this performance was recorded in detail by the Conservatoire de Paris (CNSMDP).

To share this performance with those who could not attend, and to honor the Cathedral, damaged by the fire one year ago, acoustic researchers and sound engineers have taken these recordings and an acoustical 3d model of Notre-Dame, created from measurements on the night of the concert (developed at LAM-IJLRDA, Sorbonne Université), to recreate the concert from several listening positions, offering a unique 3d-audio experience approaching the reality of the moment in the past.

Table of Contents

- Hearing the Past : A virtual immersive audio concert for the ears
  - Recreating Notre-Dame Cathedral's 850th anniversary performance of « La Vierge »
- Listen to the Concert
- Listening survey
- The Acoustics of Notre-Dame
  - In Music History
  - The Acoustics
- Massenet's "La Vierge"
  - Who is Massenet
  - La Vierge
  - Review of the 24-April-2013 performance
- How it was done
  - Concert recording
  - Acoustic simulation & Auralization
  - Mixing / Post-processing
  - Limitations
  - Project Background
- Principal Contributors
  - Acknowledgements
  - Tools
  - Links
- Contact

**7 - 11 December 2020**

**Forum Acusticum 2020**

Forum Acusticum is the major conference of the European Acoustics Association held every third year. Forum Acusticum 2020, originally scheduled to be held in Lyon 20-24 April 2020, was eventually held as an e-conference, 7-11 December 2020. It was organized by the French Acoustical Society on behalf of the European Acoustics Association (EAA). Extended reference to the IYS 2020+ was made during the opening of the Conference.

Outreach events related to this conference were scheduled by Centre Lyonnais d'Acoustique and included:

- February 4 / March 12: Draw your sound – workshops for adults and children.
- March 26: Public Lecture on "Air transportation of the future: making quieter aircraft is not a utopia"
- April 6: Scientific concert of the Ophonius Band to be presented to 300 high school students.

- April 23: Workshop for children : Sound in all its forms

Unfortunately, due to the restrictions imposed by the Covid-19 pandemic the last three events were cancelled. Some details on the “Draw your sound” event appear elsewhere in this section.

**12 May - 2 June 2021**

**Les mercredis du son**

Les mercredis du son (Wednesdays of sound) was a series of 4 online conferences (12 May to 2 June 2021 from 1 p.m. to 2 p.m.) examining the link between sound and technology in our day life. Each topic was in the form of a simple question to reach out to a large public. They were organized by Université de Technologie de Compiègne (UTC).

Les mercredis du son, were not considered as scientific congresses: questions discussed were about the place of sound in society and how technology produces, mitigates or uses the sound in our life. The intended audience was students in science (mechanics, computer science, biology, ...), engineers (not only acousticians) and the general public. It was free of charge and it was an important outreach activity of the IYS 2020+.

Website : https://www.utc.fr/mercredis-du-son/

**18-21 May 2021**

**International Conference on Wind Turbine Noise**

The 9th International Conference on Wind Turbine Noise was organized by INCE/Europe, 18-21 May 2021. This biennial event was held online from Europe in the same spirit as Quiet Drone 2020 Symposium that was held in the same format in October 2020, which enabled participants to meet in a very successful way.

It brought together all those who work to understand, control and manage the noise from wind turbines: turbines manufacturers, wind farms developers, researchers in aeroacoustics, psychoacoustics, environmental acoustics, consultants, as well as regulation authorities and objectors. Over 4 days, fifty papers and conversations were presented, followed by discussions sessions which will constitute the backbone of the meeting.

Since its first edition in 2005, WTN conferences have tried to bring together all those involved in the various aspects of the problem, including objectors and this had hopefully, contributed to progress ina better understanding and communication, as well as significant technical improvements in the control of noise. For this meeting, in addition to the technical sessions covering all research and development aspects with extended (and not only scientific!) discussions, there were two "conversation sessions" of 45 min. each, to discuss interactions between neighbors, manufacturers and wind farm developers.

The conference was one of the events of IYS 2020+. More information about the conference can be found in www.windturbinenoise.eu/content/conferences/9-wind-turbine-noise-2021/

# GERMANY

## Report provided by the German Acoustical Society (DEGA)

The main aim of the International Year of Sound 2020-2021 in Germany was to address the importance of acoustic information in everyday life and to make sound in everyday life the subject of current experiences. The *German Acoustical Society* (DEGA) took part with its own events, campaigns and publications. However, as many events could not take place as planned due to the pandemic, the focus was on the publication of media (primarily videos, especially for children).

All individual links are listed on the page https://www.dega-akustik.de/sound2020.

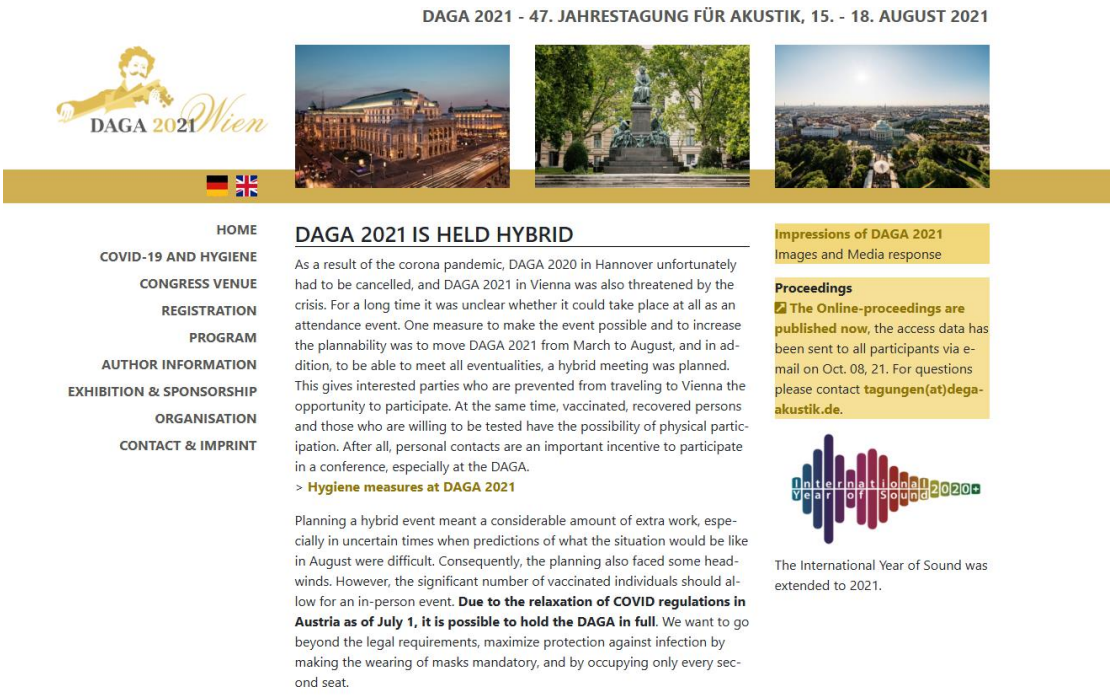
### Publications-Productions:

"Noisella lehrt Akustik" - a YouTube info series for children

YouTube video: "Faszination Akustik" - a journey through the world of sound

YouTube video: "So klingt meine Welt" - from the entries to the school competition of the same name

A special website for the 50th anniversary of the annual conference “DAGA”




https://2021.daga-tagung.de/en/

Other publications included several press releases and an editorial in the “Akustik Journal”[1].

## Events:

**25 September 2020**

**“Akustik verbindet**

In 2020, the most important event to replace the cancelled annual conference was a livestream symposium “Acoustics is connecting” “Akustik verbindet” in

[1] The editorial can be found in the Publications Section of the IYS 2020+ report.

German, that included three plenary lectures, musical contributions, welcoming speeches and award ceremonies. In addition, the film "Faszination Akustik" was shown.

Website : https://www.dega-akustik.de/13-symposium

**12 - 13 November 2021**

**14th DEGA Symposium "Interaktive Auralisierung für die Planung von Räumen"**

The 14th DEGA Symposium on Room acoustics under the title "Interactive Auralization for Room Planning" "Interaktive Auralisierung für die Planung von Räumen" in German, was held in Berlin, discussed new developments in simulation and auralization. It provided an overview of the state of the art in simulation algorithms and in headphone and loudspeaker-based reproduction of acoustic scenes. Acoustic demonstrations took place in the newly established Mixed Reality Laboratory at TU and UdK Berlin.

Website**:** www.dega-akustik.de/dega/14-symposium

**DAGA 2021**

As the most important event in 2021, the annual conference “DAGA” was held in a hybrid format for the first time, as a joint conference with our Austrian colleagues in Vienna. https://2021.daga-tagung.de/en/

Other events in Germany included the “Noise Awareness Day”, workshops and video discussions, as well as events of partner organizations.

## Additional Events/Projects

**14 October 2020**

**Accessible Concert “International Year of Sound” with “the Mix”**

This concert was part of the IYS 2020+. Musicians with and without handicap were on stage, playing for a likewise mixed audience. The organizers aimed to reach the audience with questions like:

- Would a concert be possible without sound?
- How can the sound of a concert be perfect for a mixed audience?
- When does a concert become noise?

Due to COVID-19 restrictions on attendance at this concert, only a small audience was on site, but it was streamed online via rockradio.de. This was a great way to carry the sound of live concerts to people who are having difficulties accessing concert locations.

Organization Responsible was Handiclapped - Kultur Barrierefrei e.V.

# GREECE

**3 - 4 September 2020**

**Timbre 2020**

The 2nd International Conference on Timbre was organized as a virtual Conference in Thessaloniki and was supported by the School of Music Studies of the Aristotle University of Thessaloniki, the School of Electronic Engineering and Computer Science of the Queen Mary University of London and the Department of Medical Physics and Acoustics of the University of Oldenburg.

The study of timbre has recently gained remarkable momentum. Following the Berlin Interdisciplinary Workshop on Timbre (2017) and the international conference Timbre is a Many-Splendored Thing (2018), the goal of Timbre 2020 was to continue a tradition of meetings around timbre.

Timbre poses multifaceted research questions at the intersection of psychology, musicology, acoustics, and cognitive neuroscience. Bringing together leading experts from these and related fields, Timbre 2020 aimed to provide a truly interdisciplinary forum for exchanging novel perspectives and forging collaborations across different disciplines to help address challenges in our understanding of timbre from empirical, theoretical, and computational perspectives.

**20 - 25 June 2021**

**Underwater Acoustics Conference and Exhibition 2021**

The Conference was the 2021 edition of a series of conferences on underwater acoustics organized every second year in Greece. Due to the Covid-19 restrictions,

the Conference was held on-line using the technical infrastructure of the Foundation for Research and Technology-Hellas (FORTH) in Heraklion, the host Institution.

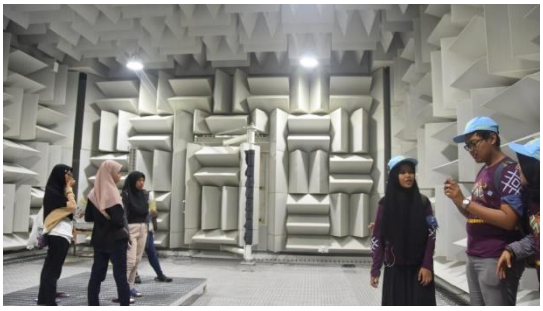
The Conference was dedicated to the International Year of Sound, with many references to the importance of sound for our lives and especially the necessity of keeping the underwater noise at levels acceptable by the specifications of the Good Environmental Status. Special mention to the IYS 2020+ was made at the beginning and closing sessions of the Conference.

# INDONESIA

**1 February 2020**

**Adhiwijogo Acoustic Laboratory Open Day**

Adhiwijogo Acoustic Laboratory is located at Institut Teknologi Bandung, Indonesia. This laboratory has the most advanced acoustic facility in Indonesia including Anechoic Chamber and Reverberation Chamber. On 1st February 2020 the Laboratory was open for public, especially for high school students. During the day, laboratory tours were hosted to share and promote acoustical aspects and how the sound can affect society.



Organization responsible was AAVI-Asosiasi Akustik dan Vibrasi Indonesia

**23 - 24 November 2020**

**The 1st Biennial International Conference on Acoustics and Vibration (A&V 2020)**

A&V 2020 was a technical conference on acoustics, vibration, and their applications. The theme of the Congress for 2020 was “Sound of Indonesia” and was originally scheduled to be held in Denpasar, Bali, Indonesia.

Due to the developments in the COVID-19 pandemic with increasing travel restrictions and the uncertainty of worldwide participation, the A&V 2020 Organizing Committee decided to move to an online platform and cancel onsite conference. The virtual conference was held on 23-24 November 2020.

The Congress was organized by Vibration and Acoustics Laboratory (Vibrastic Lab), Engineering Physics Department, Institut Teknologi Sepuluh Nopember, Surabaya, Indonesia.

**30 July - 20 August 2021**

**Training for Trainer: Menyelesaikan Permasalahan Akustik Masjid di Indonesia**

Indonesia has over two hundred thousand mosques, and one of the most frequently encountered issues is with the acoustic quality. This free online course aimed to educate participants on room acoustics, mosque sound systems, room acoustic measurement, and room acoustic modeling. The event was held on-line in Bandung and was organized in collaboration with Institut Teknologi Bandung, Dewan Masjid Indonesia, Asosiasi Masjid Kampus Indonesia, and Asosiasi Akustik dan Vibrasi Indonesia.

# ITALY

## Report provided by the Italian Acoustics Association (AIA)

During the International Year of Sound 2020-2021, several activities have been organized including the International Student Competition on the theme "My world of sounds". The contest is closely related to the motto "The importance of sound for the society and the World," the melody "The sound of the world" and its refrain, the musical basis of which has been made available in the section of the IYS 2021+ website dedicated to the Contest

The IYS international competition was included in the Italian INAD program, which was celebrated on 28 April 2021 with the theme “Let’s listen to the sound”. This aims to highlight the importance of sound in society and the world, considering aspects of landscape, noise control in nature, the built environment, and workplaces.

The Acoustical Society of Italy (AIA) was involved in various IYS initiatives and events at regional and national levels, including a national student competition, in parallel with the international one, and with the theme “Let’s listen to the sound”.


Italian participation in the initiative was lower than in previous years due to the Covid-19 pandemic, which created difficulties especially regarding the educational lessons given by technical experts in acoustics, soundscapes and listening quality. Even so about 320 Italian students participated in the initiative, with nine schools from seven different regions. Seven schools participated in the competition.

The first prize for the category “graphic work” was given to School I.C. “Anna Rita Sidoti Gioiosa Marea” for the drawing “The sound of the marine world”.

The kindergarten "M.L. Niccolini" in Ponsacco received the second prize for the category “graphic work” with the project "The House of Sounds and Noises".

The kindergarten "I.C. Ardigò" in Padova received the third prize for the category “graphic work”.

1) I.C. “Anna Rita Sidoti Gioiosa Marea”, Messina


2) Kindergarten "M.L. Niccolini", Ponsacco


3) Kindergarten "I.C. Ardigò", Padova

The works of the three winners for the two categories of the national competition were sent to the Competition Coordinating Office to represent Italy at the international competition. For category 2, IC "Puccini," Florence-Italy and Institut Escola Salvador Vilarrasa, Besalú-Spain were tied for first place in the international competition "My world of sounds".

All Italian contributions, including videos made by secondary school students to the notes of their verse and refrain, along with those from other schools around the world, were edited into a documentary “Drawing and singing the sound of the world” published on YouTube (https://www.youtube.com/watch?v=XYKqdUEFwVA) and various social networks, promoting the initiative globally.

In the same context as the initiatives organized for the IYS 2020+, two series for a total of 11 cartoons titled "Noisella teaches acoustics" and "Hearing sounds with Noisella" were produced and made permanently available via YouTube. The "Noisella Short Stories" feature Noisella, who has been the mascot of INAD Italy

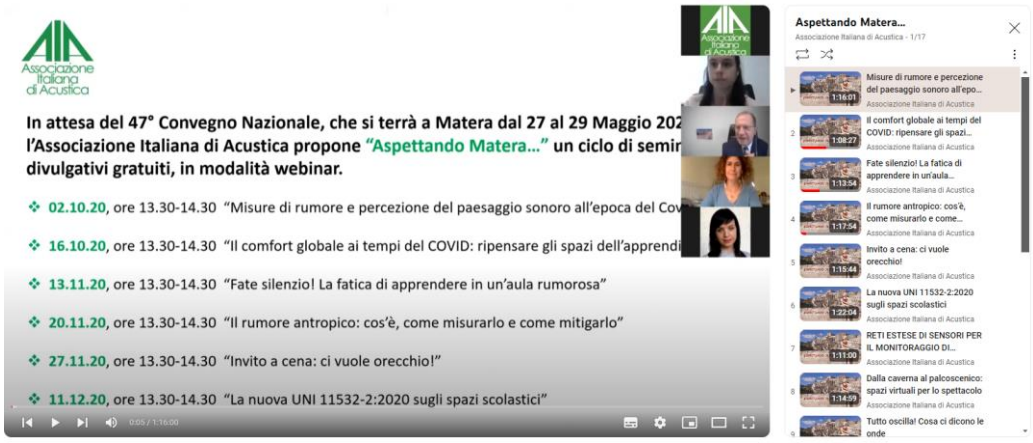
for many years. In the various episodes, Noisella, together with her cat Marisa and her friends, illustrates some basic concepts concerning acoustics. The project was produced by Vie en.ro. se. Ingegneria with the support of the Head Genuit Foundation and is distributed on the dedicated YouTube channel "The Noisella's Adventures". As part of INAD Italy 2022 activities, AIA has subtitled the two cartoon series in Italian. The videos are used as dissemination/information material during INAD's educational lessons.


Among the several initiatives foreseen for the celebration of the IYS 2020+, several events organized at regional, national, and international levels were planned, thanks to the efficient and worldwide coordinated communication campaign foreseen by the ICA. All events had in common the feature of presenting an acoustical outreach component in line with the goals of the IYS focusing on the valorization of positive sounds and soundscapes.

Italy has actively taken part to this global initiative taking part with at least 35 events organized and shared on the IYS 2020+ website  Among the numerous activities, we are pleased to mention a few of them which have been organized by the Acoustical Society of Italy and have involved a significant number of participants, embracing the aim of Year of Sound 2020-2021:

- **Webinars “Waiting for Matera…”**

  In anticipation of the 47th National Conference organized by the Acoustical Society of Italy, which was held in Matera in May 2021, a cycle of free webinars had been scheduled. The 12 events include different topics related to soundscape during lockdown and global comfort at the time of COVID, acoustic comfort in school environments, noise in densely occupied places, sensor networks and monitoring, simulations and applications of virtual reality, wooden buildings, acoustic metamaterials, vibroacoustic methods for the elastic/viscoelastic characterisation of materials and structures, performance-based design. The speakers were mainly young researchers and professionals, experts in acoustics and other disciplines related to the study of sound. Each one-hour webinar was structured according to an interactive format between speakers and participants.




- **Conference “The Acoustics of Ancient Theatres”**

  The Acoustical Society of Italy (AIA) with the collaboration of the European Acoustics Association (E.A.A.) and the Hellenic Institute of Acoustics (HEL.IN.A.) have organized an international conference in Verona from 6 to

8 July 2022. The conference brought together international experts to present and discuss all aspects related to the acoustic characteristics of historical monuments that are often used for public performances including opera, theatre, concerts, amplified music, sporting and other events, and conferences. The evolution and development of new technologies for multi-channel measurement systems, together with acoustic simulations, auralisation methods and virtual reconstructions, have generated renewed interest in these spaces. In addition to acoustic aspects, further studies and interdisciplinary contributions (archaeologists, historians, singers, musicians, directors, set designers who have worked in open-air theatres, etc.) took part in the initiative.



- **The 47th Conference of the Acoustical Society of Italy**

  In May 2021, the National Conference of the Acoustical Society of Italy took place on an online platform and addressed the main topics in the fields of environmental noise, acoustic quality in buildings, working environments and metrological acoustics. Among the speeches, the awareness-raising activities, organized by AIA, were presented together with the Year of Sound 2020-2021 initiative.


- **The seminar "Beautiful Sounds"**

  The scientific seminar named "Beautiful Sounds" was held in Florence on October 18th. It brought together contributions from experts that deal with sound and well-being in living environments. The speeches involved the sounds of the world and cities, the components of sound as a source of memory, health, pleasure and the compatibility of sounds and noises with the surroundings.

## Additional Events/Projects

**Global Program of Hush City Soundwalks for the International Year of Sound 2020**

To celebrate the International Year of Sound 2020-2021, the 2020 Global Program of Hush City Soundwalks has been set up.

Starting on April 29 2020, for the celebration of the International Noise Awareness Day and continuing during the year, a number of Hush City Soundwalks were guided by different soundwalk leaders in multiple locations worldwide and throughout the year, using the Hush City app, in order to map and assess quiet areas, and in doing so, raise awareness on the importance of living in healthy acoustic environments.

The organizer, Antonella Radicchi invited the participants to celebrate the International Year of Sound and join a Hush City Soundwalk in Italy! She also encouraged people to take the lead and organize a Hush City Soundwalk in their city!

