

inter·noise

2021 1- 5 AUGUST

WASHINGTON, DC, USA

50th International Congress
and Exposition on

Noise Control Engineering

Final Program Booklet
Theme: Next 50 Years of Noise Control



www.internoise2021.org

★ TABLE OF CONTENTS ★

Welcome and Organizational Matters.....	2
INCE Session Chairs.....	10
Virtual Platform (Cadmium CD).....	14
Schedule at-a-Glance and Featured Sessions	16
Daily Schedule Matrix.....	20
Workshops	25
Featured Speakers.....	27
Technical Sessions.....	34
Poster Gallery Information.....	158
Networking Sessions.....	164
Exhibitor Descriptions	167
Sponsors and Exposition	173
NoiseCon 2022	175

Note:

This is the final program as of July 15.



WELCOME AND ORGANIZATIONAL MATTERS



WELCOME note from the CONGRESS PRESIDENT, CO-PRESIDENT and TECHNICAL CHAIR

Welcome to INTER-NOISE 2021!

The 50th International Congress and Exposition on Noise Control Engineering, Washington DC, USA, is organized by the Institute of Noise Control Engineering of the USA (INCE-USA) and ProAcustica (Brazil), on behalf of the International Institute of Noise Control Engineering (I-INCE). Cooperative societies that support the 50th Congress include the Acoustical Society of America, SAE International, Spanish Acoustic Society, and the Korean Society for Noise and Vibration Engineering. We are also part of the Year of the Sound 2020+ events.

The planning process has been very challenging due to the COVID-19 pandemic and associated complications as encountered by all professional societies and scientific conferences. Originally, it was planned as a “live” meeting with plenty of 50th congress celebrations since the 1st INTER-NOISE was held in Washington DC in 1972. Finally, it was decided to hold the conference only in the virtual or online mode due to health considerations and travel restrictions around the world, although we briefly considered the “hybrid” meeting concept about a year back.

The Congress theme is “Next 50 Years of Noise Control” as we intend to look forward while honoring the accomplishments of last 50 years. Like prior congresses, our program covers all aspects of noise control engineering, acoustics, and vibration. Highlights of the overall program include the following:

- 7 plenary or keynote lectures on a range of relevant topics
- Over 585 papers in 120+ sessions
- About 50 posters
- Special events such as Latin American Symposium and several workshops or sessions
- Over 60 networking sessions for informal conversations and exchange of ideas
- Programs for young professionals and students
- At least 23 exposition booths, with 3 gold and 3 silver sponsors (from several countries)

There are a few innovative elements to better utilize the online mode. For instance, the schedule considers the geographical locations of most attendees in Americas, Europe-Africa, and Asia-Pacific regions. Accordingly, 15-hour days are planned in the Cadmium platform, recognizing that attendees will pick and choose what they can or able to attend. The entire schedule is displayed only in the New York (or Washington DC) time zone from 6:00am to 9:00pm; attendees should consult the <https://www.timeanddate.com/> site for find local times. Another novel element is the introduction of virtual networking sessions to simulate in-person hallway or around the table discussions. These are being held throughout the congress on selected topics with moderators to lead the discussion and encourage attendees to enjoy virtual coffee, lunch, cocktail or dinner breaks. Finally, the 9:00am to 11:00am New York time is reserved each day for opening and closing ceremonies and for seven featured lectures (almost without any other parallel events).

We express our most sincere gratitude to many individuals and institutions as listed under the Organizations part of this book, and of course the authors, presenters, and contributors (see the detailed schedule). We thank our sponsors and exhibitors as well – see the relevant parts of this book for details. Also, we salute the organizers of the past 49 congresses for their efforts to bring us to this 50th congress.

Finally, we hope you enjoy the entire program from the comfort of your home or work. Note that the recordings will be available on the Cadmium platform (about a week after the live events, except for the networking sessions that cannot be recorded) for about 2 months if you wish to watch or re-watch certain presentations (except for a few live lectures that will not be recorded). Proceedings will include all written papers (including the doi information) and a table of contents; papers will be added to the INCE digital archive in about 3 months. Questions may be directed to Secretariat@internoise2021.org.

Sincerely,

Raj Singh,
Congress President



Davi Akkerman,
Congress Co-President



Tyler Dare,
Technical Program Chair



WELCOME from the PRESIDENT of I-INCE (Bob Bernhard)

On behalf of the International Institute of Noise Control Engineering (I-INCE), I want to welcome you to INTER-NOISE 2021. It has been a very challenging year, and unfortunately, the in-person format of INTER-NOISE 2021 was one of the casualties. The Organizing Committee and Congress President Raj Singh have done an excellent job adjusting to the situation and pulling together a program that we hope makes the very best of the situation. INTER-NOISE 2021 is an opportunity to test new "distance" formats that some in our community have said they prefer. INTER-NOISE 2021 will teach us a great deal while also providing us with the technological information and networking opportunities that we look forward to at these congresses.