**Soundscapes**

The project was born in 2020, during the days of isolation of the first Covid-19 lock-down when we realized how the sound landscape around us had suddenly changed overnight. This extraordinary event made us reflect and we thought it would be interesting to have a collective reflection on the soundscape in which we are immersed and to which we do not pay much attention. We therefore invited the members of the promoting associations and other associations close to us to listen to the sounds that surround us and to record them, even if only with a mobile phone. The recording could be done at any time of day or night, and some information and possibly a comment on the emotions and sensations experienced added. Furthermore, whoever wants to can return to the same place

at the same time in a month, in six months, in a year and make a new recording to testify the change that has taken place.

Participating in the project by recording the soundscape as well as being fun and interesting, makes people aware of the places they live in, and makes them reflect on important issues such as our being on Earth, both today, in times of pandemic, and in "normal" times.

Organizations Responsible were : Club for UNESCO (Asti, Italy), Club for UNESCO (Canelli, Italy), Center for l'UNESCO (Turin, Italy).

Website: https://www.facebook.com/paesaggisonoribase/

**13 - 20 June 2020**

**BioAcustiamo Week**

It was an event of naturalistic and scientific education. The initiative consisted in recording and possibly classifying, in the vicinity of one's home and during an entire week (from 20.00 on 13 June to 20.00 on 20 June 2020), the greatest number of sounds, verses, songs of animals. The collected recordings would have a double use: they would improve knowledge on the diffusion of less known and less visible species, while living around us, and can be used for ethological and bioacoustic studies by specialists.

The event took place in the framework of the International Year of Sound 2020-2021.

Organization Responsible was Museo del Fiore di Acquapendente.

**19 - 21 August 2020**

**EMUfestSABINA (Electroacoustic Music Festival) 3rd Edition**

Rescheduled from 3-5 July 2020, Sabina elettroacustica, in collaboration with the Municipality of Poggio Moiano and the Conservatory of Music Santa Cecilia of

Rome, presented the third edition of EMUfestSABINA (Electroacoustic Music Festival in Sabina). It was held in Saint Martino's Church in Poggio Moian (RI).

EMUfestSABINA is an event with an international profile that intends to connect with the cultural tradition of the territory and, at the same time, bring to the audience a significant excerpt of the best world production in this sector of contemporary art music. The event included three evening concerts in which six nations are represented: Germany, ltaly, Portugal, Spain, the United States and Sweden:

Website: https://sabinaelettroacustica.it/home-classic/emufestsabina-2020-en/

**18 - 19 May 2021**

**TCA 2020 Misura e controllo del rumore (Noise Measurement and Control)**

The 1st Conference on "NOISE MEASUREMENT AND CONTROL", was an international event, organized by the Universita degki Studi di Salerno and promoted by ARPAC, ARPAT, the Italian Center for Environment and Culture APS and the Municipality of Ravello. The Conference presented lectures by experts from the European Commission Directorate-General for the Environment, the MATTM, the Territorial Agencies for the Environment, ISPRA, the Ausl, and Italian researchers from important universities: Ryerson University Toronto, Sussex University, Nottingham University, and King's College London. The theme of the webinar was "The risk of noise and vibrations in the workplace **"**.

The initiative was aimed at disseminating and sharing experiences of studying and monitoring noise, through reports from Italian experts plus academics from all over the world.

The event was rescheduled from 22-24 June 2020 and remained part of the IYS 2020+ celebration.


Website:

https://www.unisa.it/unisa-rescue-page/dettaglio/id/529/module/87/row/5938/1-convegno-su-misura-e-controllo-del-rumore-tca-2020

**3 - 4 March 2021**

**SONIC HERITAGE: Interazioni sonore e multisensoriali nella Realtà Virtuale Immersiva e nel patrimonio culturale (Sound and Multisensory Interactions in Immersive Virtual Reality and Cultural Heritage)**

This webinar was a social initiative carried out on 3-4 March 2021 on the zoom platform. Organized by Istituto di Scienze del Patrimonio Culturale – Consiglio Nazionale delle Ricerche. The event was part of the IYS 2020+.

The webinar aimed to explore how the development of interactive tools aimed at involving visitors as "soundwalkers" of virtual reconstructions of archaeological sites or places of historical-cultural and architectural interest and their "historical soundscape" can open new research perspectives not only on the applications of Immersive Virtual Reality, but also on the relationship between sound and multisensory interaction in a virtual environment. In fact, over the last few years, through Immersive Virtual Reality, it has been possible to experiment with new opportunities for multisensory design that combines modeling tools and

techniques and Virtual Reality Experience in the acoustic field with the full involvement of the visitor's perceptual apparatus. The intention was, therefore, to focus on the "sonic heritage" with the aim of laying the foundations for an innovative method that will take into account not only the potential of the application of 3D technology to virtual acoustics, but also the acousstemological research that considers sound as an instrument of knowledge through the interweaving of relationships that binds it to places, space and the body, providing new tools for analyzing and evaluating the impact of immersive experiences and sound communication in cultural heritage.

The webinar is available on the YouTube channel https://youtube.com/playlist?list=PLSNWzD2-V2vfURoLCRetJPWDag5EMY69r

**26 - 30 April 2021**

**Sounds of life / Life of sounds**

On the occasion of the IYS 2020+ the Acoustic Research Group of the Politecnico di Bari organized a number of popular initiatives to promote the culture and the importance of sound in the society and in our life (the “Sounds of life” thread), as well as the knowledge of the way sound propagates and interacts with the physical world (the “Life of sounds” thread).

Every day different initiatives were organized and advertised to primary and secondary level schools and university students, including in particular: open laboratories (with visits and demos); popular science seminars and workshops on the different aspects of acoustics; sound walks around the city to highlight different quiet and noisy soundscapes; concerts and performances.

The events were held on-line from Bari and the Organization Responsible was Politecnico di Bari.

The events were rescheduled from 26-20 October 2020.

**28 April 2021**

**Il Paessagio Sonoro (The Soundscape)**

An online seminar from Rome on the urban sound landscape dedicated to compositional systems and sound treatment. It was organized by the Università degli Studi di Roma Tor Vergata Master in Sonic Arts on the occasion of the International Noise Awareness Day (INAD 2021) and was associated with the IYS 2020+.

Website: mastersonicarts.uniroma2.it/2021/04/23/paesaggio-sonoro-2021/

**14 May 2021**

**Electric mobility and low-noise asphalts: the LIFE E-VIA project and other contributions**

The European project LIFE E-VIA organized the free of charge workshop titled "Electric mobility and low-noise asphalts: the LIFE E-VIA project and other contributions", during which the progress of some ongoing activities, related to the design of a new low-noise asphalt and to the implementation of the pilot case in the city of Florence. Views were exchange on options for dealing with sounds of electric vehicles and use of end-of-life tyres for several useful applications (e.g. low-noise asphalts).

The workshop has been sponsored by AIA and was realised in collaboration with Associazione Pescas, HEAD Acoustics, Ecopneus and the LIFE NEREIDE project.

The workshop was held on Friday 14th May 2021 from 14:00 to 16:10 via the Teams platform with about 130 participants.


https://life-evia.eu/event/workshop-electric-mobility-and-low-noise-asphalts-the-life-e-via-project-and-other-contributions/

**17 September 2021**

**Soundscape in urban and building design**

How to protect our cities from noise? How to use sound as a design resource? How is noise different from sound?

This on-line event rescheduled from 4 September 2020, aimed at raising awareness of the importance of sound in the built environment and in the integration of human activities with the natural landscape, especially the Alpine one. The goal was to promote a discussion on how policy makers, planners and designers can work to reduce negative impacts and foster positive impacts that sounds can have on people´s health and well-being.

The event was organized by the University of Trento – Department of Civil, Environmental and Mechanical Engineering, and was open to citizens, the university community, policy makers, practitioners, designers, and urban planners.

**24 November 2021**

**La qualità dell'ascolto in ambienti storici e monumentali molto riverberanti – Materiali e tecniche di diffusione sonora / The quality of listening in historic and monumental monumental environments – Materials and sound diffusion techniques**

Many historic or monumental environments, often used for seminars, conventions, assemblies or other initiatives in which the quality of listening is of primary importance, are characterized by acoustic conditions not suitable for such destinations, as a result of high reverberation noise.

The improvement and adaptation of the acoustic response of these environments through passive techniques of surface coating or addition of sound-absorbing materials are often made difficult by the presence of historical, artistic or structural constraints.

In the seminar both traditional solutions, with little impact on the forms and on the appearance of these environments, and advanced techniques of control of the "sound" through sound systems characterized by power and directivity specifically calibrated for the case in question were described.

The seminar was organized within the framework of the single-cycle degree course in Architecture. By the University of Florence in collaboration with the Associatione Italiana di Acustica.

More information can be found in https://acustica-aia.it/wp-content/uploads/2021/11/seminario-novembre-2021-diffusione-sonora.pdf

UNIVERSITÀ DEGLI STUDI FIRENZE | DIDA Dipartimento di Architettura

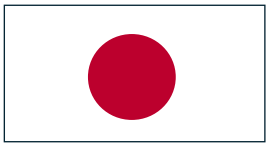
# La qualità dell'ascolto in ambienti storici e monumentali molto riverberanti
# Materiali e tecniche di diffusione sonora

**Mercoledì 24 novembre 2021 – 9.00-12.30**
Aula 1 - plesso di Santa Verdiana, Scuola di Architettura
Piazza Ghiberti, Firenze

Iniziativa organizzata nell'ambito dell'International Year of Sound

Con il patrocinio dell'Associazione Italiana di Acustica

# JAPAN



## Report provided by the Acoustical Society of Japan (ASJ)

Acoustical Society of Japan

### Introduction

To launch the International Year of Sound 2020 (eventually International Year of Sound 2020-2021 (IYS 2020+)), the Acoustical Society of Japan (ASJ) organized a Week of Sound in Japan in 2019 in cooperation with "LA SEMAINE DU SON DE L'UNESCO". It included multichannel audio demonstrations and face-to-face craft instruction. Due to COVID-19 restrictions, these activities were not possible during the IYS 2020+, as activities were limited to online works through the internet. This report describes IYS 2020+ activities conducted by the ASJ, especially how they were conducted online, as well as the Week of Sound in Japan.

### Week of Sound in Japan

From 20 to 25 August 2019, the ASJ organized the Week of Sound in Japan. It was comprised of a series of individual events. The details are as follows:

1) **Summer vacation family event – create your own musical instrument and your own sound –**

It was done in Toshiba science museum, Kawasaki, on 20 August, under the co-sponsorship of the Japan Society of Mechanical Engineers. The elementary school students built musical instruments under the guidance of the instructors.

2) **Public seminar "How to make a high-reality audio widely available"**

It was done in the Institut Français Japan – Tokyo / Espace images on 23 August, under the co-sponsorship of the Ultra-Realistic Communications Forum, Japan.

In this event, an open discussion with demonstrations was held on new musical expression using multi-channel audio.

**3) Meeting for study on musical acoustics and high-reality audio**

An open discussion was held in WOWOW broadcasting center, Tokyo, on 24 August, under the cooperation with WOWOW (a Japanese broadcaster). In this event, technologies around multichannel audio reproduction were demonstrated in the newly developed audio studio.

**4) Science School of Sound – Let's make smartphone have an acoustic horn!**

It took place at the National Museum of Nature and Science, Tokyo on 25 August. The students from fifth grade of high school made a sound radiation device for smartphones, under the guidance of a National Museum staff.

**Organized Seminars for the IYS 2020+**

All IYS2020+ activities were conducted in an online format. Typical examples of activities are listed below.

**1) Sound education for the future**

ASJ held an online discussion on 27 August 2020 to enhance sound education for young children, students, and teachers. In particular, in the COVID-19 situation, an open discussion was held on the treatment of sound in online classes and the sound environment in telecommuting.

**2) Beginners' Seminar "Introduction to Acoustic Technologies Supporting Web Conferencing"**

ASJ held an online seminar on 9 September 2020 on acoustic technologies supporting web conferencing in the context of the growing popularity of online conferencing during the Covid-19 pandemic.

**3) Special Session "Acoustics x AI"**

ASJ held a seminar on the relationship between acoustics and AI on September 10, 2020, as part of its regular meeting. With AI technology gaining attention, this session explored how technology will impact acoustics in the future.

**4) Kyoto City University of Art Special Lecture: "Sounds of Kyoto, Innovation of WA (Japanese Traditions): An Investigation of Acoustic Analysis of a New SHAMISEN with WASHI (Japanese paper) Membranes"**

From the perspective of preserving its tonal qualities, this lecture, held on 21 February 2021, addressed the attempt to explore alternative materials for a traditional Japanese musical instrument SHAMISEN, for which raw materials are becoming increasingly difficult to obtain,. The instrument has traditionally utilized animal skins, but now the use of Japanese paper was explored. The lecture was open to general people who might not be familiar with the acoustic science.

**5) What sounds can be heard indoors**

This was an online seminar, conducted on 16 December 2021, with content that even high school students could understand. Participants experienced how the sound perception changes in different indoor environments by listening to various sounds recorded in a laboratory/building with a simple sound source.

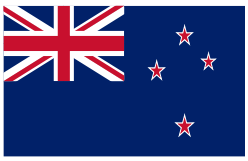
**Outreach activities for elementary school students and their parents**

The ASJ, in collaboration with the Japan Society of Mechanical Engineers, held events to get children interested in sound and vibration. The dates of the events were 15 August 2020 and 18 August 2021. These events were continuations of the event described in 2. 1) "Summer vacation family event" held on 20 August 2019. Unlike the 2019 event, these events were held in an online format. The participants received craft kits in advance, and on the day of the event, they assembled their own musical instruments while viewing the examples displayed on their PCs.

**Conclusion**

The Week of sound in Japan scheduled for 2020 was canceled due to COVID-19. The event "Baschet Acoustic Sculpture from a Scientific Perspective" scheduled for 27 June 2020 was also cancelled. However, a number of innovative on-line events were held. It is important that IYS 2020+ activities not only take place during the activity period but also continue afterwards. ASJ will continue to promote the importance of sound in accordance with the principles of IYS 2020+.

# NEW ZEALAND



**March-May 2020**

**Auckland Philharmonia Orchestra Virtual Play-In**

During the first New Zealand lockdown in March-May, the Auckland Philharmonia Orchestra (APO) invited musicians around New Zealand and the world to contribute to a virtual play in. Players recorded a video of themselves performing along with a reference track and submitted it to the APO who edited it all together. Over 250 musicians from across the world joined the APO for this special virtual performance of the Radetsky March by J. Strauss Sr. Featuring musicians from Aotearoa, Mexico, USA, Canada, Spain, Japan, China, Australia, UK, Ireland, Italy and Denmark with the conductor – Vincent Hardaker.

The performance can be watched at

https://www.youtube.com/watch?v=7Yo9TXQzuo0

**28 April 2021**

**Record a sound for the Covid 19 Sound Map**

The event was organized by the Acoustical Society of New Zealand. Members of the Acoustical Society of New Zealand were asked to mark the International Year of Sound by contributing to the Covid 19 Sound Map.

The members were asked to record soundbytes on their phones that show how life in New Zealand is returning to normal following Covid restrictions and upload them to the Google Earth-based sound map at https://www.petestollery.com/covid.

This contribution did indicate that life for the people in New Zealand was more quickly returning to normal than in many other parts of the world.

**28 - 29 June 2021**

**Acoustical Society of New Zealand biennial conference**

This is the biennial conference of the Acoustical Society of New Zealand. Originally planned for 15-16 February 15-16 same year, it was postponed at the last minute due to a Covid-19 lockdown. The conference was eventually held 28-29 June 2021 in Auckland, and included presentations related to the IYS 2020+.

# NIGERIA

**5 - 6 October 2020**

**ASON 2020**

The 4th International Conference of the Acoustical Society of Nigeria was held as a virtual event. The theme was “Acoustics and COVID-19 Pandemic”. The subthemes addressed the effects and implications of COVID-19 on various areas of acoustics.

## NORWAY

**3 - 5 May 2021**

**The Baltic-Nordic Acoustics Meeting BNAM 2021**

The Baltic-Nordic Acoustics Meeting (BNAM)is the biennial Baltic-Nordic Acoustics Meeting (BNAM), organized by one of the national member societies of the Nordic Acoustics Association (NAA). In 2021, the conference (BNAM 2021) took place in Oslo, Norway on 3-5 May 2021 rescheduled from 3-6 May 2020. It was held as an online conference. The Organization responsible was the Norwegian Acoustical Society (NAS).

# PERU

**22 - 23 January 2020**

**Architectural Acoustics in Peru in the framework of International Year of Sound IYS2020+**

This event was held in Lima under the auspices of UNESCO-Peru (The Week of Sound 2020). The organization responsible was the Institute for Land Conditioning, Conservation and Development (INPACTA) and the Acoustical and Vibroacoustical Institute of Peru (INPAVAC). It was held as a workshop organized in several sessions with topics centered on health problems because of buildings. During the event, the Ministry of Housing presented the next Acoustical Building Code.

**27 - 29 April 2021**

**Protect your hearing. Protect your health**

Under the slogan “Protect your hearing. Protect your health”, the Acoustical and Vibroacoustical Institute of Peru (INPAVAC), commemorated for the first time in Peru the International Noise Awareness Day in the framework of the International Year of Sound.

Due to social isolation as a result of the COVID pandemic, the event was held virtually through zoom platform.


**2 October – 18 December 2021**

**Extra-curricular Virtual Courses in Acoustics**

In the framework of the International Year of Sound 2020-2021, the Peruvian Institute of Acoustics launched the first regional virtual course in acoustics, to link people interested in acoustics with teachers and researchers and thus propagate the importance of sound in all aspects of life.

The course was presented by Ibero-American professors (considering gender-parity), who are professionals and researchers in different branches of acoustics from Argentina, Mexico, Peru, Spain and Uruguay.

Organization responsible was the Acoustical and Vibrational Institute of Peru.

https://inpacta.org/inpavac/en/home/training/extra-curricular-courses/

**16 - 18 December 2021**

**First Regional Acoustics Symposium**

To close the International Year of Sound 2020+, a Regional Acoustics Symposium was held 16-18 December 2021 in Lima, with prominent Ibero-American acousticians as invited speakers.

The Symposium was organized in virtual mode by the Acoustical and Vibroacoustical Institute of Peru. The Proceedings of the Symposium (in Spanish) can be found in

revistas.udelar.edu.uy/OJS/index.php/ecos/issue/view/76

Welcome speeches – with English subtitles can be found in www.youtube.com/channel/UCkG_X0TKJk-QnAr7eVfXryg

**25 - 27 January 2023**

**Week of Sound 2023. Reflections on the International Year of Sound IYS 2020+**

In December 2021 the Acoustical and Vibroacoustical Institute of Peru (INPAVAC) held a regional symposium on acoustics, during which the closing ceremony of the International Year of Sound for Peru was held, and because of the increase in COVID infections it could not be held in person.

In January 2023 the Acoustical and Vibroacoustic Institute of Peru (INPAVAC) organized the Week of Sound 2023, which was considered as the formal closure of the IYS 2020+, with live musical performances and in-person technical presentations at the Architects Council of Peru Auditorium (CAP).


Semana del Sonido 2023. Lima, Perú
Week of Sound 2023. Lima, Peru
Semaine du Son. Lima, Pérou
International Year of Sound 2020+

# POLAND

**14 - 15 September 2021**

**67th Open Seminar on Acoustics**

The Open Acoustics Seminar (OSA) is an annual, conference, bringing together leading Polish acousticians for over sixty years. It is organized cyclically by subsequent branches of the Polish Acoustic Society - in 2021 by the Krakow Branch.

The conference presents work from all areas of acoustics. The aim of the conference is to exchange scientific experiences in the field of acoustics, promote science and integrate specialists from various fields who are connected by acoustics. The conference plays an integrative role for the Polish acoustics community, and increasingly also for foreign ones. This enables the exchange of ideas, implementation of new research techniques and opening new application areas.

It was held in Krakow in on-line mode rescheduled from 15-18 September 2020 and incorporated the XXIV Conference on Acoustic and Biomedical Engineering (originally scheduled for 31 March-3 April 2020 and rescheduled twice), and the 36the Symposium on Hydroacoustics (originally scheduled for 26-28 May 2020).

A special session was organized to celebrate the International Year of Sound 2020-2021.

# PORTUGAL

**4-29 March 2020**

**Voices for Biodiversity**

Voices for Biodiversity was an interactive artwork that broadcast sounds from the natural world in the face of the calamitous extinction of species caused by human action. The installation was composed of a set of “cocoons” each filled with an electronic assemblage with a motion sensor, a microcontroller, a memory card, an RGB LED ring and a speaker. When a “cocoon” detects movement, it randomly reproduces a sound of an animal stored in a mp3 library and lights up the LED. The more people enter the room the more the environment will resemble a jungle disturbed by human presence.

“Voices” was an event integrated in the International Year of Sound 2020-2021.

Organization responsible was the National Museum of Natural History and Science in Lisbon, Portugal.

**21-23 October 2020**

**XI Iberian Congress of Acoustics -ACUSTICA 2020- and the 51st Spanish Congress of Acoustics -Tecniacustica 2020-**

The Congress was scheduled for June in the city of Faro, but the situation created by the pandemic made it necessary to postpone its celebration to later dates and in e-congress format. Thus, between 21 and 23 October, the congress brought together two acoustic events: the XI Iberian Congress of Acoustics-ACUSTICA 2020 and the 51st Spanish Congress of Acoustics -Tecniacustica 2020.

Despite the difficulties presented by the e-congress format, the effort made by the Portuguese Society of Acoustics ,the organizer of the event, to implement all the elements necessary for the development of the congress in this novel format has

resulted in a very interesting and attractive format for holding these events, a format that will very possibly set the tone for future developments.

The program was designed as if it were a face-to-face conference, grouping the 103 papers presented into 12 thematic areas, which were held simultaneously in three virtual rooms. The program included three plenary presentations, a round table discussion and a symposium.

The round table discussion on Iberian Regulations on Acoustic Rehabilitation of Buildings, and the EAA Symposium “Current Trends on Ocean Sound and Impacts on Marine Biodiversity” was held in parallel with the congress and was attended remotely by a large group of participants.

Also, in parallel with the Congress, the traditional EXPOACISTICA was held, which this time was also virtual, with five participating firms.

Despite the difficulties that this new format of congress presented, and the uncertainty that its development would be up to what was expected, it is necessary to recognize the effort made by the Portuguese Society of Acoustics, which had access to a powerful computer program, so that everything was carried out to complete satisfaction.

## REPUBLIC OF KOREA

**6-9 June 2021**

**ISTU 2021**

The 20th Annual International Symposium for Therapeutic Ultrasound (ISTU 2020) was originally scheduled to be held from 17-20 May 2020, at the Hwabaek International Convention Center (HICO) in Gyeongju, South Korea. Gyeongju was the capital city of the ancient kingdom of Silla for 992 years (from 57 BCE to 935 CE), and to this day, a great number of archaeological sites and old architecture still stand.

Due to Covid-19 Pandemic the congress was rescheduled for 2021 and was held as ISTSU 6-9 June 2021 in hybrid format. Almost 500 scientists, engineers, clinicians and industry from around the world came together for the 20th Annual International Symposium for Therapeutic Ultrasound!

It was our first ever hybrid symposium where we offered both virtual and in person attendance for local participants and many from around the world that were able to attend in person.

Sessions were broadcast at Korean Standard Times and were available on demand to meet attendee scheduling needs.

- Plenary and Education Sessions
- Scientific Programs
- Q & A Sessions
- e-Poster Sessions
- Q & A for all Sessions
- Exhibition Booths from all the Sponsors with chat ability through the unique Guest Books.

**23 - 26 August 2020**

**INTERNOISE 2020**

The 49th International Congress and Exposition on Noise Control Engineering planned for Seoul, Korea, 23-26 August 2020 was held as an e-congress. The Congress was hosted by the Korean Society for Noise and Vibration Engineering (KSNVE) on behalf of the International Institute of Noise Control Engineering (I-INCE). The theme of the Congress was "Advances in Noise and Vibration Control Technology".

The Congresses included a large technical program consisting of papers and posters on all topics of noise control engineering. Papers summarizing these presentations were collected into a proceedings document that is available for reference after the congress. The congress also included a virtual exhibition of the latest products and instrumentation for noise control engineering.

Inter-Noise 2020 supported the International Year of Sound 2020-2021 and had on the site a 'promotion' with links to the IYS 2020+ film, both the short and long versions.

**24 - 28 October 2022**

**24th International Congress on Acoustics**

The Congress was held at Hwabaek International Convention Center (HICO) in Gyeongju, Korea from 24 to 28 October 2022, in hybrid format. It was organized on behalf of the International Commission for Acoustics by the Acoustical Society of Korea.

The ICA Congress is the main event of the International Commission for Acoustics and it is held every third year in a different Continent. It covers all the areas of Acoustics and hosts an exhibition of Companies offering Acoustical Products and Services.

The Congress was originally intended to include a session on the IYS activities. Due to several problems this session was rescheduled for 2023 to be held in one of the major acoustic conferences. Nevertheless, extended reference to the IYS 2020+ activities was made during the opening and closing ceremonies of the Congress, as well as throughout its duration in selected sessions.

# SINGAPORE

## Report provided by the Society of Acoustics Singapore (SAS)

The IYS 2020+ enhanced the activities of the Society of Acoustics (Singapore)(SAS). An example would be the Organization of a workshop by the SAS to commemorate the International Noise Awareness Day in 2020 and 2021. The IYS helped to increase the awareness of the importance of sound to members of our society. It also helped to introduce the importance of the ICA on the world scene of acoustics to our members and which will increase the participation of our members in the activities organised by the ICA. This will also increase the interest of the scientific community in Singapore in the field of acoustics and help to increase the membership of SAS.

The events that were held on the occasion of the International Year of Sound that commemorated the International Noise Awareness Day, were the following:

1.A webinar was to be held on 29 April 2020. But due to COVID-19, it was postponed to 3 September 2020. It was held from 10.00 am to 2.30 pm with 4 speakers and 30 participants.

2.A webinar was held on 28 April 2021, Wed, with speaker Jim Chia of Polytec. The title was “Optical Measurement Solutions for noise,vibration,and hardness(NVH) testing”. There were 30 participants.

# SLOVENIA

## Report provided by the Acoustical Society of Slovenia (SDA)

Participating in international activities is important for Slovenia because it raises public awareness, especially among the youth, about the importance of the quality of the acoustic environment in the spaces where we live, work, learn, and spend our free time.

In Slovenia, we marked the International Year of Sound 2020-2021 by participating in the international competition “My World of Sounds”. The response was expectedly small, as schools were dealing with the challenge of remote work, so the entire teaching process required a lot of engagement from teachers, and therefore there was less interest in additional tasks. Nevertheless, we received illustrations from numerous schools, from which it was apparent that the perception of the auditory environment in children was greatly influenced by the time of the pandemic and the limited opportunities for walks and socializing.

### International year of sound student competition: “My world of sounds”

**Author:** Mineja Verhnjak (12 let), OŠ Muta

**Title:** The mask will not stop the sound of our laughter

As part of the INTERNATIONAL NOISE AWARENESS DAY 2020, we conducted an online survey among residents: "Sounds of Spring 2020." We aimed to gather feedback on how people experience the auditory environment during a period of significantly reduced environmental noise. Here are some reflections:

**International noise awareness day 2020: Sounds of spring 2020«**

- *When I looked into the sky a few days ago, I noticed that there hadn't been any trace of an airplane for a long time, and I also thought that I hadn't heard the sound of an airplane for a long time. I really missed that sound.*
- *I also noticed that there was more birdsong, which made me happy. The real relief, however, was when there was no longer the noise of cars.*
- *As I stepped out today, the noise of the cars literally hit me in the ears.*
- *I don't miss any sound. What's more, I already knew before that noise bothers me and causes headaches, but now I really enjoy the birdsong during the day and the complete silence at night.*
- *Traffic is slowly getting busier. Otherwise, yes, birdsong prevails, then in the centre of Maribor you can hear a great violinist or violinist who masters the instrument beautifully. Then there's the sound of the fountain in Slomšek Square. I thought this pause was great.*
- *Nature has gained the most.*

**Contribution of our song writer Leon Oblak**

# SPAIN

**3 - 5 March 2020**

**Sound Week Madrid**

The Sound Week Madrid was a series of events that included a scientific conference (V International Congress sound and audio-visual space) held in Madrid 3-5 March 2020 and two events in parallel: a workshop open to the public, and two concerts. On the last day there was a plenary session, open to all- scientist, artist, citizen etc.

Organization Responsible was the Universidad Autónoma de Madrid,

**12 - 14 March 2020**

**T3chFest**

T3chFest was a conference on innovation of new technologies. It took place in Madrid on 12-14 March 2020 in Leganés (Madrid, Spain). The audience consisted of both students and technology professionals, and each field of technological innovation was represented in the event with around 3 talks.

In this edition, 10 activities introduced sound innovation in different fields such as: wearables, video games, neuroscience, quantum computing, live coding and music production. They were grouped in an opening show, talks, technical workshops and initiation workshops.

Organization Responsible was T3chFest.

**14 - 15 October 2020**

**Acusti.cat – 3th Acoustics Congress of Catalonia**

The Congress addressed environmental noise pollution and specific current effective solutions for noise problems.

The third edition of the Congress focused on:

- Sound insulation and acoustic comfort in buildings (residential, commercial, educational, health.)
- Concepts related to acoustic quality such as cities and their soundscape or the value a more friendly sound environment in the cities.
- Acoustics and product and services design at the industrial and brand level (audio branding).
- Noise pollution management tools that administrations can implement to control and reduce noise.

The congress was mainly directed to professionals with knowledge of acoustics, but some sessions, related to the participation and citizen science section, are designed as educational for the general public interested in acoustics.

The main language was Catalan, but there were talks in English and Spanish as well.

The conference was held online as an e-conference in two parallel virtual rooms and was transmitted with live streaming from Sant Cugat del Valles, so that all those interested could follow it remotely. There were virtual meeting points with speakers and sponsors, as well as a virtual fair of products and services for sponsors.

Organizations responsible were: Department of Territory and Sustainability, Barcelona Provincial Council, Sant Cugat del Vallès Council, Sabadell Council, Catalan Association of Acoustic Consultants, Polytechnic University of Catalonia.

Website: https://www.congresacusti.cat/programa-definitiu

**11 November 2020**

**Contaminación acústica y Coronavirus (Noise Pollution and Coronavirus)**

An online webinar that discussed the transformations that the Coronavirus pandemic has produced in the soundscape of our cities and our homes.

Organization Responsible was ETSIS de Telecomunicación. Polytechnic University of Madrid.

**18 November 2020**

**Arqueología de los paisajes sonorous (Archaeology of soundscapes)**

On the occasion of the International Year of Sound, the National Archaeological Museum in Madrid with the collaboration of the University of Barcelona and the ERC project Advanced Grant Art soundscapes "The sound of special places: exploring rock art soundscapes and the sacred" (EC grant agreement 787842) organized a virtual meeting that brought together specialists in music and sound in Prehistory and Protohistory. During the opening session of the meeting, the President of the Spanish Acoustical Society Antonio Pedrero presented a talk on the International Year of Sound.

In addition, the Museum in commemoration of the IYS, organized a temporary exhibition "Vitrina CERO, Archaeology of Soundscapes" open to the public between 6 October 2020 and 10 January 2021.

**24 November 2020**

**Ambisonics**

The Audio Engineering Society (AES - Spanish branch) organized a webinar (online) on Ambisonics: A Powerful tools for developing spatial sound emotions. The webinar was open to AES Spain members and to the general public.

**4 February 2021**

**Artsoundscapes project seminar – "Cathedral acoustics: A methodology for its analysis and preservation"**

Cathedrals have historically been the central focus for cities and communities, playing a key role in their soundscapes. How sound is experienced in their interiors is an essential feature of cathedrals' character, and for this reason, the study and preservation of their acoustic environment has received growing attention in recent decades. This on-line seminar by Lidia Alvarez Morales focused on the methodology utilized to characterize the acoustic behaviour of a sample of European cathedrals. Its aim was to show how on-site measurements are applied to register a set of room impulse responses (RIR) that describes the current acoustic properties of each building, as well as on how simulation techniques are used to assess the influence of the most acoustically significant architectural changes that these cathedrals suffered through history, in an attempt to understand the impact of such changes on the sonic events that the listeners experienced in them over time.

Organization responsible was Universitat de Barcelona in the framework of the ERC Artsoundscapes project.

**3 March 2021**

**Presentation of the World Hearing Report**

The World Hearing Report prepared by the World Health Organization was presented in the form of an online webinar. The webinar began with a greeting from WHO. In addition, the event included a presentation on the situation of the treatment and prevention of hearing loss in Spain, and another presentation on the latest technological advances in the field of hearing aids. WHO was a partner of ICA in the celebration of the IYS 2020+.

Organization responsible was the Spanish Acoustical Society (Sociedad Española de Acústica).

**19 - 21 March 2021**

**Poetry and interactive sound: Project Conjuntos UC3M**

Carlos III University celebrated the World Poetry Day with a project that put together sound, poetry and technologies.

The interdisciplinary platform “Conjuntos” (supported by Daniel and Nina Carasso Foundation) tries to establish dialogues between arts and sciences. One of the main laboratories of the platform is called Dispares, where two people from different disciplines (artist and scientist students) work together. In this event one of the pieces made in this laboratory which combine poetry and interaction through sound and technology: “TERRACE” was presented.

It was in the form of an interactive sound carpet that returned an auditory construction of sounds and texts according to the paths users make walking along the carpet. The trajectory, permanence, movement and weight of the body of each user/reader generates, thanks to the algorithm, a unique composition of sounds and verses. Also, people could record some sounds and texts to add and complete the installation.

During the weekend of 19-21 March 2021, this installation could be visited on the ground floor of Casa del Lector in Matadero, Madrid. In addition to the interactive experience, throughout the day there were also small dance pieces to activate the installation.

This project was supported also by “Magic Outfit” a research project on sound funded by Agencia Estatal de Investigación.

Organization Responsible was Universidad Carlos III de Madrid.

**23 March 2021**

**Artsoundscapes project seminar**

The “Voice of the World - Sonic Ontologies in Native California” was the subject of an on-line seminar in which David Robinson provided a sketch of Native Californian concepts of sound, hearing, voice and ontology by focussing on the polycultural region of South-Central California. He looked at ethnographic accounts of the region to understand how Native Californian’s perceived different forms of sounds as different kinds of agency. He incorporated recent Native Californian concepts of song and sound through his collaborative work with the Tejon Indian tribe. This involved experimental work at the rock art sites of Pleito and Echo working with Jake Hernandez, a singer for the Tejon tribe, to consider the sonic possibilities of rock art and sonic agency. Finally, this research highlighted the deep importance of the Native voice in the revitalisation of both rock-art and wider society.

Organization Responsible was Universitat de Barcelona in the framework of the ERC Artsoundscapes project.

**7 April 2021**

**Professional meetings, Acoustics**

Meetings of professionals in the acoustics sector with students from different telecommunication engineering schools to teach the different professional opportunities within acoustic engineering and encourage them to continue their studies within this branch. The meetings were held on-line in Andalucía.

Organization Responsible was COITTA – SEA.

**28 April 2021**

**SoundWalk Sant Gervasi**

A soundwalk in Barcelona, in Plaça Bonanova was organized by La Salle University to listen to quiet places around the neighborhood and upload audio samples in Hush City App.

**5 - 7 July 2021**

**Web Audio Conference 2021**

The sixth Web Audio Conference (WAC) was organized from the 5th to the 7th of July 2021 at the Campus del Poblenou of the Universitat Pompeu Fabra in Barcelona, Spain. It was held on-line and was rescheduled from 9-11 December 2020.

WAC is an international conference dedicated to web audio technologies and applications. The conference addresses academic research, artistic research, development, design, evaluation and standards concerned with emerging audio-related web technologies such as Web Audio API, Web RTC, WebSockets and Javascript. The conference welcomes web developers, music technologists, computer musicians, application designers, industry engineers, R&D scientists, academic researchers, artists, students and people interested in the fields of web

development, music technology, computer music, audio applications and web standards.

The theme for the sixth edition of the Web Audio Conference was “The International Year of Sound”. Therefore, the organizers encouraged submissions focusing on inclusive sound computing, cultural sound computing, collaborative and participatory interfaces for generation, production, distribution and consumption of audio in any context of our society, as well as any other production which shows how sound is an essential part of communication.

The Proceedings of the Conference along with other related material can be found in https://webaudioconf.com/proceedings/

Organization Responsible was Universitat Pompeu Fabra (Music Technology Group) and SonoSuite..

# SWEDEN

**14 - 17 June 2021**

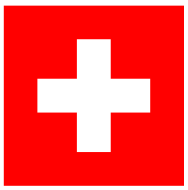
**ICBEN 2021**

The 13th Congress of the International Commission on Biological Effects of Noise (ICBEN 2021) was held at the Karolinska Institute, Stockholm, Sweden in virtual mode. Its theme was Noise as a Public Health Problem.

The Congress was rescheduled from 15-18 June 2020. The ICBEN 2021 organizational committee worked hard to arrange the congress in a new remote format and keep it as engaging as our usual congresses.

The organization responsible for the Congress was the Institute of Environmental Medicine, Karolinska Institutet.

# SWITZERLAND



**6 November 2020**

**SGA-SSA Fall Meeting 2020**

The Annual Fall Meeting of the Swiss Acoustical Society SGA-SSA was held on line via zoom and its subject was “Acoustics and Security”.

**20 May 2021**

**Spring Meeting of Swiss Acoustical Society**

The Spring Meeting of the Swiss Acoustical Society SGA-SSA was held on-line. The focus of the conference was on road traffic noise, but contributions on other types of traffic noise and on-land use planning were also scheduled. Among other topics, the conference dealt with the effect of speed limits and the problem of loudly driven vehicles. The conference was therefore also attractive for a broader audience.

**Contest Audio Binaural:**

**What does Switzerland sound like in 3D?**

For the International Year of Sound 2020-2021 and its 50th anniversary, the Swiss Society of Acoustics SGA-SSA looked for the most impressive binaural 3D sound recording. They looked for short binaural (dummy) 3D sound recordings of real Swiss soundscapes or of music performances with a duration of 1 to 6 minutes, illustrated with video or still image.

# TURKEY

**7 - 8 October 2021**

**National Acoustic Congress**

The National Acoustics Congress was held on 7-8 October 2021. The topic of the congress was ‘Sounds and Silence after 2020’ and it covered three major events we experienced in 2020 that re-emphasized the importance of the acoustics field: Pandemic, Earthquake, Protests. During the congress 3 panels with distinguished researchers on these topics were organized.

The National Acoustic Congress was open to the public. The Turkish Acoustical Society which is the Organization responsible for the Congress is trying to reach as many people as possible either they are academics, professionals or just interested in acoustics.

# UNITED KINGDOM

**24 February 2020**

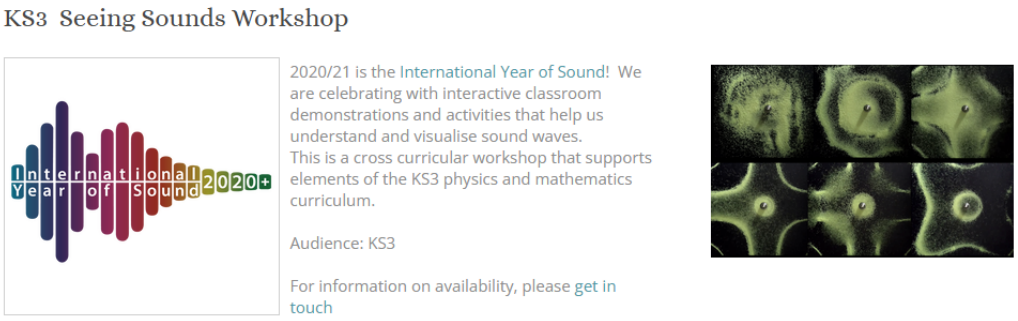
**Parliamentary and Scientific Committee**

The Institute of Acoustics presented to the UK Parliamentary and Scientific Committee in London on the subject of noise. They gave 3 x 15 minute presentations outlining both the positive and negative economic, social and health implications of sound. The presentations were followed by 30 minutes of questions with further discussions.

**2020-2021**

**Seeing Sounds Workshops**

Outreach workshops were held in local secondary schools. The organization responsible was the University of Manchester. They were originally scheduled for March 2020 but due to the Covid-19 pandemic they were extended to 2021.




Website: http://mwmresearchgroup.org/schools-and-colleges.html

**11 - 14 March 2020**

**See the Sound! Exhibit at The Big Bang Fair**

The Mathematics of Waves and Materials research had a stall at the Big Bang Fair in Birmingham, where visitors could explore the mathematics of sound waves and find out how we can use maths to reduce noise and improve our quality of life!

Organization responsible was the Mathematics of Waves and Materials research group, University of Manchester.

**2 July 2020**

**Acoustics, Music and Hearing**

An inaugural lecture on a collaborative project with the Royal Academy of Music on acoustics and hearing.

Professor Stephen Dance has spent the past 14 years collaborating with leading music organizations on acoustic solutions. Initially with the Royal Academy of Music when the Control of Noise at Work Regulations 2005 were introduced. This was followed in 2009 by the London Philharmonic Orchestra and Henry Wood Hall. More recently the Royal Opera House and St Paul's Cathedral have been supportive. The research focused on providing education, raising awareness, and producing designs which would allow these extraordinarily talented and dedicated professionals to continue to performance to the very highest standards.

The lecture that was held on-line combined architectural acoustics, audiology, product design, material science, education, noise control, and functional art. This was necessary as there is no golden bullet to solve the issue of, "music, is it noise?"

Organization responsible was London South Bank University and the Institute of Acoustics.

**16 July 2020**

**UK's Interactive 'Year of Sound' Exhibition**

Winchester Science Centre and Planetarium opened the UK's largest hands-on interactive exhibition about sound, vibration and hearing. The exhibition, designed to wow and delight, would excite and inspire children and their grownups in science, technology, engineering and maths. They would discover the science of sound through art, biology, physics, chemistry, nature, engineering, and interactive exhibits, live science shows and demonstrations. A full and brilliant day out for all the family!

The exhibition opened on 16 July 2020.

Organization responsible was Winchester Science Centre and Planetarium, in UK.

**21 July 2020**

**Using Bioacoustics for Field Survey**

This webinar that was held on-line was a great introduction for people to engage in acoustics and understand how they can add another dimension to their bird watching with sound recordings.