One of the features of the INTER-NOISE 2021 will be the virtual networking sessions. The Organizing Committee has put together a large and diverse set of short, facilitated virtual social gatherings. I hope you will take the opportunity to participate in a number of these live sessions.

We are very grateful to the exhibitors and sponsors for their willingness to test this new format. A virtual exhibition has potential advantages as our exhibitors and delegates can now interact virtually across many miles (and oceans). I know many of you have interest in the instruments and services of the exhibitors. I hope you will give the virtual exhibition format a try. I know the exhibitors would appreciate meeting you.

One of our primary foci for INTER-NOISE 2021 is celebrating the 50th congress at the venue of the 1st congress. That first congress in 1972 was in Washington DC and was both well attended by an international audience and quite influential. The US Noise Control Act was under consideration at the time and a group of the delegates met with White House officials and congressional delegates. The [bill passed later that year](#) and started significant effort in the USA for noise control, driven primarily in the early days by the Environmental Protection Agency (EPA). I'm asked sometimes if I was there. I'm old but not that old 😊. However, I know and have worked with many of the people who were at the first congress, and I must say, I admire them very much for helping to launch the noise control engineering field and for the contributions they made to making the world a quieter place.

As a counter viewpoint to celebrating the 50th congress, the Organizing Committee chose the theme "Next 50 Years of Noise Control". The primary commentary about what comes next will be in the keynote and plenary talks. I'm looking forward to what our speakers have to say and comparing it to my own thoughts.

I hope you all enjoy INTER-NOISE 2021. Thank you for supporting the congress with your papers, presentations, posters, exhibits and attendance. And a special thank you to the Organizing Committee, INCE-USA and ProAcustica for enduring all of the challenges and bringing us this excellent program.

Bob Bernhard,
I-INCE President



CONGRESS ORGANIZATION

The 50th International Congress and Exposition on Noise Control Engineering is 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).



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Young Professionals Grants and Practice School for Students	Patricia Davies, Taha Sen
50 th Congress Celebration	Patricia Davies
Latin American Events	Davi Akkerman, Carolina Monterio
Networking Sessions	Alexis Kurtz
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Website	Steve Hambric, Ben Bussey
Marketing	Carol Fusaro, Darya Behnia, Rui Cao
Congress Secretariat	INCE-USA IBO 11130 Sunrise Valley Drive, Suite 350, Reston VA 20191 USA +1 703 234 4124 (phone), +1 703 435 4390 (fax)

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web: <http://i-ince.org/>

e-mail: SecretaryGeneral@i-ince.org

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web: <http://www.proacustica.org.br/>
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★ THANK YOU TO OUR CONGRESS SPONSORS! ★

Thank you to our generous sponsors in the Noise Control community for your continued support of INTER-NOISE. Your contribution is very appreciated and has made the Congress program which covers all aspects of noise control engineering, acoustics, and vibration a successful virtual event.

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VIRTUAL PLATFORM (CADMIUM CD)



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Authors, please monitor your email associated with your conference registration for information on how to access the Education Harvester so you can complete your speaker profile and upload your pre-recorded video in the platform. Authors will also receive instructions on how to pre-record their video.

HOW TO ACCESS THE CADMIUM WEBSITE AS AN ATTENDEE

Attendees, please monitor your email associated with your conference registration for information on how to access and navigate our virtual platform.

SCAVENGER HUNT

HOW TO PLAY

Important: You will need two devices to play – a desktop browser and a mobile device (phone or tablet)!



1. From your mobile device, download the Eventscribe Live app from your App-Store for iOS or Google Play for Android.
2. From your desktop browser, visit booths in the Virtual Exhibit Hall, posters, or presentations to find QR codes.
3. Using your phone or tablet with the Eventscribe Live app, scan the QR code on the desktop browser screen.
4. When the QR code is scanned, a question will pop up on your mobile device. Answer the question correctly to earn points and climb the leaderboard. Hint: Got the wrong answer? Re-scan the QR code for another chance.

PRIZES

The top couple of attendees on the leadership board will receive a prize. All winners will be notified after the conference concludes.

Prizes include:

Internoise 2022 Prize -- One 50% discount on a full registration for Interoise 2022

INCE-USA Prize -- One year access to the INCE-USA Digital Library

INCE-USA Prize -- One year access to the INCE-USA Digital Library

For technical support, please contact the app provider, CadmiumCD, directly at +1-877-426-6323 or support@cadmiumcd.com. 1.

CONGRESS PROCEEDINGS

Proceedings is located on the Cadmium website only. Table of Contents and abstracts are on the INTER-NOISE 2021 Website as well as the online platform (Cadmium).



★ SCHEDULE AT-A GLANCE AND FEATURED SESSIONS ★

- The Congress schedule is in the New York (or Washington DC, US eastern) time zone. Please go to <https://www.timeanddate.com/> to see local times). Congress program is from 6:00am to 9:00pm, with featured lectures and events from 9:00am to 11:00am.
- Most pre/post events such as the I-INCE Board meetings, General Assembly, etc. are not included in the program as they are by invitation only.
- All events in the program are via the virtual platform (Cadmium CD <https://www.cadmiumcd.com/>) are open to registered attendees. Authors and attendees will be invited in July to view the Cadmium platform, complete the necessary tasks, view the detailed program, etc.

Time(s)	Event(s)	Cadmium Live Stream
Day 1: Sunday, 1 August 2021		
9:00am-10.45am	Opening Ceremony and Plenary Lecture Chairs: TBD	Channel 1
9.00am-9.45am	Opening Ceremony Welcome Remarks by INTER-NOISE 2021 President (Raj Singh) I-INCE President (Robert Bernhard) INCE-USA President (Mike Bahtiarian) Congress Co-President and ProAcustica Representative (Davi Akkerman) Technical Program Chair (Tyler Dare) Young Professionals/Student Programs (Patricia Davies, Tyler Dare)	
9:45am-10.45am	Plenary Lecture Soundscape: Progress in the past 50 years and challenges in the next 50 years Professor Jian Kang, University College London, United Kingdom	
11:30am-3:00pm	Special Latin American Symposia	Channel 1
6:00am-9:00pm	Technical Sessions (in Parallel)	Livestream Channels 1-N
8:00am-4:00pm	Selected Networking Sessions	Video Chats
11:00am-1:00pm	Accompanying Persons' Program	Video Chats
6:00am-9:00pm	Posters (View at Your Leisure)	Posters Gallery

Day 2: Monday, 2 August 2021

9:00am-11am	Keynote Lecture and Exposition Highlights Chairs: TBD	Channel 1
9:00am-10am	Keynote Lecture Developing deep noise suppression for Microsoft Teams and Skype Dr. Ross Cutler and Dr. Robert Aichner, Microsoft Corp., USA	
10:00am-10.45am	Exposition and Sponsorship Highlights Welcome and Thank You to the Sponsors and Exhibitors 50th Celebration of INTER-NOISE Congresses INTER-NOISE 2022 INCE-USA Board Certification Scavenger hunt Q&A	Mike Bahtiarian Patricia Davies Barry Gibbs Paul Burge Regina Young and Casey Lane
6:00am-9:00pm	Technical Sessions (in Parallel)	Channels 1-N
6:00am-9:00pm	Selected Networking Sessions	Video Chats
6:00am-9:00pm	Exposition Opens (Live Hours Vary by Booths)	Exposition Hall
6:00am-9:00pm	Posters (View at Your Leisure)	Posters Gallery
8:00am-9:00am	Posters Q&A Session (Part 1)	Video Chats

Day 3: Tuesday, 3 August 2021

9:00am-11:00am	Keynote Lectures Chairs: TBD	Channel 1
9:00am-10:00am	Keynote Lecture Efforts for reducing the impact of aircraft noise at Japan and worldwide airports and a suggestion for the improvement to the next generation Naoaki Shinohara, Aviation Environment Research Center, Japan	
10:00-11:00am	Keynote Lecture Challenges in modeling sound packages: A short history and future trends of the sound propagation in poro-elastic media Dr. François-Xavier Bécot, MATELYS – Research Lab, France	
6:00am-9:00pm	Technical Sessions (in Parallel)	Livestream Channels 1-N
6:00am-9:00pm	Selected Networking Sessions	Video Chats
6:00am-9:00pm	Exposition (Live Hours Vary by Booths)	Exposition Hall
6:00am-9:00pm	Posters (View at Your Leisure)	Posters Gallery

Day 4: Wednesday, 4 August 2021

9:00am-11:00am	Keynote Lectures Chairs: TBD	Channel 1
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9:00am-10:00am	Keynote Lecture Environmental noise in cities: Lessons learned and what is next Professor Jorge P. Arenas, Institute of Acoustics, University Austral of Chile, Chile	
10:00am-11:00am	Keynote Lecture Applications of acoustical oceanography Dr. Megan Ballard, University of Texas, USA	
06:00am-9:00pm	Technical Sessions (in Parallel)	Livestream Channels 1-N
12:00am-1:00pm	Q&A Session C on Posters	Video Chats
6:00am-9:00pm	Selected Networking Sessions	Video Chats
6:00am-9:00pm	Posters (View at Your Leisure)	Posters Gallery
12:00pm-1:00pm	Posters Q&A Session on (Part 2)	Video Chats
6:00am-12:00pm	Exposition Ends (Live Hours Vary by Booths)	Exposition Hall
4:00pm-5:00pm	INCE-USA General Membership Meeting	To be held outside Cadmium