Bioacoustics is the study of animal ecology and behavior through the use of sound. This approach is commonly used by researchers and consultants studying bats and cetaceans in Europe and globally. The same approach can also be used for a variety of other species groups, including birds, mammals, amphibians and invertebrates, but is rarely used due to a lack of knowledge and established practice. This webinar will show how acoustic recording has a great untapped potential for tackling conservation issues, generating new data that could support the protection of rare species, and better understanding of the environment. The session will introduce and explain a range of hardware, software and field/analysis methods, demonstrating how bioacoustics can be used to determine presence/absence, distribution and populations of target species or

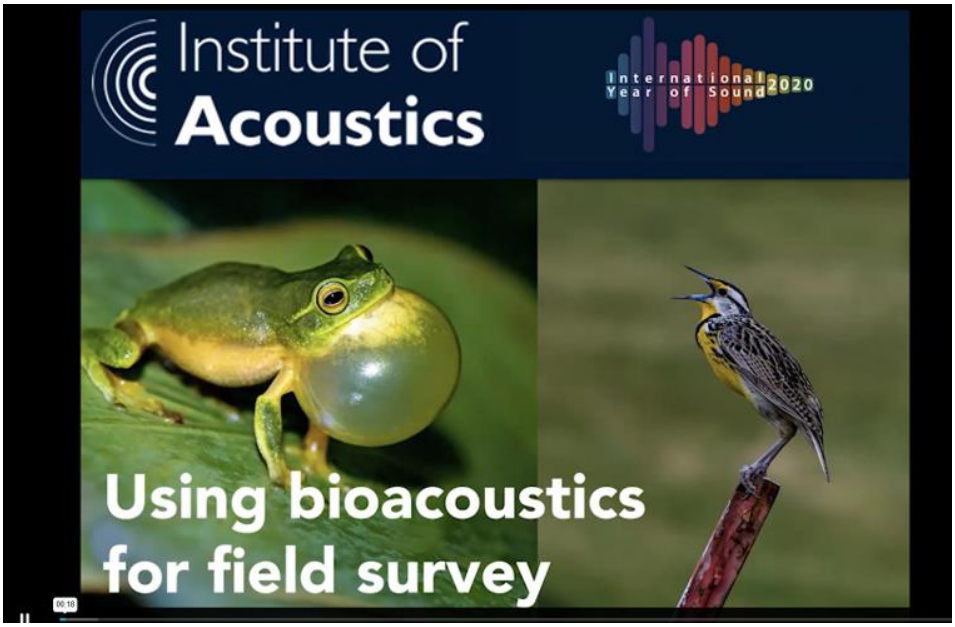
communities. The evidence for potential benefits, and disadvantages, will be explained, to allow attendees to understand how they might be able to use bioacoustics within their own practice.

Carlos Abrahams is Technical Director at Baker Consultants in Derbyshire and a Senior Lecturer on the Environmental Biology BSc at Nottingham Trent University. He has been working in ecology and nature conservation roles for more than 25 years, with expertise in ecological surveys, wetland ecology and bioacoustics. He has recently published a number of scientific papers on bird bioacoustics and is trying to develop the application of these methods within the UK.

This event was free to everybody, and members of the general public were welcome to attend. The presentation was pitched at a moderate level, in terms of the ecology and the acoustics knowledge required.

The webinar may be viewed at https://vimeo.com/441037598/5368374be5

Organization responsible was the Institute of Acoustics.



**9 September 2020**

**ICUA-2020**

The International Conference in Underwater Acoustics (ICUA-2020) organized by the Institute of Acoustics and originally scheduled for 6-10 July 2020, was eventually held on-line on 9 September 2020. The Conference is held every other year in some location in England and deals with underwater acoustic applications.

**Spring 2021**

**Birdsong and Bells — the Peak Sound Project**

In the spring of 2021 members of Harp & a Monkey (an award-winning art, music, and storytelling collective) were invited to undertake a new project in the Peak District National Park in England. Four different communities were chosen to take part by the community arts provider Live & Local. Biggin by Hartington, Calton, Tideswell and Great Longstone were chosen to reflect the diversity of lifestyles experienced across the Park – from larger tourist towns to small rural settlements.

The residents of these four communities, as well as volunteers working for the National Park, were invited to close their eyes and engage with their everyday experiences in a different way – by listening to the sounds that surround them; from the mundane to the magical. They were then invited to record them on their mobile phones and submit them for inclusion as part of a larger sound collage.

The result is this short film: BIRDSONG AND BELLS: THE PEAK SOUND PROJECT that can be found in https://youtu.be/GEMz2p18kJk

**26 May 2021**

**Metadiffusers- An Acoustic Solution to Improve the Environment for Musicians**

This was an outreach activity to musicians on how acoustics can improve their working environment. Suitable for the general public with an interest in unamplified music.

The introduction of the Control of Noise at Work Regulations 2005, enforced for entertainment in 2008, has resulted in music exposure based High Court Cases. Currently, there is no viable acoustic solution to improve the environment for musicians in orchestra pits with all recent research focused on auditorium acoustics. Thus, the long tradition of excellence in live performance is at risk in the UK. A new approach is needed which, rather than trying to reduce the sound could redistribute the sound, allowing more music to escape the orchestra pit and hence reach the audience and the conductor.

The key issue for the Royal Opera House was that very limited space was available, there being no room to retrofit any traditional acoustic solution. The research presented will show how metamaterials were developed which would diffuse broadband sound using ultra-thin panels, and how simulations predicted more music would leave the pit. This solution has yet to be implemented, due to COVID, but is seen as having great potential. Metamaterials have wider applications that go well beyond live performance applications.

This event was held online using Zoom and it was open to a general audience.

Organization Responsible was the Institute of Acoustics (IOA).

**3 June – 31 July 2021**

**IOA's soundscape competition for secondary schools**

This school competition was for a small team of students to produce a map of their local area, indicating the different sounds that can be heard at different

places. Students could be from different years and classes; however, they needed to be from the same school. They could use an existing map as the backdrop or sketch their own map to use. The map should cover an area of approximately 1 km x 1 km, so that the walk when exploring the soundscape was no more than 2 km in length. The map should be accompanied by a supporting description of at least 5 different places (e.g. road junction, park, playground), a list of what sounds that can be heard at each of the different places and photographs or drawings of the different sound sources making up the soundscape at each place.

The competition was organized by the Institute of Acoustics in the framework of the International Year of Sound 2020-2021.

Related link :

https://www.ioa.org.uk/sites/default/files/ioa-iys_schools_competition.pdf

**21 June 2021**

**Light & Sound for Heritage Sites**

A webinar to present the results of a study that was carried out in collaboration of the University College London (UCL), the Polytechnic Institute of Turin, Italy and University of Roma Tre, Italy, thanks to seed funding awarded via the Cities Partnership programme.

The novelty of this research is to identify a procedure aimed at evaluating the influence that different acoustic conditions together with the lighting that can induce on the people the perception of an artistically significant and relevant place, such as the archaeological area of the Colosseum in Rome (which includes the archaeological site called “Fori Imperiali”). The final goal was to define a procedure starting from the consolidated one for the soundscape analyses by implementing questionnaires and measurements with assessments also related to the lighting environment.

The webinar involved invited speakers from industry and professional bodies in UK and Italy for urban sound and light environments.

Organization Responsible was the University College London.

**26 March 2020-31 December 2021**

**The COVID-19 Sound Map**

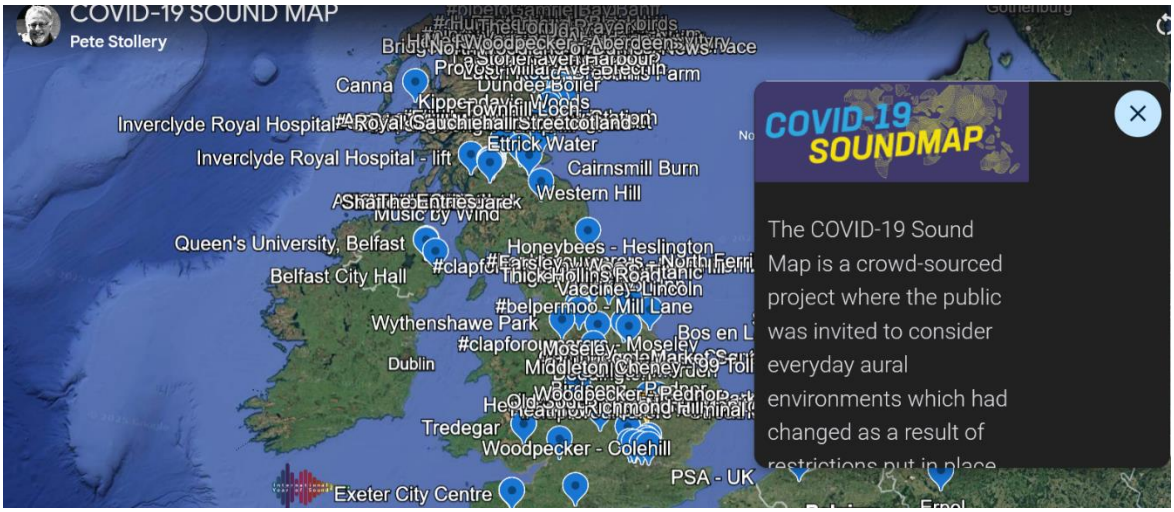
The COVID-19 Sound Map was a crowd-sourced project where the public was invited to consider everyday aural environments which have changed as a result of restrictions put in place around the world during the various periods of lockdown following the COVID-19 outbreak. The main aim of the project was to capture the sounds of a particular period of time, to document these sounds and preserve them on a Google Earth Web-based sound map which will be available in perpetuity so that these sounds can be (re-)listened to at any point in the future as a sonic memory of this unique period in our history.

Those submitting sounds are required to provide reflective text to accompany their sound which details the change in the soundscape as well as any effects that change has had on the person submitting. This is a crucial part of the project as reflection on sound is not easy and, in the strange, quieter times, we are allowed more time for contemplation. The sound map provides a rich database of captured sound and text from around the world which will be relevant for many years to come.

On 31 December 2021, 230 sounds had been submitted from 24 countries with 146 from the UK, 33 from mainland Europe and 51 from the rest of the world.

The map can be accessed on Chrome, Edge or Firefox browsers at: https://tinyurl.com/covid19soundmap or on mobile devices using the Google Earth app.

Organization Responsible was the University of Aberdeen.




**30 March 2022**

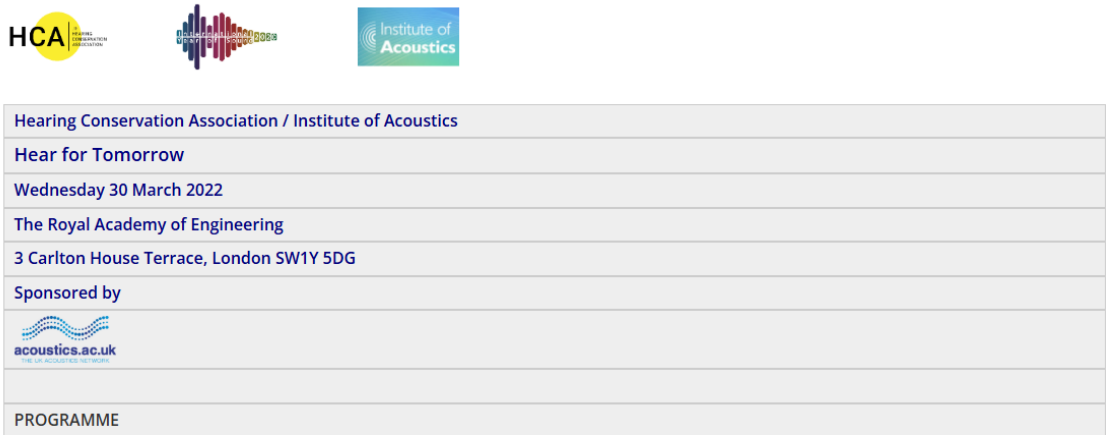
**Hear for Tomorrow**

Hear for Tomorrow was a meeting aimed to raise awareness of the effect of music on hearing health through sharing the latest research and solutions. The meeting aimed to cover the scale of the problem, what we now know, and what can be done. World leading specialists will deliver the cutting-edge knowledge to help inform decision makers and influencers on well-being and health issues for amateur players, professional musicians, casual listeners and festival goers!

The program was of interest to individuals working in the field of music and entertainment such as, live sound, DJs, musicians, those who serve the industry such as audiologists, researchers, health, safety & wellbeing consultants and key influencers for musicians such as music venues,technologists, conservatoires, music schools, employers and managers of musicians.

The event was held at the Royal Academy of Engineering, Pall Mall, London, UK, rescheduled three times, the original date being 8 April 2020. It was associated with the International Year of Sound.

Responsible organizations were UK Hearing Conservation Association and the Institute of Acoustics.




**Voices from the Peak**

Voices From the Peak was a series of immersive audio-artworks which take listeners on a journey through the UK's first National Park – the Peak District. Using acoustics of place, atmospheres, wildlife, weather, and voices past and present we discover the unheard soundscapes and stories of this strange and beautiful region. By linking Voices from The Peak with the International Year of Sound, the organizers motivated National Parks around the world will be inspired to celebrate their own sense of place and time – through sound.

Voices from the Peak were supported by Arts Council England; The Peak District National Park; Derbyshire County Council; and Cromford Mills.

A website dedicated to the voices from the Peak is accessible through:

https://markgwynnejones.com/voices-from-the-peak-2/

# UNITED STATES OF AMERICA

## Report provided by the Acoustical Society of America (ASA)

### Introduction

The Acoustical Society of America (ASA) is a premier international scientific society dedicated to generating, disseminating, and promoting the knowledge and practical applications of acoustics. Founded in 1929, ASA encompasses a broad range of disciplines related to sound, including physics, engineering, architecture, music, biology, medicine, and psychology. The ASA's mission for the International Year of Sound (IYS) was to increase and diffuse the knowledge of acoustics and promote its practical applications.

While many ASA IYS 2020+ activities were designed with a limited lifespan, their legacy endures. The innovative approaches and outreach strategies developed during the IYS 2020+ have been integrated into the Society's ongoing operations, ensuring that the spirit of the IYS 2020+ continues to thrive. These enduring elements reflect ASA's adaptability and commitment to promoting the importance of sound in our world.

### Overview

The ASA's contributions to the IYS 2020+ included a variety of activities aimed at inspiring the public to explore sound, despite the challenges posed by the global COVID-19 pandemic. These activities ranged from producing short acoustics-themed videos to hosting virtual demonstrations and online speaker events. The ASA also published a special issue of *Acoustics Today*. A detailed list of all ASA-supported activities and initiatives is available in "Acoustical Society of America: The International Year of Sound and Beyond," presented at Acusticum 2023.

**Planned and Adapted Activities**

As a member of the ICA-IYS Liaison Committee, the ASA had planned monthly events in the USA, beginning with the successful US Opening Ceremony. However, the outbreak of COVID-19 led to the cancellation of all subsequent in-person events. In response, the IYS 2020+ Steering Committee extended the IYS celebration into 2021, allowing the ASA to pivot to virtual content and eventually resume some in-person activities in 2021.

**Successful Activities**

Despite the pandemic, several IYS activities proceeded successfully:

- **US Opening Ceremony:** The ceremony featured talks by Dr. Josef Rauschecker & Gary Gottlieb, short acoustics videos, and a string quartet. The talks were also livestreamed for those who could not attend in person.
- **IYS Video Series:** ASA produced and released four brief videos aimed at a popular audience, highlighting various aspects of acoustics. The videos, available online with accompanying reading materials, have been viewed a combined total of 6,935 times.
- **Social Media Campaigns:** ASA leveraged social media for various campaigns, including a #JASAchat on Twitter for World Hearing Day 2020 and #MysterySoundMonday on Instagram. These campaigns facilitated engagement with the public on sound-related topics.
- **Special Issue of *Acoustics Today*:** This IYS 2020+ issue, designed for students, teachers, and leaders in various sectors, showcased the breadth of sound-related topics. It contains a special cover, an introduction from the ASA President, and seven article reprints.
- **Virtual Speaker Series:** ASA hosted three virtual presentations in the summer of 2020, featuring speakers from diverse backgrounds to pique

interest in non-acoustician audiences. The recorded videos of these events, available online, (https://www.youtube.com/playlist?list=PLCpwdWpezOe-AMX6R4A3mrRQVpng2zwvf) have been viewed a combined total of 11,387 times.

- **East and Southeast Asia Regional Section Acoustics Masters Lecture Series:** This series provides a platform for acoustics experts to share their knowledge with audiences across the globe, available at eseaasa.org. It underscores our dedication to reaching a diverse and international audience.
- **Acoustics at Home:** Developed by the Education in Acoustics Committee (EdCom), this virtual demonstration event replicated the educational experience of hands-on sessions at ASA meetings. The live event was attended by nearly 100 viewers, and the recorded video has been viewed 1,295 times.
- **Soundwalk:** Conducted during the 181st ASA Meeting in Seattle, Washington, participants explored urban acoustics and collected sound data, leading to another public event in 2022. See https://acoustics.org/media-invited-to-explore-urban-acoustics-with-a-sound-walk-of-nashville-asa183/
- **Wearable Sound Level Meter (WSLM):** This device, designed to raise awareness about sound levels, was used at various events and received positive feedback.

**Notable Collaborative Projects and Events**

The ASA's involvement in IYS 2020+ included several notable collaborative projects and events:

- **"My World of Sounds" Competition:** ASA selected finalists (https://acoustics.org/the-international-year-of-sound/) from the USA for the IYS international student competition. ASA awarded Arabelle Elliott and

Caius Elliot in the drawing category and Mary McNally in the stanza category. The three selected US finalists each received $200.00 from the ASA.

- **Science Outreach Catalyst Kits (S.O.C.K.s):** In partnership with the Society of Physics Students (SPS), the ASA contributed to the development of the 2020 SOCK , which focused on the physics of acoustics. These kits, designed for outreach presentations to elementary, middle, and high school students, included materials for demonstrations, a comprehensive manual, and instructions for creating engaging outreach activities.
- **Ingenierías:** To reach a broader international audience, *Ingenierías* translated select articles from *Acoustics Today* into Spanish. This IYS effort aimed to make acoustics knowledge more accessible to the Spanish-speaking community, resulting in seven English-to-Spanish article translations available online (https://acousticstoday.org/spanish-language-translations-of-articles-from-acoustics-today/).
- **Wikipedia Editing Workshop and Edit-a-thon:** During the 181st ASA Meeting in Seattle in November 2021, the ASA organized a Wikipedia Editing Workshop and Edit-a-thon (https://en.wikipedia.org/wiki/Wikipedia:Acoustical_Society_of_America/2021_conference) in collaboration with the National Institute for Occupational Safety and Health (NIOSH). Participants learned the basics of Wikipedia editing and contributed to improving acoustics-related content on the platform. This event resulted in 111 edits and 106 new references.

**More USA based activities shared with ASA**

At a Special Session of 181st ASA Meeting, members of the acoustics community shared what they did for IYS 2020+.

- ***Physics Today*:** To recognize the IYS 2020+, the American Institute of Physics (AIP) magazine, *Physics Today* devoted the December 2020 issue to

highlighting areas of acoustics research. Four feature articles were chosen with the help of past ASA president, Diane Kewley-Port.

- **Making waves:** Making waves is a partnership between educators, Grammy-winning musicians, and a small woodworking business that offers educational programs. In celebration of IYS, the team produced an arrangement of "The Sound of the World," with a video highlighting student learning and the musical heritage of the Elkhart community. The video is accessible here: https://www.youtube.com/watch?v=NbgO5ebBM6g
- **Centenary Sound Lab:** HEAD acoustics, in collaboration with Jaffe Holden Acoustics and Orchestra Hall acousticians, made analyzed and made presentations about the acoustics of the Detroit Orchestra Hall which included calibrated binaural playback in the Hall with ability to "jump" seamlessly during playback from any recorded seat to any other. https://www.dso.org/watch-listen-and-connect/latest-news/sight-and-sound-series

**Embracing Virtual Engagement**

Thanks to the lessons learned from the challenges of celebrating IYS during a global pandemic, ASA's outreach efforts have grown and improved. Since 2020, ASA has learned how to incorporate online events, leveraging digital and virtual platforms to maintain and expand our connections with members and the wider public interested in acoustics. This transition to virtual engagement has been instrumental in making acoustics more accessible and inclusive. Several virtual series, inspired by the success of IYS virtual activities, exemplify ASA's commitment to continuous learning and engagement:

- **Royster Student Poster Competition:** The Royster Student Scholarship Award is a Section-run poster competition held once a year for graduate students enrolled in a program involving acoustics, or senior undergraduate students expecting to enroll in such a program. Inspired by IYS 2020+ and

limited by the pandemic, the East and Southeast Asia Regional Section hosted the 2020 competition virtually (https://eseaasa.org/royster-student-scholarship-award-poster-sound-and-wellbeing/) Then in 2022, in collaboration with the Brigham Young University Student Section, the Spanish-Speaking Acousticians in the Americas Regional Section again hosted the competition virtually.