Day 5: Thursday, 5 August 2021

9:00-10.40am	Plenary Lecture and Closing Ceremony Chairs: TBD	Channel 1
9:00am-10:00am	Plenary Lecture Aircraft noise reduction achievements and future challenges Dr. Pascale Neple, Airbus Operations SAS, France	
10:00am-10.40am	Closing Ceremony Closing Remarks by INTER-NOISE 2021 President (Raj Singh) I-INCE President (Robert Bernhard) Introduction to INTER-NOISE 2022 (Barry Gibbs) NOISE-CON 2022 (David Herrin)	
6:00am-9:00pm	Technical Sessions (in Parallel)	Channels 1-N
6:00am-9:00pm	Posters (View at Your Leisure)	Posters Gallery
08:00am-9:00am	Posters Q&A Session (Part 3)	Video Chats
11:00am-1:00pm	Accompanying Person's Program	Video Chats
12:00pm-1:00pm	Posters Q&A Session Part	Video Chats
6:00am-9:00pm	Selected Networking Sessions	Video Chats
2:00pm-4:00pm	I-INCE Young Professionals Chairs: Patricia Davies and Taha Sen Young Professionals Workshop & I-INCE Young Professionals and Latin American Young Professionals Awards Events. Awards presented by I-INCE President Robert Bernhard. This event (Part 2) is open to all registrants. (Part 1, earlier in the day, is by invitation only.)	Channel 1

4:00pm-5:00pm INCE-USA Awards and Honors Channel 1
 Chair: Dana Lodico

The following awards will be presented in the INCE-USA Awards and Honors Session. This event/session is open to all registrants.

- INCE-USA Scholarship
- Martin Hirschorn IAC Price – Graduate Student Project Award
- INCE-USA Member's Choice Award
- Leo Beranek Student Medals
- Student Paper Competition Award
- Classic Papers in Noise Control Engineering Presentation Award

Globes Times				
1-5 August 2021 Times [https://www.timeanddate.com/worldclock/meetingtime.html]				
New York*	SãoPaulo	Berlin	Tokyo	Sydney
Mon 6am*	Mon 7am	Mon 12noon	Mon 7pm	Mon 8pm
Mon 7am*	Mon 8am	Mon 1pm	Mon 8pm	Mon 9pm
Mon 8am*	Mon 9am	Mon 2pm	Mon 9pm	Mon 10pm
Mon 9am*	Mon 10am	Mon 3pm	Mon 10pm	Mon 11pm
Mon 10am*	Mon 11am	Mon 4pm	Mon 11pm	Tue 12am
Mon 11am*	Mon 12noon	Mon 5pm	Tue 12am	Tue 1am
Mon 12pm*	Mon 1pm	Mon 6pm	Tue 1am	Tue 2am
Mon 1pm*	Mon 2pm	Mon 7pm	Tue 2am	Tue 3am
Mon 2pm*	Mon 3pm	Mon 8pm	Tue 3am	Tue 4am
Mon 3pm*	Mon 4pm	Mon 9pm	Tue 4am	Tue 5am
Mon 4pm*	Mon 5pm	Mon 10pm	Tue 5am	Tue 6am
Mon 5pm*	Mon 6pm	Mon 11pm	Tue 6am	Tue 7am
Mon 6pm*	Mon 7pm	Tue 12am	Tue 7am	Tue 8am
Mon 7pm*	Mon 8pm	Tue 1am	Tue 8am	Tue 9am
Mon 8pm*	Mon 9pm	Tue 2am	Tue 9am	Tue 10am
Mon 9pm*	Mon 10pm	Tue 3am	Tues 10am	Tues 11am

Other international cities relative to New York: London 5 hours ahead, Beijing 12 hours ahead, New Delhi 9 ½ hours ahead, San Francisco 3 hours behind

Cadmium Technical Support Hours

Cadmium CD's Technical Support is available from 6:00am – 3:00pm ET on Sunday and from 6:00am – 9:00pm ET, Monday - Thursday. You can contact their technical support desk at +1-410-638-9239 or log onto the Cadmium website and at the bottom of the page in the footer, click "Technical Support" and you can submit a support ticket immediately.

★ MONDAY, 2 AUGUST 2021 ★

DAILY SCHEDULE MATRIX

Monday, August 2	6:00 AM	6:20 AM	6:40 AM	7:00 AM	7:20 AM	7:40 AM	8:00 AM	8:20 AM	8:40 AM	9:00 AM	9:20 AM	9:40 AM	10:00 AM	10:20 AM	10:40 AM	11:00 AM	11:20 AM	11:40 AM	12:00 PM	12:20 PM	12:40 PM	1:00 PM	1:20 PM	1:40 PM	2:00 PM	2:20 PM	2:40 PM	3:00 PM	3:20 PM	3:40 PM	4:00 PM	4:20 PM	4:40 PM	5:00 PM	5:20 PM	5:40 PM	6:00 PM	6:20 PM	6:40 PM	7:00 PM	7:20 PM	7:40 PM	8:00 PM	8:20 PM	8:40 PM															
Channel 1				03.02 - Modeling & Numerical Simulation, Part 1							Keynote Lecture			Exposition Highlights			01.01 Fan and Turbomachinery Noise, Part 3			01.02 Computational Methods in Flow-Induced																					01.02 Computational Methods in Flow-Induced Noise & Vibration, Part 2																			
				2156	1985	2641	3037	2078										1970	2142	2633	3181	1108	2597	2264																			2467	1130	3067	2675	1787													
Channel 2	01.01 Fan and Turbomachinery Noise, Part 1				01.01 Fan and Turbomachinery Noise, Part 2															02.00 Vibro-acoustics and Structure-borne Noise, General				04.00 Signal Proc., Meas., Sound Repro., Diagnostics, General, Part 2				13.13 The Future of Building Acoustics Measurements and Modelling				13.01 Acoustic Regulations and Classification for Buildings, Part 1																												
	1380	1578	2507	2667	2481	1809	1666	3114	1414											1730	2389	2221	2387	3246	2661					1035	1950	2246	3510	1781	1908	1384	2619	1757					2531	3054	3063	3169	3236													
Channel 3	08.01 Vehicle Noise and Vibration, Part 1								09.01 Porous Materials													05.01 Aircraft Interior Noise				05.02 Airframe Noise				05.05 Improving Tools for Subsonic Aircraft Noise Prediction				20.08 Vibroacoustics for Medical Solutions																										
	1718	2505	2477	2109	1689					2493	2495											2671	3228	2334	1382	1882	2417					2326	1890	3202	1610	2783					2043	2723	2352	2855	2842	2846	3008					2745	3046	3138	3144	1919	3134			
Channel 4																																																												
Channel 5	20.06 UAVs and the Future of Urban Soundscape				13.16 The Future of Office Privacy & Sound Masking															13.14 Building System Noise & Vibration Control			13.15 Acoustic Performance of Operable & Demountable Partitions			Workshop: Introduction to Active Noise Control and New Challenges, Part 2																																		
	2509	2256	2457	2160	2045	2713	2168	3228	1813	3199											2948	1612	2958	2407	2413	2917	2974																																	
Channel 6	09.02 Acoustic Metamaterials, Part 1			Workshop: Introduction to Active Noise Control and New Challenges, Part 1															09.02 Acoustic Metamaterials, Part 2					09.08 New Generation Materials				09.00 Acoustic Materials - Aerospace Applications			09.02 Acoustic Metamaterials, Part 3			09.06 Sound Absorption Measurements, Part 1																										
	2962	2491	2465																2913	2567	2569	2207	2759	3078	2573					2431	1775					2074	3086	1458	2320	2437				2126	1568	1886				3472	2182	2162					2729	3158	3163	2324
Channel 7	14.07 Outdoor Noise Propagation				11.06 Wind Turbine Noise													14.03 Noise Barriers				14.00/14.01/14.04 Environmental Noise					14.05 Noise Mapping			20.01 Artificial Intelligence for Noise and Vibration Control, Part 1																														
	2679	3165	2170	2405	2130	2070	1125	2449	2589											2485	2302	1324	2310	2194	1846						2280	2615	2645	2603	2826	2966	2581				2591	3069	1616					2397	2479	2415	1490									
Channel 8	17.03 Psychoacoustic Noise Evaluation: Basics & Applications, Part 1							17.03 Psychoacoustic Noise Evaluation: Basics & Applications, Part 1			17.03 Psychoacoustic Noise Evaluation: Basics & Applications, Part 2					17.04 Sell & Buy Quiet																						17.03 Psychoacoustic Noise Evaluation: Basics & App., Part 3			16.00/16.01/16.04 Noise and Health, Part 1																			
	1304	2062	2701	3252					2777	1435	2830	2180						2487	2727	1686	1484	1630	2096	2100					2027	2240	1448	2623																			2041	1478	1900					2451	3020	3128
Networking sessions	Hot Topics in Soundscapes / sound quality			Integrating virtual and in-person in future INTER-NOISE			Poster Q&A, part 1													Meet the I-INCE President		INCE Digital Library		Hot Topics in Quiet Drones		I-INCE Activities		Meet George Maling		Hearing conservation		Hot Topics in Active Control		How can I become INCE Board Certified?		How can I become more involved in INCE?		Virtual Coffee Break and Conversation																						
																																														Sell and Buy Quiet Panel Discussion (3:30-4:30)														

★ WORKSHOPS ★

IDENTIFYING THE MOST SUCCESSFUL METHODS OF HEARING CONSERVATION IN HIGH NOISE INDUSTRY – AND WHERE WE CAN IMPROVE

CHANNEL 8 | 2:00pm - 4:00pm, Wednesday, 4 August 2021

Amanda Azman, National Institute for Occupational Safety and Health, United States
Paul Brereton, Health and Safety Executive, United Kingdom

This workshop will be a round-table review of practical implementation of hearing conservation methods and standards. The actions expected of employers in the U.S., Britain and other participating countries will be presented. Discussion of the various elements of a successful hearing conservation program will take place (noise measurement, quieter machinery, controlling noise propagation, hearing protection, audiometric testing, training, etc.). Workshop delegates will jointly consider the successes and challenges of different approaches. The workshop organizers will produce a short report on good practice to reduce the incidence and progression of occupational hearing damage. There will be a takeaway message for practical hearing conservation program implementation – what works well, what works with effort, what doesn't work and what might become possible in the near future.