- **ASA Webinar Series:** The ASA established the webinar series to provide ongoing learning opportunities and engagement in acoustics throughout the year, as a supplement to content presented at regular ASA meetings. These webinars cover a wide range of acoustics topics including acoustical sciences, applications of acoustics, and careers in acoustics and are accessible to both members and nonmembers.
- **Psychological and Physiological Acoustics Virtual Reading Club:** The reading club spotlights one article from the most recent issue of *JASA* and includes a brief introduction by the authors and discussion from attendees. The club encourages members of the acoustics community to interact and brings attention to recently published work in Psychological and Physiological Acoustics.

The International Year of Sound provided ASA with an invaluable opportunity to innovate and expand outreach efforts. The challenges of the pandemic led to the adoption of new technologies and approaches, which have had a lasting positive impact on the Society. ASA's ongoing virtual events, meeting strategies, and continued commitment to making acoustics accessible to a global audience are direct results of the insights gained during the IYS 2020+ and the pandemic. This transformative period has strengthened ASA's ability to highlight the importance of sound and engage with a broader community, fulfilling the core intent of the International Year of Sound.

The ASA IYS 2020+ activities were funded in part by an AIP Venture Grant.

## Additional Events/Projects

**14 September 2019-23 October 2020**

**Detroit Orchestra Hall Centennial and Sound Lab — public demonstration**

On 23 October 1919, the Detroit Orchestra Hall was opened. It entered its Centennial Year 23 October 2019, celebrated through 23 October 2020. The first official event was an acoustic measurement and listening evaluation using five binaural head measurement systems throughout the hall, with the Detroit Symphony Orchestra playing the 4th Symphony of Brahms. After analysis, two public presentations were made in the Hall, including a panel discussion and a binaural listening session with ability to "jump" synchronously from seat to seat. Measurements, analysis and presentation were by HEAD acoustics, Inc. in collaboration with Jaffe Holden Acoustics, the Hall's acousticians.

The binaural measurements and analysis can be viewed in the PowerPoint presentation by Wade Bray made during the 181st Meeting Acoustical Society of America Seattle 29 November-3 December 2021.

A public presentation was held in Detroit Orchestra Hall on the evening of September 14, 2019, a panel discussion. Acousticians present included Wade Bray (HEAD acoustics) and Russell Cooper, Principal of Jaffe Holden Acoustics, the Orchestra Hall acousticians. Paul Ganson, the assistant principal bassoonist emeritus who led the rescue of Orchestra Hall, two Symphony musicians, and members of the press fill out the panel participant list.

Organization Responsible: Detroit Orchestra Hall, Detroit Symphony Orchestra

Website: www.dso.org/watch-listen-and-connect/latest-news/sight-and-sound-series


**First slide of the presentation by Wade Bray at the ASA meeting**

**8 June 2020**

**Sounds of the Ocean**

The event was held on-line.

The organizer was Embodied Sounds and the text below was the announcement of the event as it appeared in the IYS 2020+ web-site.

Oceans contain between 50-80% of all life on Earth. Come gather in community to experience the power of sound as a vibrational medium for stress relief, relaxation and deep tissue restorative healing. Take a break from our hectic pace of life and bathe yourself in nourishing, loving sounds of whales and dolphins.

In this offering, participants had the chance to dive deep into their own subconscious mind, while sonically travelling 3000ft beneath the Ocean's surface. They would receive healing tones from instruments including melodic percussion, water drums, crystal bowls, gongs, vocals and recordings of whales and dolphins from Monterey Bay, a natural underwater amphitheater in a National Marine Sanctuary.

The intention of the organizers was to use sound as a way to better understand ourselves, while supporting the planet which is at risk of increased shipping traffic and offshore drilling.

Website: www.soundsoftheocean.com/event-details/world-oceans-day-live-soundbath


**21 October 2020**

**Lyne Starling Trimble Public Lecture – Tests and Testing: The Case of Hearing and the Making of Modern Aurality in the Long Twentieth Century**

The Lyne Starling Trimble Public Lecture Series features prominent science historians and writers who highlight the important roles that science plays in modern society and culture. These lectures were captioned and free to attend. Dr. Alexandra Hui gave a virtual lecture on the history of scientific testing with sounds and the cultures which formed around sound.

Organization Responsible was American Institute of Physics. Website: www.aip.org/history-programs/events/lyne-starling-trimble-public-lecture-tests-and-testing-case-hearing-and

**27 October 2020**

**Virtual Science Cafe- National Museum of Medicine -The Ear**

Theresa Schulz, Ph.D., chief of prevention and surveillance at Department of Defense Hearing Center of Excellence, presented on-line how the ear functions, how hearing damage can occur when subjected to hazardous noise over time or from a one-time explosion, and the importance of hearing protection to maintain hearing health. She also featured demonstrations showing how sound travels through the ear to the brain, what happens to the ear when subjected to different doses of sound, and how earplugs work to seal out noise, depending on how well the earplug fits.

Website: www.facebook.com/events/334709241129803/

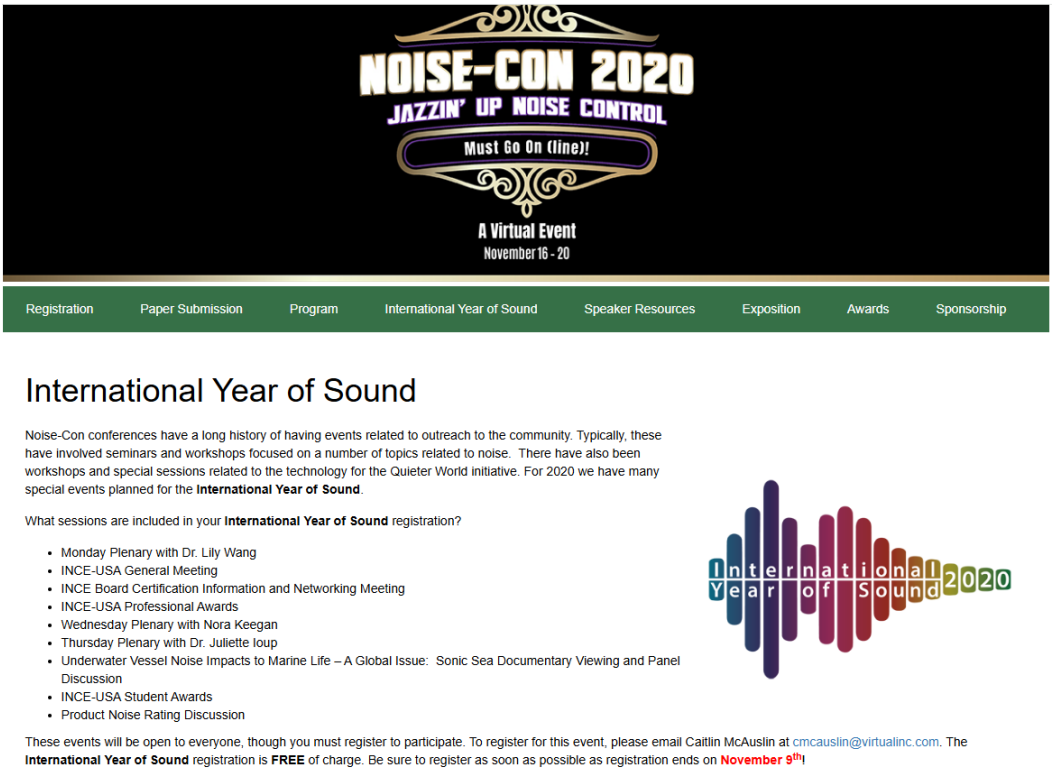
**16 - 18 November 2020**

**Noise-Con 2020**

The annual conference of the Institute of Noise Control Engineering (INCE) originally scheduled for New Orleans in June 2020 was re-scheduled for November and was held fully virtual. Outreach activities included public sessions related to noise in the ocean, product noise ratings, and a special session on hand dryer noise.

Organization Responsible was the Institute of Noise Control Engineering.

Website: www.inceusa.org/noisecon20/




**1 - 4 August 2021**

**INTER-NOISE 2021**

The 50th International Congress and Exposition on Noise Control Engineering was held virtually on 1-5 August 2021. Originally it was planned to be held with the live presence of the participants in Washington D.S. It was organized by the Institute of Noise Control Engineering of the USA (INCE-USA) and Pro Acustica (Brazil), on behalf of the International Institute of Noise Control Engineering (I-INCE). The Congress theme was "Next 50 Years of Noise Control", and the program covered all aspects of noise control engineering, acoustics and vibration. Special sessions or events were held on the 50th inter-noise congress anniversary and on other relevant topics.

YouTube: https://www.youtube.com/watch?v=iiJeLnu6zZE

# COLLABORATIONS WITH ORGANIZATIONS

The International Year of Sound 2020-2021 established collaborations with Organizations and Institutes world-wide that promote science in general or undertake initiatives to enhance the role of sound and acoustics in our lives in line with the IYS 2020+ objectives.

The most important of these Organizations were

- The International Science Council (ISC)
- The World Health Organization (WHO)
- The Center for Hearing and Communication (CHC)
- The UK Acoustics Network (UKAN)
- The National Institute for Occupational Safety and Health (NIOSH)

Below is a summary of the missions of these organizations and how they contributed to the IYS 2020+.

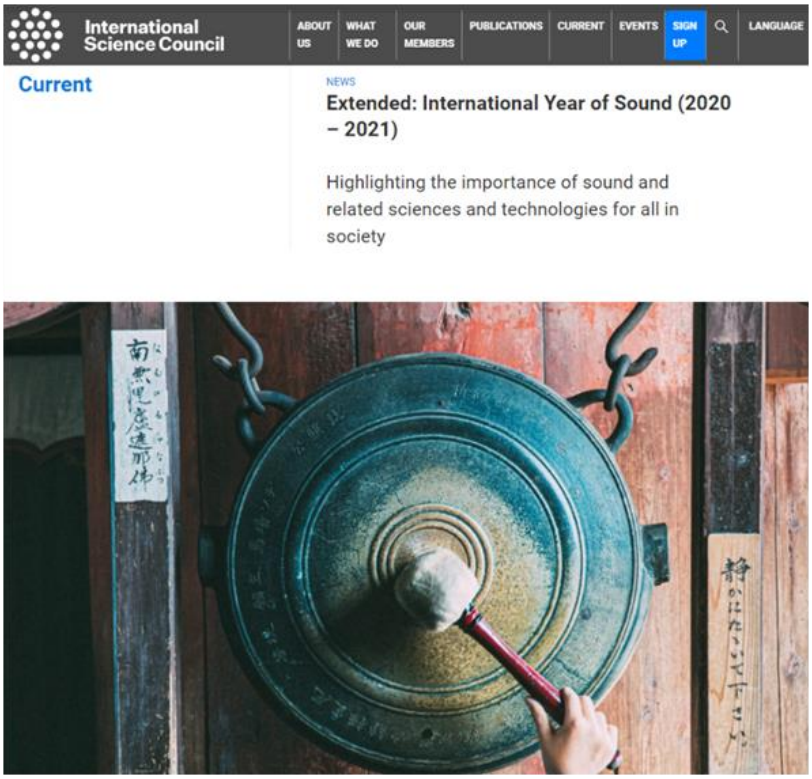
## International Science Council

The **International Science Council (ISC)** was created in 2018 by the merging of the International Social Science Council (ISSC) and the International Council for Science (ICSU). The International Commission for Acoustics, a former affiliated member of the ICSU was automatically appointed as affiliated member of the ISC.

The ISC is a non-governmental organization with a unique global membership that brings together 40 international scientific Unions and Associations and over 140 national and regional scientific organizations including Academies and Research Councils. It is the only international non-governmental organization bringing together the natural and social sciences and the largest global science organization of its type.

ISC gives priority to communication between social sciences and basic sciences and about the role of science in the international political scene. In this respect and from the very beginning ISC supported the concept of the IYS, recognizing that the IYS objectives were in line with those of the ISC.

The ISC endorsed the celebration and promoted the IYS 2020+ through their website by hosting an extended summary of the scope and activities of the IYS 2020+.




Of particular interest was a news item also posted in the ICS Website, that described a musical composition based on the protein chain structures within the COVID-19 virus. This item was posted especially to commemorate the year 2020 as the International Year of Sound.

https://council.science/news/the-sound-of-science-the-sars-cov-2-virus-as-a-piece-of-classical-music/

Thus, the mission of the IYS 2020+ was brought through the ISC to the attention of a wide scientific audience covering all areas of science.

## World Health Organization


The ICA had established links with the **World Health Organization (WHO)** in particular with respect to the WHO World Hearing Day. The intent of this day to highlight the need for improving and protecting hearing health is in alignment with the overall aims of the ICA and the IYS 2020+.

As hearing health was a priority area for the IYS 2020+, the WHO agreed to support the IYS 2020+. **Dr. Shelly Chadha**, Technical lead, Ear and hearing care at World Health Organization presented a greeting on behalf of the WHO during the opening of the IYS 2020+. She also submitted an article for the "top Stories" section of the IYS Website to highlight the importance of coordinated public health strategies to prevent and address hearing loss at all stages of life. This article can be found in Annex I of this report.

The World Hearing Day on 3 March 2021 was the subject of webinars and events held in several countries around the globe. These events were promoted through both the WHO and the IYS 2020+ websites.

## Center of Hearing and Communication

The mission of the **Center of Hearing and Communication (CHC)** based in New York, is to provide high-quality, comprehensive services to empower people affected by hearing loss, deafness, or listening challenges. International Noise Awareness Day (INAD) was established by the CHC to raise awareness about the harmful effects of noise on hearing, health and quality of life. The ICA has established links with CHC in respect to the annual INAD. The ICA helps to promote and encourages the member societies to undertake activities to support the aims of INAD.

On the occasion of the IYS 2020+, ICA undertook greater promotion of the INAD 2021 to encourage member societies to include such activities as part of the IYS 2020+ celebrations. In return, CHC promoted the IYS 2020+ through their Website and by means of a webinar under the title " Acoustic Experts Discuss the Role of Sound in our Lives" which is available from Youtube : https://www.youtube.com/watch?v=1B1iMEywasY. **Nancy Nadler**, Deputy Executive Director, of CHC discussed with **Marion Burgess** and **Michael Taroudakis** the objectives of the International Year of Sound along with the activities for the INAD that were planned by the national societies.

The Website of the IYS 2020+ hosted as a top story, an article submitted by Nancy Nadler for INAD 2021 under the title "Noise Matters" that can be found in Annex I of this report.

## UK Acoustics Network

The vision of the **UK Acoustics Network, (UKAN)** which is a UK-based institution is:

(i) to promote acoustics related research in the UK both nationally and internationally;

(ii) to provide a coherent single point of access to the acoustics research community for industry and governmental agencies; and

(iii) to support pilot/explorative projects that can be developed into competitive full-scale proposals to initiate research areas which are new to UK or strategically important nationally;

As this vision clearly aligns with the IYS, UKAN collaborated with the IYS 2020+ in several ways :

**UKAN in the IYS 2020+ Opening Ceremony**

Installations of multizone sound field reproduction were arranged by UKAN and were set up in the Foyer of the Sorbonne Amphitheater and viewed by all those attending the IYS 2020+ Opening Ceremony. These installations had been created by researchers from the Institute of Sound and Vibration Research (ISVR – University of Southampton, UK).

**A "World of Sound" to encourage kids into science**

To celebrate the International Year of Sound 2020-2021, the UK Acoustics Network initiated a collection of articles on A **World of Sound** for **Frontiers for Young Minds Collection** aimed at an audience of ages 8-15. The requests for these articles were promoted via the IYS 2020+. These articles were written by experts from the UK Acoustics Network and the International Year of Sound team and explore the fascinating world of sound and how it benefits and excess sound causes problems to people, other animals, and our environment. The 27 articles can be found at: https://kids.frontiersin.org/collections/17985/a-world-of-sound. They include a balanced representation of topics across all aspects of acoustics.

**The Rest is Just Noise**

The Rest Is Just Noise is a monthly podcast supported by the UK Acoustics Network (UKAN), exploring the relationship between sound and our cities. In each episode, three passionate and enthusiastic hosts, **Andrew Mitchell, Tin Oberman, and Francesco Aletta (**soundscape researchers from University College London) are joined by expert guests from fields such as acoustics, architecture, and environmental psychology, to discuss their latest work and introduce our audience to the science, beauty, and noise of urban sound. On March 02, 2021 the 3rd episode of the podcast was devoted to the IYS 2020+ and guests were **Marion Burgess**, **Michael Taroudakis** and **Jean-Dominique Polack**, who discussed with the hosts the objectives and the events of the IYS. The Podcast under the title "The Year of Sound (among other things)" can be found at

https://www.justnoisepod.com/1438372/episodes/8050704-ep-3-2020-was-the-year-of-sound-among-other-things-with-marion-burgess-michael-taroudakis-jean-dominique-polack

**Teaching music in deaf schools using vibration**

UKAN have funded a video from the Special Interest Group in Vibro-acoustics (SIGVA) from the Acoustics Research Unit (ARU) at the University of Liverpool who loaned vibrotactile equipment to the Royal School for the Deaf Derby to aid music education. A part-time music teacher helped us gain access to the school and the permanent music teacher did a great job adapting the technology into his teaching. This was the first time it was really feasible to teach pitch to the children. Observations indicated that there are likely to be generations of deaf children who have misunderstand pitch – in this group of deaf children many initially thought that a high level of sound or vibration equated to high pitch.

The video can be watched through the following link : Video or by scanning the QR code below.

## National Institute for Occupational Safety and Health

The **National Institute for Occupational Safety and Health (NIOSH)** is the federal institute responsible for conducting research and making recommendations for the prevention of work-related injury and illness. NIOSH is part of the US Centers for Disease Control and Prevention (CDC), in the Department of Health and Human Services (DHHS).

The NIOSH, took the lead in designing the online event, **Wiki4YearOfSound2020**. The aim of this activity was to facilitate the improvement of Wikipedia content related to acoustics, sound, human communication, music, noise its effects and control, and soundscapes. This campaign expanded on a previous successful campaign for Wiki4WorldHearingDay2019.

This initiative falls into the categories of awareness raising and education, utilising the existing format of Wikipedia to expand and enhance quality information related to acoustics. The work became twofold. One part was to identify gaps and fill those in the exiting content on Wikipedia and relating to acoustics. A second part was to translate existing content into a wide range of languages.

The platform Wiki4YearOfSound2020 (https://meta.wikimedia.org/wiki/Wiki4YearOfSound2020), which is still functioning, provides guidance on how to improve Wikipedia articles analog with information on how to translate Wikipedia articles. In addition, users can donate images and other media to the open access repository WikiCommons. A companion page, the Wikimedia outreach dashboard (https://outreachdashboard.wmflabs.org/courses/National_Institute_for_Occupational_Safety_and_Health/Wiki4YearofSound2020), allowed anyone to monitor contributions and reach, with great level of detail and accuracy.

This page can be also accessed by scanning the QR code below

A key feature of the success of this activity was the hands-on workshops to bring together Wikipedia editing veterans with acoustics experts. These workshops were scheduled during conferences of both NIOSH and the Acoustical Society of America.

# MEDIA COMMUNICATIONS – PUBLICATIONS

Among the means to promote the IYS and convey the message of the IYS 2020+ to a greater audience, publications in newspapers and non-scientific journals, special issues of scientific journals, video productions transmitted through the internet and interviews, were those which could be considered as the most efficient ones.

This Section refers to some of these communications with links to the internet whenever possible.

## Interviews - Podcasts

**SKAI CRETE interview 17 February 2020**

The Greek journalist **Eleni Vakethianaki** invited **Michael Taroudakis** co-coordinator of the IYS 2020+ at the studio of the radio station SKAI 92.1 in Heraklion, (Greece) to discuss about the International Year of Sound and the importance of sound for our lives. It was an interview transmitted live, just before the lock-down period on **17 February 2020**.


**Picture taken during the Interview of Michael Taroudakis**

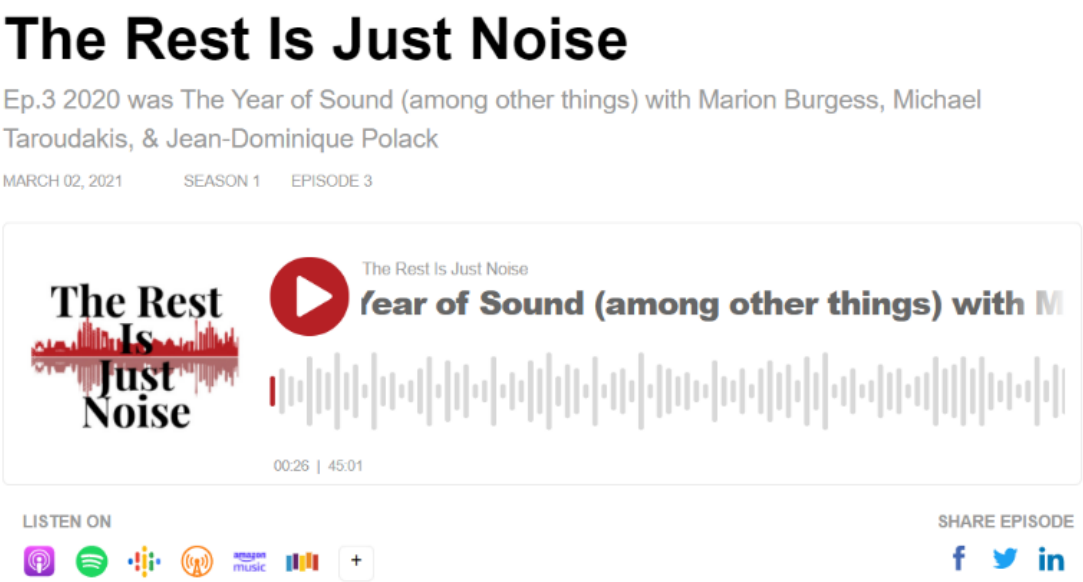
**The Physics Teaching Podcast, 5 March 2020**

**Keeta Jones** Education and Outreach Coordinator of the Acoustical Society of America (ASA) discussed on **5 March 2020**, with the producers of the Physics Teaching Podcast (USA) about the way that the ASA is supporting the International Year of Sound with a resource pack for teachers and a competition for kids. She also described the myriads of places that acousticians are found in the workplace.