INTRODUCTION TO ACTIVE NOISE CONTROL AND NEW CHALLENGES

Part 1: CHANNEL 6 | 7:00am- 9:00am, Monday, 2 August 2021

Part 2: CHANNEL 5 | 2:00pm- 4:00pm, Monday, 2 August 2021

Mingsian Bai, National Tsinghua University, Taiwan
Jordan Cheer, University of Southampton, United Kingdom
Woon-Seng Gan, Nanyang Technological University, Singapore
Yoshinobu Kajikawa, Kansai University, Japan
Yangfan Liu, Purdue University, United States
Scott Sommerfeldt, Brigham Young University, United States
Yongjie Zhuang, Purdue University, United States

In the recent decade, research and applications of active noise control (ANC) have attracted more attention than ever before, mainly due to the fast improvement in the on-chip computing power and the reduction in cost of signal processing hardware, as well as the general public's increasing concerns on health and comfort when using engineered

products. Many recent studies focus on expanding the spatial region that can be controlled by an ANC system, extending the effective frequency range to a wider bandwidth as well as exploring ANC applications in various acoustic environments and engineered products. This presents many new challenges in many aspects of ANC including signal processing, control theory, transducer design/deployment, physical acoustics and vibration, etc.

In this workshop, an introductory presentation is given first providing a brief background on ANC and overviewing fundamental theories and principles on which active noise control is based. This is then followed by six focused talks given by world leading researchers in this area. Each talk presents recent studies on a specific topic related to current technical challenges in active noise control. The topics covered in those talks include global ANC based on optimal array beamforming theory, expansion of the control region by sensing acoustic energy density and vibration spatial gradients, extension of the control frequency limit using motion tracking techniques, ANC in the built environments, an ANC-based personal audio technique for public spaces, and efficient multi-channel ANC filter design formulation for controller stability and robustness.

PLENARY LECTURE | JIAN KANG

9:45am-10.45am | Soundscape: Progress in the past 50 years and challenges in the next 50 years



Professor Jian Kang

University College London, United Kingdom

Professor Jian Kang holds Chair in Acoustics at the Bartlett Faculty of Built Environment, University College London, UK. He is Fellow of Royal Academy of Engineering, Fellow of UK Institute of Acoustics, Fellow of the Acoustical Society of America, and Fellow of the International Institute of Acoustics and Vibration. He has worked in environmental and architectural acoustics for 30+ years.

KEYNOTE LECTURE | ROBERT AICHNER & ROSS CUTLER

9:00am-10:00am | Developing deep noise suppression for Microsoft Teams and Skype



Dr. Robert Aichner
Microsoft Corp., USA

Dr. Robert Aichner, Principal Group Program Manager at Microsoft, manages Intelligent Communication and Conversation Cloud group responsible for the areas of machine learning and call quality. He has published more than 30 conference papers, journal papers, and book chapters.



Dr. Ross Cutler
Microsoft Corp., USA

Dr. Ross Cutler, Partner Applied Scientist, manages the team of applied scientists and software engineers at Microsoft with the focus of improving Teams/Skype audio/video quality and reliability and enabling new functionality with AI. He has published 50+ publications and has over 88 granted patents.

KEYNOTE LECTURE | NAOAKI SHINOHARA

9:00am-10:00am | Efforts for reducing the impact of aircraft noise at Japan and worldwide airports and a suggestion for the improvement to the next generation



Naoaki Shinohara

Aviation Environment Research Center, Japan

Efforts for reducing the impact of aircraft noise at Japan and worldwide airports and a suggestion for the improvement to the next generation

Naoaki Shinohara, Aviation Environment Research Center, Japan

Mr. Shinohara is engaged in research work on aircraft noise at the Narita International Airport Promotion Foundation (since 1981) and at Aviation Environment Research Center (since 2016). Main research subjects include monitoring and evaluation of aircraft noise airports, and development of aircraft noise modeling technologies.

KEYNOTE LECTURE | FRANÇOIS-XAVIER BÉCOT

10:00am-11:00am | Challenges in modeling sound packages: A short history and future trends of the sound propagation in poro-elastic media



Dr. François-Xavier Bécot

MATELYS – Research Lab, France

Dr. François-Xavier Bécot is the co-founder and executive manager of MATELYS – Research Lab, an independent research laboratory specialist in the characterization and modeling of sound packages. He particularly studied the characterization techniques for screens, scrims and perforated plates and the modeling of heterogeneous materials (double porosity, porous composites).

KEYNOTE LECTURE | JORGE ARENAS

09:00am-10:00am | Environmental noise in cities: Lessons learned and what is next



Professor Jorge P. Arenas

Institute of Acoustics, University Austral of Chile, Chile

Dr. Jorge P. Arenas is Professor and former director of the Institute of Acoustics, University Austral of Chile. He is currently the Editor-in-Chief of the Int. Journal of Acoustics and Vibration, and a member of the editorial board of the Shock and Vibration and Applied Acoustics journals.

KEYNOTE LECTURE | MEGAN BALLARD

10:00am-11:00am | Applications of acoustical oceanography



Dr. Megan Ballard
University of Texas, USA

Dr. Megan S. Ballard is a Research Scientist at the Applied Research Laboratories, University of Texas at Austin. Her research areas are related to underwater acoustic propagation modeling, geoacoustic inversion, and direct measurement of marine sediment properties. Dr. Ballard received the R. Bruce Lindsay Award from the Acoustical Society of America in 2016.

PLENARY LECTURE | PASCALE NEPLE

9:00am-10:00am | Aircraft noise reduction achievements and future challenges



Dr. Pascale Neple

Airbus Operations SAS, France

Dr. Pascale Neple has been an acoustic engineer in the Acoustics and Environment Department at Airbus Operations SAS France since 1999. Since 2015, she has been involved in program activities development in the field of cabin noise and external noise.

04.00 SIGNAL PROCESSING, MEASUREMENTS, SOUND REPRODUCTION, DIAGNOSTICS FOR NOISE AND VIBRATION ENGINEERING, GENERAL, PART 1CHANNEL 1 • **Chairs** | Woon-Seng Gan, Efren Fernandez-Grande

Time	Paper number	Title	Authors
6:40am	1136	Distortion measurements of sound pressure level generated by a pistonphone	Thiago Antônio Bacelar Milhomem, Zemar Martins Defilippo Soares, Gustavo Palmeira Ripper, Peter Hanes, Adrian Solano Mena, Federico Ariel Serrano, Giancarlos Miguel Guevara Chuquillanqui, Juan Pablo Ayala Breña
7:00am	2557	MEMS digital microphone and Arduino compatible microcontroller: an embedded system for noise monitoring	Felipe Ramos de Mello, William D'Andrea Fonseca, Paulo Henrique Mareze
7:20am	1580	Visualization of magnetic field corresponding to acoustic signal and estimation of magnetic source based on symmetry of magnetic field distribution	Takuto Kurosawa, Takuto Kurosawa, Eri Ishizuka, Yasuhiro Oikawa, Masatoshi Asakawa, Yuya Suzuki
7:40am	3112	Measurement of loudspeaker mechanical impedance by changing the sound load at the throat of loudspeaker	Shichun Huang, Liang Yu, Weikang Jiang
8:00am	2757	Comparison of Estimation Methods of Room Impulse Responses in Local Region Using Small Number of Microphones	Haruka Matsuhashi, Izumi Tsunokuni, Yusuke Ikeda

SPECIAL LATIN AMERICAN SYMPOSIUM: ENVIRONMENTAL NOISE MANAGEMENTCHANNEL 1 • **Chairs** | Davi Akkerman, Carolina Monteiro

Time	Paper number	Title	Authors
11:30am	20001	Environmental noise management in Latin America: a general panorama	Priscila Wunderlich
11:45am	20002	Environmental noise regulations and noise mappings in Brazil	Juan Frías de Pierrard
12:00pm	20003	Noise mapping and environmental policies: the Chilean experience	Jorge Arenas
12:15pm	20004	Current challenges of noise management in Uruguay	Alice Elizabeth Gonzalez
12:30pm	20010	Roundtable discussion on environmental noise management	Carolina Monteiro

SPECIAL LATIN AMERICAN SYMPOSIUM: ACOUSTIC COMFORT IN BUILDINGSCHANNEL 1 • **Chairs** | Davi Akkerman, Carolina Monteiro

Time	Paper number	Title	Authors
1:30pm	20005	Building acoustic regulations in Latin America: a general panorama	Carolina Monteiro
1:45pm	20006	Acoustic performance in Dwellings in Brazil - From regulation to reality	Marcos Holtz
2:00pm	20007	Acoustic comfort: Applications of Standards in Argentina building codes	Arturo Raúl Maristany
2:15pm	20008	Building acoustic requirements: current situation in Uruguay	Gonzalo Fernández Brescia
2:30pm	20011	Roundtable discussion on acoustic comfort in buildings	Carolina Monteiro