**The Rest is Just Noise Podcast, 02 March 2021**

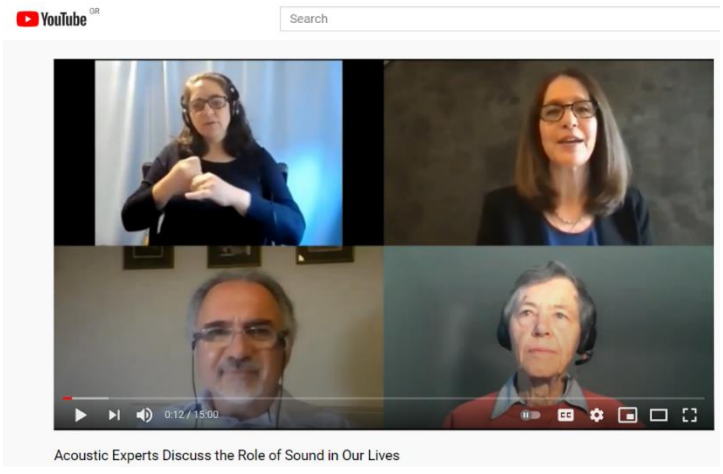
The 3rd episode of the Podcast "The Rest is Just Noise" on **2 March 2021** organized by the UK Acoustics Network and hosted by **Andrew Mitchell, Tin Oberman, and Francesco Aletta** was devoted to the IYS and guests were **Marion Burgess, Michael Taroudakis and Jean-Dominique Polack**, who discussed with the hosts the objectives and the events of the IYS. The Podcast can be wached in

https://www.justnoisepod.com/1438372/episodes/8050704-ep-3-2020-was-the-year-of-sound-among-other-things-with-marion-burgess-michael-taroudakis-jean-dominique-polack




**Center for Hearing and Communication interview 21 March 2021**

**Nancy Nadler** (Center of Hearing and Communication) invited **Marion Burgess and Michael Taroudakis** on **21 March 2021**, to discuss the role of sound in our lives and the structure of the IYS. This was a CHC initiative with simultaneous sign translation was transmitted live through YouTube and is still available on: https://www.youtube.com/watch?v=1B1iMEywasY




**Screenshot of CHC organized interview available at YouTube**

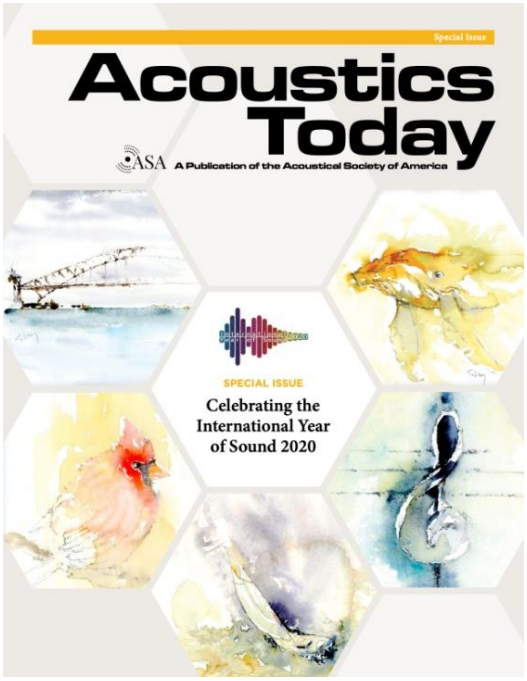
# Publications

## Acoustics Today Celebrating the International Year of Sound

This special issue of Acoustics Today has been produced by the Acoustical Society of America (ASA) for students, teachers, and leaders in industry, government, and academia to showcase the breadth of sound around us. The purpose of this special issue of Acoustics Today is to introduce the reader to some of the different areas of acoustics. The articles were chosen from the more than 300 that have been published in Acoustics Today over the past 15 years to represent not only diverse areas of interest in the ASA but also to highlight some of the issues that might be of most interest to the readers of this issue. The Acoustics Today website (acousticstoday.org) is reachable by everybody and all the articles are open access and can be downloaded at no cost.

The special issue can be accessed through the link below or by scanning the QR code

https://acousticstoday.org/acoustics-today-celebrates-iys-2020/



## Paisajes Sonoros del Maestro Roncador (Sound Landscapes of the Snoring Professor)

The Spanish Acoustic Society has published a book written by Francesc Daumal, as a contribution of the International Year of Sound 2020+.

The book, entitled “Paisajes Sonoros del Maestro Roncador” (Sound Landscapes of the Snoring Professor), is a fun story that, through different episodes of the professor’s life, explains the fundamental principles of acoustics and soundscapes.

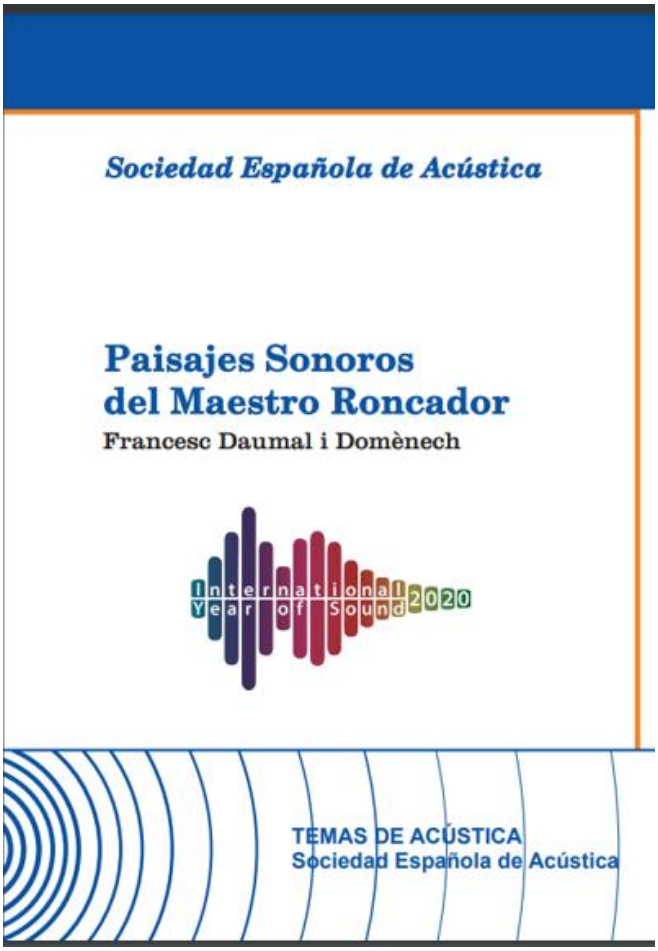
Francesc Daumal is an architect, Professor at the Polytechnic University of Catalonia and a member of the Spanish Acoustic Society.

This book is the continuation of the previous book, Maestro Roncador, published by the Spanish Acoustical Society in 2014, within the collection “Temas de Acústica”. The book tells the most important episodes in the life of a professor (Maestro Roncador), which shows his students, in his unconventional classes, the sound experiences in the most practical and attractive way that can be done. In addition, episodes from the personal life of the maturity and old age of the professor are recounted, which unequivocally reveal his personality.

The book may be freely downloaded using the link :

https://documentacion.sea-acustica.es/storage/publicaciones/614e44750c58e.pdf

or by scanning the QR code to the right


Sociedad Española de Acústica
Paisajes Sonoros
del Maestro Roncador
Francesc Daumal i Domènech
International Year of Sound 2020
TEMAS DE ACÚSTICA
Sociedad Española de Acústica

## General articles in newspapers and journals

### Editorial by Brigitte Schulte-Fortkamp in the Akustik Journal 01_20

The editorial article for the IYS 2020+ in the German journal Akustik.



# Editorial

**2020 – das Internationale Jahr des Sounds**



Liebe Leserinnen und Leser,

Am 31. Januar hat in Paris die Auftaktveranstaltung zum „International Year of Sound" stattgefunden. Viele akustische Gesellschaften aus aller Welt waren vertreten, um dieses Jahr, das sich um akustische Informationen und ihre Bedeutung im Alltag drehen soll, zu eröffnen.

*Brigitte Schulte-Fortkamp Vertreterin der DEGA im Coordinating Committee zum International Year of Sound*

Das „International Year of Sound" ist eine weltweite Initiative der International Commission for Acoustics (ICA) - in Kooperation mit weiteren internationalen Dachverbänden für Akustik. Am 29. März 2019 erfolgte die Deklaration des "International Year of Sound" durch die International Commission for Acoustics. Mit ihrem Format für das „International Year of Sound" folgt sie dem Format der UNESCO für Events, die von einem internationalen Liaison Committee organisiert werden. Weltweit werden viele Veranstaltungen stattfinden, die sich mit Akustik im alltäglichen Leben befassen. Die Webseite *https://sound2020.org/* gibt eine Übersicht zu vielen dieser vielseitigen Veranstaltungen, bietet aber auch Glossars zu Sound, zu wissenschaftlichen Fragestellungen von Sound, und auch zu Sound und Gesellschaft an.

Geräusche und Sound, Schall und Klänge begleiten uns nicht nur in unserem Alltag, vielmehr strukturieren sie den Alltag, vermitteln Wohlbefinden und Unbehagen, bereichern unser Leben ebenso wie sie es aber auch belasten können. Im „ International Year of Sound" bieten sich viele Möglichkeiten den verschiedenen Akzentuierungen von „Sound" in Kooperationen nachzuspüren, auch im wissenschaftlichen Alltag auf Kommunikation über Sound zu setzen, Erkenntnisse aus einträglichen Fachgebieten wie z. B. Elektrotechnik, Fahrzeug- und Maschinenbau, Medizin, Musik, Physik, Psychoakustik, Psychologie, Soundscape, Umweltschutz abzugreifen und nutzbar zu machen für eine erweiterte Öffentlichkeit. Warum nicht z. B. die Leitlinien der WHO zum Umgebungslärm noch einmal in den Fokus stellen oder die neuesten Ergebnisse aus der Lärmwirkungsforschung erneut diskutieren, die auch die Erkenntnisse der Soundscapeforschung und Psychoakustik einbeziehen? Warum nicht nach den potenziellen Auswirkungen von E-Mobilität fragen oder neue Vereinbarungen über akustischen Komfort zu erzielen? Oder auch sogar die Stadt der Zukunft, Verdichtung von Lebenslagen zum Thema machen?

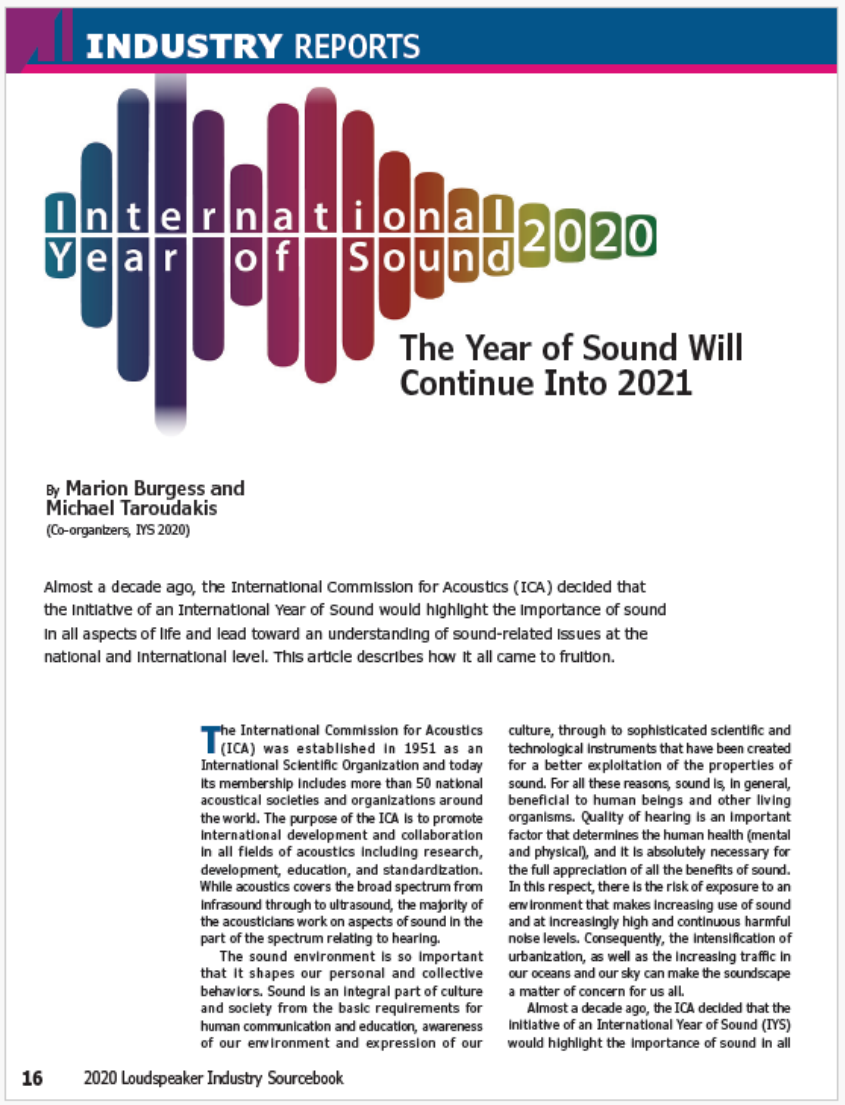
Mit konzertierten Veranstaltungen und auch Publikationen beteiligt sich die Deutsche Gesellschaft für Akustik (DEGA) am „International Year of Sound" Im Kontext der DEGA-Aktion „Tag gegen Lärm 2019 " wurde ein Bilder- und Videowettbewerb an Schulen durchgeführt, dessen Ergebnisse im „ International Year of Sound" auf *www.so-klingt-meine-welt.de* und als Youtube-Video zu sehen sind. Bei der Jahrestagung „DAGA" im März 2020 sollen zum 50-jährigen Tagungs-Jubiläum besondere Rückblicke und Ausblicke auf technische Innovationen im Bereich Akustik präsentiert werden. Eine Übersicht über die Aktivitäten der DEGA ist auf der Webseite *www.dega-akustik.de/iys2020* zu finden und wird laufend ergänzt.

Das „International Year of Sound" gibt uns allen die Chance, die Diskussion über Akustik, Geräusche, Schall und Klang in die Öffentlichkeit zu tragen, mehr zu lernen über Geräusche und ihre Wirkungen aus unterschiedlichsten Perspektiven. Wir sollten dem erklärten Ziel folgen, mit der DEGA auch in Zukunft einen positiven Beitrag zur Stärkung der Akustik zum Wohl der Gesellschaft zu leisten, uns beteiligen am „International Year of Sound", und unsere Beiträge zur Akustik in diesem Jahr bewusst in diese weltweite Kooperation einbinden.

Ihre
Brigitte Schulte-Fortkamp

**Article by Marion Burgess and Michael Taroudakis in Loudspeaker Industry Sourcebook**

The On-Line Loudspeaker Industry Sourcebook hosted in 2020 an article by Marion Burgess and Michael Taroudakis on the IYS 2020+, its objectives and events.



INDUSTRY REPORTS

International Year of Sound 2020

# The Year of Sound Will Continue Into 2021

By Marion Burgess and Michael Taroudakis
(Co-organizers, IYS 2020)

Almost a decade ago, the International Commission for Acoustics (ICA) decided that the initiative of an International Year of Sound would highlight the importance of sound in all aspects of life and lead toward an understanding of sound-related issues at the national and international level. This article describes how it all came to fruition.

The International Commission for Acoustics (ICA) was established in 1951 as an International Scientific Organization and today its membership includes more than 50 national acoustical societies and organizations around the world. The purpose of the ICA is to promote international development and collaboration in all fields of acoustics including research, development, education, and standardization. While acoustics covers the broad spectrum from infrasound through to ultrasound, the majority of the acousticians work on aspects of sound in the part of the spectrum relating to hearing.

The sound environment is so important that it shapes our personal and collective behaviors. Sound is an integral part of culture and society from the basic requirements for human communication and education, awareness of our environment and expression of our culture, through to sophisticated scientific and technological instruments that have been created for a better exploitation of the properties of sound. For all these reasons, sound is, in general, beneficial to human beings and other living organisms. Quality of hearing is an important factor that determines the human health (mental and physical), and it is absolutely necessary for the full appreciation of all the benefits of sound. In this respect, there is the risk of exposure to an environment that makes increasing use of sound and at increasingly high and continuous harmful noise levels. Consequently, the intensification of urbanization, as well as the increasing traffic in our oceans and our sky can make the soundscape a matter of concern for us all.

Almost a decade ago, the ICA decided that the initiative of an International Year of Sound (IYS) would highlight the importance of sound in all

16 2020 Loudspeaker Industry Sourcebook

The publication can be accessed through the following link

https://www.calameo.com/kck-media/read/0053543533249d273ae4b?authid=AvlB4EBfh7Et

**Article by Michael Taroudakis in the Greek Newspaper "To Vima"**

The Greek journal with the highest tirage in Greece hosted an article by Michael Taroudakis on the International Year of Sound 2020-2021 with subtitle "The importance of sound in our lives".

# 2020-2021, Διεθνές Ετος Ηχου: Η σημασία του στη ζωή μας



Μιχάλης Ταρουδάκης

Διανύουμε εφέτος τη δεύτερη περίοδο του Διεθνούς Ετους Ηχου (International Year of Sound). Τα Διεθνή Ετη ανακηρύσσονται από τον Οργανισμό Ηνωμένων Εθνών με πρόταση συνήθως από την UNESCO ή από διεθνείς επιστημονικούς οργανισμούς, με στόχο την ευαισθητοποίηση της κοινωνίας σε σημαντικά θέματα που έχουν μεγάλη κοινωνική, πολιτική αλλά και επιστημονική διάσταση.

Το 2020 ανακηρύχθηκε αρχικά από τη Διεθνή Επιτροπή Ακουστικής (International Commission for Acoustics), που είναι ο παγκόσμιος επιστημονικός οργανισμός για τα θέματα της ακουστικής, ως Διεθνές Ετος Ηχου ακολουθώντας τη διακήρυξη της UNESCO 39C/49 του 2017, με την οποία αναγνωρίζεται η σημασία του ήχου στον σημερινό κόσμο.

Ο ήχος, πέρα από το κύριο μέσο επικοινωνίας μας, είναι βασικό μέσο εκπαίδευσης και μεταφοράς πολιτισμού, ενώ τα τελευταία χρόνια ο ήχος στο υψηλό φάσμα των μη ακουστών συχνοτήτων του (υπέρηχοι) αποτελεί βασικό και πολύτιμο μέσο ιατρικής διάγνωσης. Η μουσική είναι ίσως η πιο οικεία μορφή πολιτιστικής δημιουργίας που βασίζεται στους ήχους, ενώ η ομιλία είναι κύριος φορέας μετάδοσης γνώσεων, απόψεων και εν γένει στοιχείων που αφορούν τη ζωή μας στο κοινωνικό σύνολο.

Είναι λοιπόν φυσικό να προσπαθούμε να αξιοποιήσουμε τον ήχο με τον καλύτερο τρόπο, αλλά επίσης να διαφυλάξουμε τη δυνατότητα να ακούμε με τη βέλτιστη δυνατή ποιότητα. Η έννοια του ηχοτοπίου αποτυπώνει το ακουστικό περιβάλλον στο οποίο ζούμε και το οποίο είναι αναπόσπαστα συνδεδεμένο με την ψυχική αλλά και σωματική μας υγεία, καθώς είναι γνωστό ότι η έκθεσή μας σε υπερβολικούς ήχους αλλοιώνει τα ψυχοσωματικά μας χαρακτηριστικά. Το υγιές περιβάλλον και συνακόλουθα το υγιές ακουστικό περιβάλλον αντικατοπτρίζει και διαμορφώνει την ατομική και συλλογική συμπεριφορά μας, καθώς και την παραγωγικότητά μας. Δυστυχώς η ανθρώπινη παρέμβαση στο ηχοτοπίο, μέσω της χρήσης της σύγχρονης τεχνολογίας βιομηχανικής παραγωγής αλλά και του συνόλου των μέσων μαζικής μεταφοράς που αναγκαστικά εισάγουν υπερβολικά επίπεδα θορύβου

# SPECIAL SESSIONS FOR THE IYS 2020+

Two special sessions devoted to the IYS 2020+ were organized in major International Conferences. The first of them was held in the framework of the ASA Meeting in Seattle on Friday 3 December 2021 and the second one, which is considered as the closing event of the International Year of Sound 2020-2021, was held in Torino, Italy, during the FORUM ACUSTICUM 2023 on Friday 15 September 2023.

## 181st Meeting of the Acoustical Society of America, Seattle (WA): International Year of Sound Potpourri

The special session was organized and chaired by **Michael Vorlander** (Germany), **Mark Hamilton** (USA) and **Keeta Jones** (USA). Michael Vorlander is former President of the ICA and member of the IYS 2020+ Steering Committee, Mark Hamilton was President of the ICA at the time of the Conference and Keeta Jones was the representative of ASA for the IYS 2020+.

The session was very successful as there were 12 talks, all of them presenting various events and initiatives about the IYS 2020+. It was the first time the IYS 2020+ its history and events were presented in such a detail in an international Conference.

The list of talks copied from the program book of the Conference is as following:

5aAA1. **International Year of Sound 2020–2021: History and objectives**. Marion Burgess (Univ. of New South Wales, Sydney, New South Wales, Australia) and Michael Taroudakis (Mathematics and Appl. Mathematics & IACM, Univ. of Crete, Voutes University Campus, Heraklion 70013, Greece, taroud@uoc.gr)

5aAA2.**International Year of Sound 2020–2021: Main events and achievements**. Marion Burgess (Univ. of New South Wales, Sydney, New South Wales, Australia), Michael Taroudakis (Mathematics and Appl. Mathematics & IACM, Univ. of Crete, Voutes University Campus, Heraklion 70013, Greece, taroud@uoc.gr), Michael R.

Stinson (none, Carlsbad Springs, ON, Canada), and Jean-Dominique Polack (Inst. D'Alembert, Sorbonne Univ., Paris, France)

5aAA3. **Acoustical Society of America and the International Year of Sound**. Keeta Jones (Acoust. Society of America, 1305 Walt Whitman Rd., Ste. 300, Melville, NY 11747-4300, kjones@acousticalsociety.org)

5aAA4. **IYS Outeach through SPS Science Outreach Catalyst Kits (SOCKs**). Noah Johnson (Society of Phys. Students, American Inst. of Phys., South Orange, NJ), Holly Fortener (Society of Phys. Students, American Inst. of Phys., Houston, TX), and Brad Conrad (Society of Phys. Students, American Inst. of Phys., 1 Phys. Ellipse, College Park, MD 20740, bconrad@aip.org)

5aAA5. **Celebrating sound in Physics Today**. Christine Middleton (Phys. Today, American Inst. of Phys., 1 Phys. Ellipse, College Park, MD 20740, cmiddleton@aip.org)

5aAA6. **Strengthening the link between the ASA and the Spanish-speaking community**. Ana M. Jaramillo (Ahnert Feistel Media Group, 8717 Humboldt Ave. N, Brooklyn Park, MN 55444, ana.jaramillo@afmg.eu) and Zachery O. L'Italien (McKay Conant Hoover, Inc., Westlake Village, CA)

5aAA7. **Making waves in Elkhart for the international year of sound**. Jay B. Brockman (College of Eng., Univ. of Notre Dame, 257 Fitzpatrick Hall, Notre Dame, IN 46556, jbb@nd.edu)

5aAA8. **A jumping-off point—Sound and listening as means of contemplating our world**. Carl P. Giegold (Threshold Acoust. LLC, 141 W Jackson Blvd., Ste. 2080, Chicago, IL 60604, cgiegold@thresholdacoustics. com) and Scott Pfeiffer (Threshold Acoust. LLC, Chicago, IL)

5aAA9. **The Detroit Orchestra Hall "Centennial Sound Lab" multilocation binaural acoustic measurement and audition project**. Wade R. Bray (HEAD Acoust., Inc., 6964 Kensington Rd., Brighton, MI 48116, wbray@headacoustics.com)

5aAA10. **UK Acoustics Network and International Year of Sound**. Kirill V. Horoshenkov (Dept. of Mech. Eng., Univ. of Sheffield, Sheffield S10 2TN, United Kingdom, k.horoshenkov@sheffield.ac.uk)

5aAA11. **The International Year of Sound (IYS2020ώ)** in Spain. Antonio Pedrero (Sociedad Espaňola de Acústica, Serrano 144, Madrid 28006, Spain, presidente@sea-acustica.es), Antonio Pérez-López, Antonio Calvo-Manzano, and Ana Delgado-Portela (Sociedad Espaňola de Acústica, Madrid, Spain)

5aAA12. **The International Year of Sound: A worldwide student competition**. Chiara Bartalucci (Vie en.ro.se. Ingegneria s.r.l., Viale Belfiore 36, Florence 50144, Italy,

chiara.bartalucci@vienrose.it), Sergio Luzzi, Paola Pulella, Sara Delle Macchie, and Rossella Natale (Vie en.ro.se. Ingegneria s.r.l., Florence, Italy)

The abstracts of the presentations can be found in the program book of the Seattle meeting, pp A321-A324, which is available on-line. Use the link below or scan the QR code to obtain access to the program book.

https://acousticalsociety.org/wp-content/uploads/2022/01/Seattle_Program.pdf

FRIDAY MORNING, 3 DECEMBER 2021 ELWHA A, 8:00 A.M. TO 12:10 P.M.

**Session 5aAA**

**Architectural Acoustics, Computational Acoustics, Noise, Physical Acoustics, and Education in Acoustics: International Year of Sound Potpourri**

Michael Vorländer, Cochair
*ITA, RWTH Aachen University, Kopernikusstr. 5, Aachen 52056, Germany*

Mark F. Hamilton, Cochair
*Walker Department of Mechanical Engineering, The University of Texas at Austin, Austin, TX 78712-1591*

Keeta Jones, Cochair
*Acoustical Society of America, 1305 Walt Whitman Road, Suite 300, Melville, NY 11747-4300*

**Chair's Introduction—8:00**

## FORUM ACUSTICUM 2023, Torino, Reflections on the International Year of Sound

The Special Session was organized and chaired by **Sergio Luzzi** and **Jean-Dominique Polack**. It was the final session with international attendance presenting important events organized by IYS 2020+ partners and the students' competition which was a centrally organized event of the IYS 2020+.

During the last day of the conference, Marion Burguess and Michael Taroudakis presented a summary of the IYS 2020+ in a Plenary talk entitled **Experiences from the International Year of Sound** on the last day of the conference. Thus, FORUM ACUSTICUM 2023 can be considered as the closing international event of a very successful International Year of Sound.

The list of presentations of the Special Session copied from the electronic version of the Conference program are as following :

**The International Year of Sound and the Students Competition**
S. Luzzi, C. Bartalucci, S. Delle Macchie, R. Natale, P. Pulella
Vie en.ro.se. Ingegneria srl

**The International Year of Sound and the Italian experience of INAD 2020-2021 "LET'S LISTEN TO THE SOUNDS"**
S. Delle Macchie, R. Natale, C. Bartalucci, P. Pulella
INAD Italia- Acoustical Society of Italy (AIA)

**Acoustical Society of America: The International Year of Sound and Beyond**
K. Jones
Acoustical Society of America

**A summary and a reflection on the International Year of Sound (IYS2020+) in Spain**
A. Pedrero, A. Pérez-López, A. Calvo-Manzano, A. Delgado-Portela
Universidad Politécnica de Madrid

**International Year of Sound 2020+ in Argentina**
M.A. Farina, N. Vechiatti, G. Basso
Universidad Nacional de La Plata

**Experiences From IYS 2020, Public Engagement And Awareness Activities In Turkey**
K. Saher, H. Sezgin, A. Sentop Dumen, S. Nas, S. Kulak, Z. Ozcetin
Kadir Has University

**“The sound of the world”: the IYS Students Competition videoclip and documentary**
S. Delle Macchie, S. Luzzi, C. Bartalucci, P. Pulella
Vie en.ro.se. Ingegneria srl

Links to the full papers of the Plenary talk as well as those of the special presentations of the special session, can be found in Annex I : ARTICLES RELATED TO THE IYS 2020+, in subsection: Articles in FORUM 2023 Proceedings presented at the Special Session on IYS 2020+

# THE INTERNATIONAL YEAR OF SOUND LEGACY

The IYS 2020+ came to an official end in 2021, however it was among the objectives of the celebration that the message of the importance of sound would continue after the end of the year. This will be achieved in several ways.

The ICA will keep the website, www.sound2020 active. This will maintain the content of the listing of events which recognizes the efforts of the many organizations that became involved. Keeping the site active, the educational resources, the projects and other information related to sound that were posted on the site will be freely accessible into the future. In addition, this report on the planning and realization of the IYS 2020+ will be posted to the site, to maintain a consolidated reference to the achievements of the IYS 2020+ and perhaps provide guidance for those planning another International Year of Sound in a decade or so.

Another important outcome of the IYS 2020+ was the encouragement of international institutions and various groups dealing with sound to communicate and collaborate between themselves under the scope of promoting the purpose of the IYS 2020+, namely to raise the awareness of the community of the importance of sound in our world. The experience gained during the two years of the celebration indicates that these collaborations will continue and will strengthen cohesion among the acoustics community towards this important goal.

The website will play an important role in this respect. While not all the ICA member societies organized events themselves, the sharing of the information via the website of the range of activities and innovative events will help all member societies to consider new ways of remaining in contact with their membership base. This will also encourage them to undertake more outreach activities for the broader community and collaborate with like-minded national organizations.

Despite the challenges of the years 2020 and 2021 due to the restrictions associated with the pandemic, the ICA member organizations and supporters found new and innovative ways to promote the motto of the IYS 2020+. To recognize and encourage

member societies to continue the momentum for such outreach activities, the ICA has established an annual award to recognize an outstanding outreach activity undertaken on behalf of an ICA Member Society. The details of this award are posted at https://www.icacommission.org/what-we-do/international-year-of-sound-award-for-outstanding-outreach-activity/. A key feature of this award is that it is retrospective : The award is made to recognize the achievement by a group, a committee or an individual member of a national Member Society or an International Affiliate. The Member Society or International Affiliate receiving the award can choose to spend the amount of the award in whatever manner it chooses but it is hoped that it will be used to encourage and enhance future outreach activities.

The first recipient of the award was for the **"Keep your hearing, keep your health"** Symposium, organized in the context of the 28th International Noise Awareness Day 2023 (INAD 2023) "Sound that unite us" event, on **26 April 2023**, that involved the collaboration of three ICA members: **the Acoustical Society of Italy (AIA), the Acoustical Society of Spain (SEA), and the Acoustical Society of Turkey (TAKDER)**. The Symposium featured a full day of activities, including a documentary screening, a competition presentation, various video shows, a general discussion, and an afternoon scientific workshop with speeches on noise exposure and awareness in schools. The successful symposium involved hundreds of students from the three countries, representing an opportunity to strengthen the collaboration between the three national acoustical societies and provide for communication among students sharing similar projects. The full recording of the event is available on the AIA YouTube channel https://www.youtube.com/watch?v=1ThZcQ0t7ks

INTERNATIONAL YEAR OF SOUND AWARD FOR
OUTSTANDING OUTREACH ACTIVITY

THIS CERTIFIES THAT

**Keep your hearing, keep your health: Educational facilities**

*by AIA - Associazione Italiana di Acustica (Italy)*

has been selected to be the recipient of the
2024 ICA International Year of Sound Award for Outstanding Outreach Activity

SEPTEMBER 21, 2024

ICA
International Commission for Acoustics

DORTE HAMMERSHØI
*President*

JORGE ARENAS
*Vice-President*

MARK HAMILTON
*Past-President*

# SPONSORS AND SUPPORTERS

## Founding Members

Founding Members are the Organizations that supported the Preparation and the Organization of the IYS with original funding.

### International Commission for Acoustics

### Acoustical Society of America

### European Acoustics Association

### International Institute of Acoustics and Vibration

**International Institute of Noise Control Engineering**

## Silver Sponsor

**Head-Genuit Foundation** was the sponsor of the Student Competition.

## Sponsors

The following Companies financially supported the International Year of Sound

**Acoustics First Corporation**

**International Institute of Noise Control Engineering**

**CESVA**

**International Institute of Noise Control Engineering (USA)**

**Saint-Gobain Ecophon**

## Supporting Organizations

The International Year of Sound was supported by the following Scientific Organizations:

**International Science Council**

**International Union of Pure and Applied Physics**

**International Union of Theoretical and Applied Mechanics**

# ANNEX I . ARTICLES RELATED TO THE IYS

## Articles Appeared as Top Stories in the IYS 2020+ Website

### World Hearing Day, 3 March

**By Dr. Shelly Chadha, Technical lead,**

**Ear and hearing care at World Health Organization**

The World Hearing Day 2021 on 3 March, marks the launch of the World report on hearing.

Requested by WHO Member States, this report gives a very clear message: Hearing across the life course is possible! This requires coordinated public health strategies to prevent and address hearing loss at all stages of life. A very important aspect of prevention relates to the reduction of exposure to loud sounds at workplace and in the environment at large.

In addition, it also relates to the promotion of safe listening practices among youth who are especially at risk of hearing loss due to the common practice of listening to music at loud volumes for prolonged periods. Towards this end, the WHO has launched the Make Listening Safe initiative which is making a headway in raising

awareness among young people about the need for, and importance of safe listening.

It is for this reason that we are especially pleased to be launching this landmark report during the International Year of Sound. We have a common goal: to highlight the importance of sound and listening in our lives, to promote understanding on noise control in our environment, and to ensure the continued enjoyment of sound experiences through good hearing, across the life course.

On behalf of the WHO, I thank the International Commission for Acoustics and all our partners who have joined hands in this effort.

## Noise Matters

**By Nancy Nadler**

**Deputy Executive Director of CHC**

April 28, 2021, marks the 26th Annual International Noise Awareness Day, founded by the Center for Hearing and Communication (CHC) in New York, a leading nonprofit hearing healthcare organization since 1910. The goal of International Noise Awareness Day (INAD) is to raise awareness about the harmful effects of noise on hearing, health and the quality of life. We are honored to participate in The International Year of Sound with our shared goal of improving the understanding of the importance of sound in our lives and the deleterious effects of unwanted noise.

Over the past year, as our lives have been upended with an unprecedented pandemic, our day-to-day experiences have changed drastically. Around the globe there were lockdowns. Work was halted; schools were closed. Many of us experienced a change in our soundscape with lower noise levels due to stay-at-home orders and a decrease in noise from transportation and industrial and recreational activities. During the height of COVID in NYC, the daily barrage of ambulance sirens elicited emotions of dread, while the nightly banging of pots and pans and cheers for frontline workers was a moment of celebration and hope.

This past year had a significant impact on people with hearing loss. Almost overnight, communication shifted from in-person to various forms of virtual

spaces, and with the use of facemasks and social distancing, communication has become increasingly difficult. For the 1.5 billion people worldwide who live with some degrees of hearing loss (WHO Deafness and hearing loss, 2021, https://www.who.int/news-room/fact-sheets/detail/deafness-and-hearing-loss), the use of face masks and social distancing, while critical to slow the spread of COVID-19, has made communication almost impossible. Facemasks not only muffle speech, but also create communication difficulties for someone with hearing loss who may be relying on lipreading and facial cues to understand a conversation. As we all began social distancing during the coronavirus pandemic, it became evident just how essential hearing and good communication are to staying engaged and connected.

Noise matters. Noise impacts all aspects of our lives – our physical well-being, our mental health, our learning, our quality of life and our connections with others. This INAD I encourage you to participate in your community's efforts to raise awareness of the impact of noise. Partners around the world have celebrated this day with activities meaningful for their communities – from school poster contests to seeking changes in local noise legislation. INAD is a day we can all reflect on how the soundscape has had an impact on our lives. Take action. Be part of the movement – https://noiseawareness.org.

On behalf of the Center for Hearing and Communication, I invite you to join the International Commission for Acoustics and all the partners globally on INAD and throughout The International Year of the Sound to raise awareness about the importance of sound in our lives, the need to protect our hearing across the lifespan and to promote the message that sound and noise matters to us all.

## What may be the legacy of changing soundscapes during IYS 2020-2021

**By Marion Burgess**

**ICA Former President and IYS Co-coordinator**

As the International Year of Sound 2020-2021 approaches the end, it is worthwhile to reflect just a little on this two-year period. When the year 2020 was selected by the ICA for the IYS, there was not even a hint of the turmoil that the entire world would endure starting in this very year. At the time of the opening ceremony in January 2020, there was great enthusiasm for the opportunity that the declaration of the year created to host events and activities that would highlight the importance of sound in all parts of our life and culture. That soon changed as the Covid-19 virus took hold. While intense work was being undertaken to develop a vaccine, restriction on movement became an important management strategy along with sanitizing and, later, mask wearing. In most countries, these restrictions have continued with different levels of severity until mid/late 2021. So IYS event organisers and all the national and associated organizations have had to provide alternative means to continue hosting activities that would be in alignment with the motto of the IYS.

At the same time, acoustics researchers realized that the restrictions on movements introduced to minimize the effects of the pandemic would have a great effect on the soundscapes on land and in the water. This presented an opportunity to measure and analyse those changes. Many cities have distributed sensor arrays that would continue to collect data. Many researchers and Organizations had noise loggers on location which could be left in position to continue to collect noise level data. Other loggers which no longer had a task could be deployed to obtain more data. The importance of analysing and documenting these changes in noise level was quickly realized. In addition to individual articles, some journals promoted special issues on noise levels during the pandemic (for example the Journal of the Acoustical Society of America and

the journal Noise Mapping). The bulk of these papers demonstrate the change in soundscape due to minimal transportation and the increase in other residential activities (such as construction and general neighborhood noise).

As so many transitioned to working from home ("WFH" has become a new acronym), individuals became aware of the acoustics of their internal spaces, particularly important when participating in on-line meetings. They also became more aware of how sound transmits within and into their home from their neighborhood. At times this noise had a positive effect giving reassurance that they were not alone, but at other times the noise could quickly become distracting during WFH, especially for construction/home maintenance noise.

We have all learnt to appreciate what life has to offer in and around the home and the importance of sound when communicating with family, friends and colleagues. While talking continued as an important means of contact, collaborating via music (group singing from balconies) and sound (mass clapping to appreciate frontline workers) also provided some form of cohesion for communities.

In the underwater domain, the mobility restrictions due to Covid-19 had a considerable effect on marine soundscapes as well. The part of the ambient noise chart that corresponds to frequencies between 50 and 1000 Hz is dominated by marine traffic noise. Systematic measurements are performed to monitor the levels of anthropogenic noise in the marine environment due to the necessity for reducing their levels in order to achieve a good environmental status and preserve the biodiversity — marine mammals and several other species living in the ocean are vulnerable to excess noise levels. According to reports recently published showing differences between noise levels in this frequency region before the confinement (lockdown) periods and during these periods, considerable differences have been observed. For coastal waters which are the regions where passengers and recreation ships are sailing more frequently, differences can be up to 7-10 dB in the low frequency range (50-100 Hz). Similar observations have been made following predictions of noise levels based on modeling that takes into

account the actual marine traffic (location and type of ships) as a result of reduced traffic density. It is clear that marine creatures, which are affected by the noise, especially at low frequencies, experienced a much quieter period during lockdown.

So, it is interesting to speculate what may happen when the world cautiously returns to the pre-2020 life. Will the awareness of the positive and negative aspects of suburban soundscapes during the pandemic continue? Will the realization of the importance of controlling sound within homes continue with attention to achieving improved sound control within the home and in particular the 'home office' ? When transportation and the associated noise increase, will there be an increase in pressure from the community for greater control? Will the importance of controlling sound underwater for the ongoing benefit for marine life be fully understood and applied?

As the end of IYS 2020-21 approaches, there is on the one hand a little disappointment of the lost opportunities to raise awareness of the importance of sound in our world. However, the pandemic of 2020-21 has provided a unique experience to the majority of the community around the world to become personally aware of the importance of sound and soundscapes in so many aspects of our life. Let us all work towards ensuring that this is not quickly forgotten.

## International Year of Sound and the United Nations Decade of Ocean Science for Sustainable Development

**By Michael Taroudakis**

**ICA Past President and IYS Co-coordinator**

The current year (2021) marks the second year of the International Year of Sound, which coincides with the first year of the United Nations Decade of the Ocean Science for Sustainable Development. The Decade that has just begun was associated by the United Nations with the marine environment, as a direct recognition of the importance of the sea in the sustainable development of the planet. The motto of the decade is: “The Science we need for the Ocean we want.”

The coincidence of the beginning of the Decade of Ocean Science with the International Year of Sound is of particular importance as sound is not only important as a means of communication in the air. The message of the International Year of Sound for the importance of sound for the society and the world, touches the sound in the marine environment as well. It is well known that large classes of animals living in the sea use sound for all their activities. The population of marine organisms of all kinds is an essential component of life at sea and a balancing factor of its biodiversity. Any alteration in the hearing conditions of cetaceans and other marine creatures that use sound or are directly affected by sound and noise is dangerous for the conservation of their population. Unfortunately, as in the air, human activity degrades the quality of the marine soundscape, through the insertion of man-made noise caused by a series of interventions either of temporary duration (for example, seismic surveys for sea-bed classification, pile driving, marine installations) or of a continuous nature, such as the navigation.

On the other hand, due to the interaction of the marine with the terrestrial and atmospheric environment, it is self-evident that the preservation of good environmental conditions at sea and the conservation of the status of its natural biodiversity are necessary conditions to ensure the continuation of our life on the planet under the best possible environmental conditions.

Sustainable development therefore goes through the good use of sound at sea which must be done with great caution. The European Union, in the context of its efforts to achieve a marine environment characterized by the necessary quality, has already adopted in 2008 the Marine Strategy Framework Directive (MSFD), which applies the ecosystem approach to the management of human activities to achieve good environmental status (GES- original deadline 2020), and covers all sectors having an impact on the marine environment. One of the sectors and special indicator for the GES is the underwater sound. Member States should gradually take initiatives to control underwater sounds as they are required to do for the atmospheric noise. As atmospheric noise is recorded and controlled through noise maps and measures are imposed to reduce it, the same is expected to happen in the coming years for the sound in the marine environment.

The goals of the International Year of Sound are therefore in line with the United Nations in the context of the Decade of Ocean Science and with the EU efforts for a good environmental status in the marine environment. The appeal is to all of us (scientists and policy makers) to do our best to ensure at sea, a soundscape compatible with the required standards of an environment of good quality, as this is essential for the prosperity of our planet in a future characterized by the harmonious coexistence of the human race with its natural environment.

Links

https://oceandecade.org

https://ec.europa.eu/environment/marine/eu-coast-and-marine-policy/marine-strategy-framework-directive/index_en.htm

## Articles in FORUM 2023 Proceedings presented at the Special Session on IYS 2020+ and the Plenary Talk

Each article can be downloaded by clicking at the corresponding title

- The International Year of Sound and the Students Competition
  by ***S. Luzzi, C. Bartalucci, S. Delle Macchie, R. Natale, P. Pulella***.

- The International Year of Sound and the Italian experience of INAD 2020-2021 “LET'S LISTEN TO THE SOUNDS”
  by ***S. Delle Macchie, R. Natale, C. Bartalucci, P. Pulella***.

- Acoustical Society of America: The International Year of Sound and Beyond
  by ***K. Jones***.

- A summary and a reflection on the International Year of Sound (IYS2020+) in Spain
  by ***A. Pedrero, A. Pérez-López, A. Calvo-Manzano, A. Delgado-Portela***.

- International Year of Sound 2020+ in Argentina
  by ***M.A. Farina, N. Vechiatti, G. Basso***.

- Experiences From IYS 2020, Public Engagement and Awareness Activities In Turkey
  by ***K. Saher, H. Sezgin, A. Sentop Dumen, S. Nas, S. Kulak, Z. Ozcetin***.

- The sound of the world:  the IYS Students Competition videoclip and documentary
  by ***S. Delle Macchie, S. Luzzi, C. Bartalucci, P. Pulella***.

**Plenary talk**

- Experiences from the International Year of Sound
  by ***M. Burgess, M. Taroudakis***.

# ANNEX II . ADDITIONAL REFERENCES

## Links to On-Line Material

Links to online material related to the sound in general and to the IYS 2020+ in particular, can be found on the IYS 2020+ website. The links were provided by the producers of the corresponding material during the celebration of the IYS 2020+.

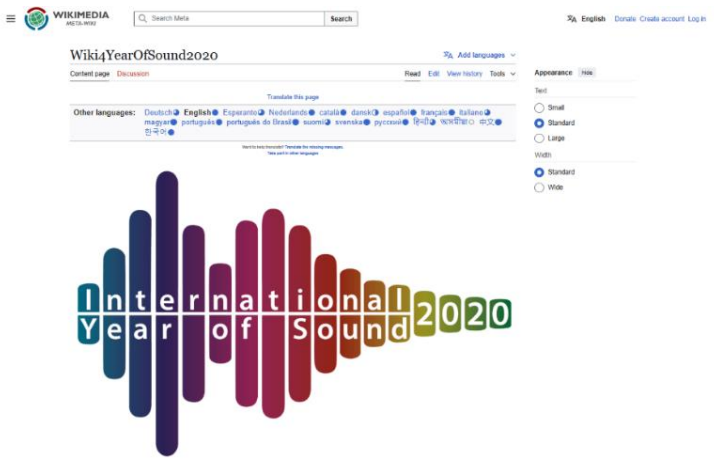
Links which appeared in the IYS 2020+ website, that are still reachable, and address important products websites or publications related to acoustics, are summarized here with a short description. The online material can be reached by clicking at the title of the material and/or the detailed link provided.

Some of these links as well as additional links to material associated with the IYS can be found in other sections of the report.

- Sounds of our life

"Sounds of our life" is the film created for the IYS 2020+, produced by Antonio Fischetti and sponsored by International Institute of Noise Control Engineering (I-INCE) and made freely available for downloading and viewing. The 9-minute version can be downloaded in mp4 format (1.25 GB) or in mov format (10.4 GB) or viewed at https://www.youtube.com/watch?v=eK-ApCMQNhY&t=8s. A 2-minute version can be downloaded in mp4 format (351 MB) or viewed at https://www.youtube.com/watch?v=Y6HgT1iujwQ&t=2s. Conditions: the film can be downloaded for free distribution but not for commercial purposes. Editing of the film, reproduction, or use of any part of it for any purpose without the permission of the ICA/IYS 2020+ Steering Committee is not allowed.

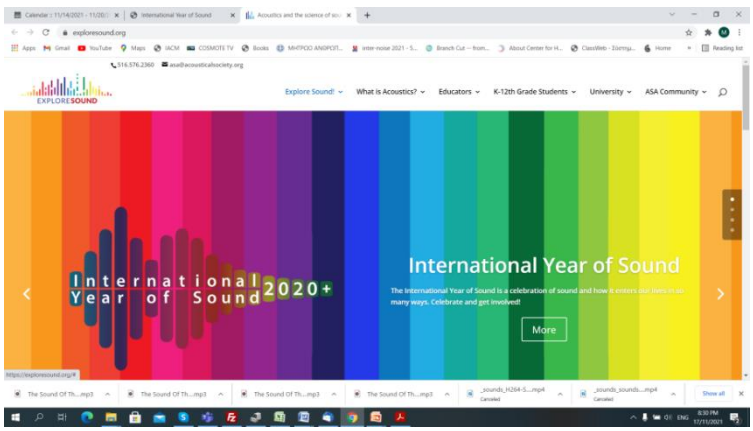
- Wiki4YearOfSound2020




The organizers of this initiative encouraged participants to help make information about acoustics freely available to everyone to celebrate the International Year of Sound 2020-2021. This could be done by helping to improve Wikipedia content related to acoustics, sound, human communication, music, noise its effects and control, and soundscapes. Participants are also encouraged to translate pages from the English Wikipedia into other languages.

https://meta.wikimedia.org/wiki/Wiki4YearOfSound2020

- Explore Sound



The education and outreach site of the Acoustical Society of America (ASA).

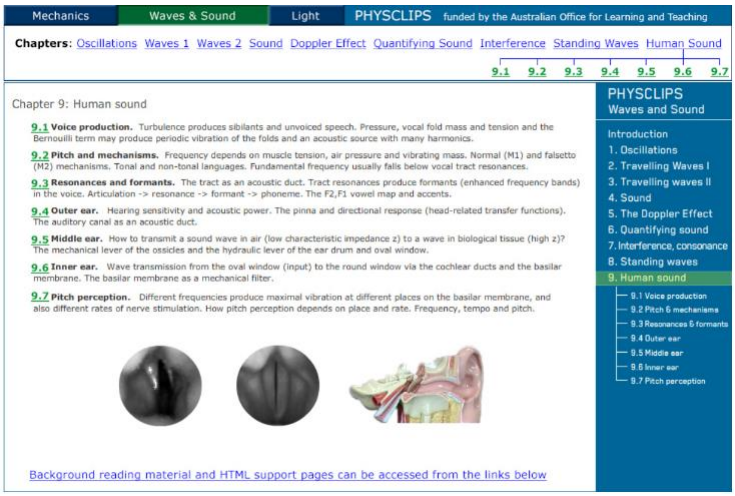
https://exploresound.org/internationalyearofsound/

- IYS 2020+ Video Series

In celebration of the International Year of Sound 2020-2021, the ASA created a series of videos highlighting various acoustics topics. These videos can be used to introduce someone to the amazing world of acoustics!

https://exploresound.org/asa-iys-videos/

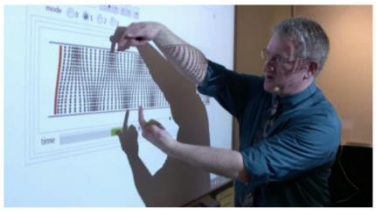
- Human Sound




Physclips on speech and hearing, hosted by the University of New South Wales.

https://www.animations.physics.unsw.edu.au/waves-sound/human-sound/index.html

- ## Acoustics and Vibrations Animations



Educational material by Daniel Russell.

https://www.acs.psu.edu/drussell/demos.html

- ## Universo del Sonido de Acústica UACh

The “Universe of Sound” project by the Instituto de Acústica of the Universidad Austral de Chile, is a support tool for secondary school students and teachers who are studying sound. In Spanish.

http://www.universodelsonido.cl/

- ## So klingt meine Welt (Sounds of my World)


A YouTube video especially for children, produced by the German Acoustical Society (DEGA), showing the daily routine of a pupil and all the sounds around it – as result of a drawing and video contest.

https://www.youtube.com/watch?v=OMbAriiaNTw

- Faszination Akustik – Eine Reise durch die Welt des Schalls (Fascination Acoustics – a Journey through the World of Sound)


A YouTube video produced by the German Acoustical Society (DEGA), showing important developments in acoustics during the last decades.

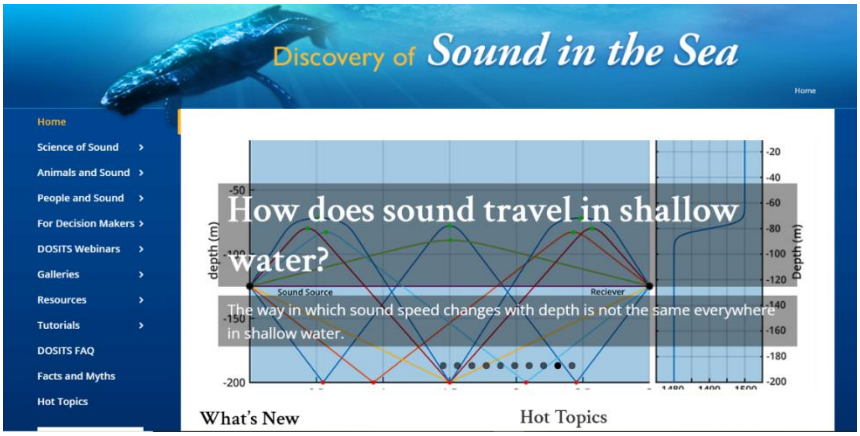
https://www.youtube.com/watch?v=f9KGNy2WS60

- ACOUCOU — an educational initiative


Acoucou is an online platform, where professionals, educators, students and other people interested in acoustics can find educational materials regarding various branches of acoustics. It is designed to serve as modern self-development tool for engineers as well as comprehensive solution for professional education in work environment.

https://acoucou.org/

- Discovery of Sound in the Sea (DOSITS)




DOSITS is an international, comprehensive, scientific resource on underwater sound, providing a synthesis of the latest peer-reviewed science in a form that is accessible for everyone, from students and educators, to reporters, the public, and natural resource regulators and decision makers. In addition to the web link, the DOSITS Team hosted webinar series in 2020 on topics related to underwater sound for the international decision-making community.

https://dosits.org/

- World Report on Hearing from the World Health Organization

A Webinar presenting the World Report on Hearing by the World Health Organization was organized on March 12, 2020 and can be watched by clicking on the following link :

https://who.zoom.us/rec/play/upIlduisqm03G9PBtgSDBPIrW9TuJ_qshHUd_PAMn020BSQHYQHzMrRBYrFSp8c0y5Ky2UeNSMJbQpBW

The Power Point presentation describing the World Report on Hearing can be downloaded by clicking on the following link :

https://www.sound2020.org/docs/World%20Report%20on%20Hearing%20for%20Webinars.pptx

- The sound of science – the SARS-CoV-2 virus as a piece of classical music

This news item from the International Science Council (ISC) posted especially for the IYS, describes a musical composition based on the protein chain structures within the COVID-19 virus. Markus J. Buehler is the McAfee Professor of Engineering at MIT, and a composer of experimental, classical and electronic music, with an interest in sonification. He has converted the SARS-CoV-2 Coronavirus protein to music.

https://council.science/news/the-sound-of-science-the-sars-cov-2-virus-as-a-piece-of-classical-music/

- Tears of Joy: The Magic of HEARING

A TEDxSFIT video by Dr. Raj Shekhawat, explaining the importance of hearing.

https://www.youtube.com/watch?v=z73JHSG-5GE

- Early history of international anti-noise actions

This is the first of a series of articles documenting the history of global actions seeking to control noise by **Walter Montano** Technical Department, Arquicust, Gualeguaychu, Argentina

These are provided as contributions to the upcoming 50th anniversary of I-INCE and its international efforts to create the environment for important discussions on noise control at the INTER-NOISE conferences. They are also contributions to the International Year of Sound 2020–2021.

https://noisenewsinternational.net/the-first-international-anti-noise-conventions-congresses-1895-1912/

- ## African Bioacoustics Community Conference 2020 – Presentations

The African Bioacoustics Community held a very successful on line conference in November 2020 (ABC2020). The community has agreed to make these high-quality research presentations presented by national and international researchers freely accessible as part of their efforts to make the field of bioacoustics research more accessible to students and researchers.

The presentations can be watched on YouTube

https://www.youtube.com/playlist?list=PLq5T9wuMxSqvIb06oDW0-2AkVo9yOyBrk

- ## Introdução à Engenharia de Som I

A collaboration between three Brazilian Universities hosted a series of international seminars on Acoustics, with guests from Latin America, Europe, and North America dealing with various topics related to Acoustic Engineering. The event which was associated with the IYS 2020+ was broadcasted live every Wednesday between 24/03 and 30/06/2021.

The list of speakers can be found in

https://docs.google.com/document/d/1xkqBcveHsCmbnyZLzXx-j2nsAfUQzQmgjgeYFeFL-UQ/edit?tab=t.0

The event playlist can be accessed on Youtube: https://www.youtube.com/playlist?list=PLGa6Ybe5AxUwW7JMz9meBpbN_0XMm8Bai

- International Noise Awareness Day video

The Acoustics Research Institute (Austrian Academy of Science) organizes a public outreach event each noise awareness day. In 2020 and 2021 this event was cancelled, so it was decided for 2021 to produce this video (in German with English subtitles).


https://www.youtube.com/watch?v=R5oY_obd8-k

- The Rest is Just Noise podcast

The Rest Is Just Noise is a monthly podcast exploring the relationship between sound and our cities. In each episode, the passionate and excitable hosts (three soundscape researchers) are joined by an expert guest from fields such as acoustics, architecture, and environmental psychology, to discuss their latest work and introduce our audience to the science, beauty, and noise of urban sound. Hosted by **Andrew Mitchell, Tin Oberman, and Francesco Aletta**.

https://www.justnoisepod.com/

## Special Projects promoted on the IYS 2020+ website.

During the two-year duration of the International Year of Sound, announcements of several projects, exhibitions, festivals, and other activities were promoted on the IYS 2020+ website following requests from the organizers/producers. These are in addition to the events that are described in the main section of this report and provide an indication of the breadth of interest of the aim of the IYS 2020+ to highlight the importance of sound in our world. If still functioning, a link to the relevant website is included with the brief description of the project.

**SOUNDSCAPE UNDER Covid-19**

During the years of IYS 2020+ most around the world were experiencing life with very low noise levels due to restrictions which involved being confined to home and a decrease in the industrial, transportation and leisure activity. There was also a reduction in shipping noise and a change in the underwater soundscapes. This provided an opportunity to quantify and record for the future. the lower noise levels of our soundscapes.

There are many noise monitoring systems (noise monitoring terminals, city wide systems, underwater systems etc.) installed all over the world which could capture this information for the future. As well there are many acousticians working from home with access to a sound level meter that can be used to capture the soundscape from their balcony or from their garden.

The IYS 2020+ committee has provided a central contact between a number around the world who were thinking similarly that there would be some benefit in coordination and some standardization in the capture of the data. Marçal Serra from CESVA has taken a lead to set up a LinkedIn group COVID-19 Noise Reduction (at www.linkedin.com/groups/13844820/) and with hashtag #COVID19NoiseReduction for any posts. A general structure was developed for documenting the important details such as location, type of

primary noise source, noise measuring system etc. for those wishing to participate and share their data in the future. The main intent was to capture the noise data during the time of Covid and compare it with the sound environment once there was a return to normal activities.

**Exhibition: La La Lab – The Mathematics of Music**

La La Lab, was an interactive exploration and discovery of music from a mathematical perspective, at MAINS in Heidelberg over the period 17 March 2019 to 29 March 2020. The exhibition was in English and German and the entry free!

Music and Mathematics share many similarities as fields of study. Both disciplines are abstract, have structures and manipulation rules, a well-defined notation, and are precise in their results. Working on them requires practice and an analytical mind. It is no surprise that Mathematics and Music are closely related. But their relationship goes far beyond an analogy. Mathematics is infused deeply in all aspects of Music, from the physics of sound to the crafting of instruments, from rhythmic patterns to tonal harmony, from classical to electronic music. Mathematics supports Music and our understanding of Art the same way as it supports Physics and our understanding of the World. Hearing music with an appreciation of the link to mathematics brings to the music lovers deeper understanding, appreciation for details, and greater enjoyment of the art; and to the professionals improves their ability to compose, perform and express their creativity.

Conceived in collaboration with world renowned experts, “La La Lab – the Mathematics of Music” mixed a laboratory format with interactive exhibits to present visitors with the historical, conceptual, and philosophical connections between mathematics and music: from the centuries-old tools that musicians use for composing, to the most current research that pushes the boundaries of musical creativity and mathematical knowledge.

Organization responsible for this project was IMAGINARY gGmbH and the website https://www.imaginary.org/exhibition/la-la-lab-the-mathematics-of-music. The organization is willing to offer help and assistance to produce or adapt the exhibits for exhibitions in other locations.


**Application Arquitecturas de la memoria (Memory Architectures AR APP)**

Recognizing sound as a source of intangible cultural heritage, this project proposes the creation of an augmented reality app by geolocation that links different audios on memory to specific places in the public space. The app configures an interactive cartography in which, through the smartphone, y geolocated audios can be accessed during a walk through the town.

During a visit to a city, the app records the places through which the tourist passes and offers audio linked to those places including stories told by the inhabitants themselves.

The app presents an aesthetic and usability experience similar to a video game. The inspiration for this app was Pokemon Go, in which the user goes out to the city to hunt Pokemons. In Arquitecturas de la Memoria, the tourist uses the same geolocation technology to “hunt” the memories of his community linked to the public space.

It builds an intergenerational meeting space. The stories and memories are held by our elders and were formerly passed on via stories. But contemporary life has led to fewer and fewer opportunities for such relationships between people of different ages. The message that this app brings is that the use of new technologies serves to facilitate these memories that can be transmitted orally to the new generations. Thus, the app uses audio, as a way to recover those stories that gave continuity to the collective memory in previous generations. In addition, working with audio allows us to keep our eyes on the urban landscape. It is the difference between interposing an image between you and the world or listening to a voice that accompanies you while your eyes discover the environment. A new way of looking at the urban landscape through sounds.

The organization responsible for linking this with the IYS 2020+ was Universidad Carlos III de Madrid.

**Villa Pennisi in Musica**

This is the meeting place of Music and Architecture during a festival where everything sounds. The stage is created and built, the most suitable lighting is realized, the best possible propagation of the sound produced on stage is studied and, finally, the live performance is prepared. The students, young talents and the exceptional Masters work together to design and build ReS – RESONANT STRING SHELL, an ACOUSTIC SCENE that optimizes the use of chamber music outdoors. ReS won the PETER LORD AWARD 2015, awarded by the Institute of Acoustic (UK) for its exceptional and innovative acoustic design.

Organization responsible for posting this event to the IYS 2020+ website was ASSOCIAZIONE M.A.R. – MUSICA, ARTE, RICERCA in Italy.

Activities at Villa Pennisi can be found in https://www.vpmusica.com/?lang=en

**Sons del Delta del Llobregat**

A small Citizen Science campaign to collect short videos and a questionnaire about noise annoyance in Delta del Llobregat, just next to El Prat Airport in Barcelona. The Organization responsible was La Salle – URL. Start date was 26 April 2021 and end date 7 June 2021.

**Sons al Balcó**

This was a Citizen Science campaign to collect 30-sec video samples of the soundscape in Balc**ó** Catalonia, during the lockdowns required to control the spread of Covid. The Organization responsible was La Salle Ramon Llull University. The project first involved collecting findings from subjective questionnaires by people living in pre-defined diverse acoustic areas (urban, suburban and rural environments). Then the same citizens answered the questionnaires and the short videos. The final stage involved analysis of the data from operative acoustic sensor networks. The "Sons al Balcó" aimed to synthesize the perception of the citizens in lockdown, and conclude its dependence on objective sound levels, characteristics of the urbanism and the landscape and the typology of noise sources. Several publications have resulted from this study and the details can be found in https://www.salleurl.edu/en/research/project/sons-al-balco