20.15 CLASSIC PAPERS IN NOISE CONTROL ENGINEERINGCHANNEL 1 • **Chairs** | Tyler Dare, Patricia Davies

Time	Paper number	Title	Authors
3:00pm	2201	An overview of Leo Beranek's paper on "The Forty-fifth Thomas Hawksley Lecture: The Transmission and Radiation of Acoustic Waves by Structures" and its influence on architectural acoustic research	Jonathan Broyles, Nathan C. Brown
3:20pm	2435	Overview of J. E. Ffowcs Williams' 1984 paper on anti-sound	Dazhuang He
3:40pm	3206	Overview of Dah-You Maa's 1987 paper on 'Microperforated-panel wideband absorbers'	Zhuang Mo
4:00pm	3240	Overview of Biot's 1956 paper on theory of propagation of elastic waves in a fluid-saturated porous solid 1. Low-frequency range.	Guochenhao Song
4:20pm	3404	Overview of Sung, S.H. and Nefske, D.J.'s 1984 paper on A Coupled Structural-Acoustic Finite Element Model for Vehicle Interior Noise Analysis	Srinivasa-Rao Ippili
4:40pm	3469	Overview of M. J. Lighthill's and M. H. A. Newman's 1952 paper on "On Sound Generated Aerodynamically. 1. General Theory."	Seth Donkin
5:00pm	3471	Overview of Hunt, F. V., Beranek, L. L., and Maa, D. Y.'s 1939 paper on "Analysis of Sound Decay in Rectangular Rooms"	Jared Schmal

03.02 - MODELING & NUMERICAL SIMULATION, PART 1CHANNEL 1 • **Chairs** | Elke Deckers, Steve Hambric

Time	Paper number	Title	Authors
7:00am	2156	Vibroacoustic analysis of a thin laminated composite plate with surface-bonded piezoelectric patches and subjected to general boundary conditions	Zhengmin Hu, Kai Zhou, Yong Chen
7:20am	1985	Free vibration analysis of rectangular plates with arbitrary elastic boundary conditions	Zhenshuai Wan
7:40am	2641	Development of a virtual biomechanical manikin used in vibrations studies in occupied spaces	Eusebio Conceição, M ^a Inês Conceição, M ^a Manuela Lúcio
8:00am	3037	Numerical modeling of ground-borne vibrations induced by pile driving with a simple and direct material damping approach	Tales Sofiste, Luís Godinho, Delfim Soares, Pedro Alves Costa
8:20am	2078	Structural Dynamics, Noise and Vibration: Buildings Adjacent to Train Lines	Pablo Reboredo Gasalla

01.01 FAN AND TURBOMACHINERY NOISE, PART 3CHANNEL 1 • **Chairs** | Seongkyu Lee, Murat Inalpolat

Time	Paper number	Title	Authors
11:00am	1970	Experimental study of wavy trailing edge serrations on flat rotor blades	Sai Manikanta Kaja, K. Sriinivasan, A. Jaswanth Kalyan Kumar
11:20am	2142	Study on the effect of separation and reattachment flow between blades on fan noise	Sho Kosaka, Masaharu Sakai, Hideaki Sato, Kaori Seki
11:40am	2633	Directivity of sound propagation from an commercial supersonic engine inlet	Mitchell Sugar, Paul Slaboch
12:00pm	3181	Industrial fan vibration signature characterization	Timothy Copeland, Arthur Kohn, Orrin Southall

01.02 COMPUTATIONAL METHODS IN FLOW-INDUCED NOISE & VIBRATION, PART 1CHANNEL 1 • **Chairs** | Steve Hambric, Randolph Leung

Time	Paper number	Title	Authors
12:20pm	1108	Characterization of trailing edge broadband noise from wind turbine blades	Bhargava Vasishta, Naidu N.V. Swamy, Satya Prasad Maddula
12:40pm	2597	Prediction of wind turbine blade trailing edge noise under various flow conditions for a passive damage detection system	Murat Inalpolat, Caleb Traylor
1:00pm	2264	Energy fluctuations in recorder pipes during transient sound attacks and steady state sound	Hirofumi Onitsuka, Tetsuro Shoji, Katsuya Uchida, Akira Miki

01.02 COMPUTATIONAL METHODS IN FLOW-INDUCED NOISE & VIBRATION, PART 2CHANNEL 1 • **Chairs** | Cheolung Chung, Seongkyu Lee

Time	Paper number	Title	Authors
7:20pm	2467	Two-step computational aeroacoustics approach for underhood cooling fan application	Parag Chaudhari, Jose Magalhaes, Aparna Salunkhe
7:40pm	1330	Turbulent model validations with CFD/wind tunnel test and application to SEA for wind noise prediction	Kai Aizawa, Susumu Terakado, Masashi Komada, Hidenori Morita, Richard DeJong, Steve Sorenson
8:00pm	3067	Wake-body interaction Noise Simulations by Coupling CFD and BEM	Masaaki Mori
8:20pm	2675	Investigation into effects of side-window rubber sealer on cabin interior noise due to external flow disturbances of vehicle	Sangheon Lee, Songjune Lee, Cheolung Cheong, Hyerin Kwon, Changman Seo
8:40pm	1787	Implementation of Direct Acoustic Simulation using ANSYS Fluent	Dennis Huang, Zhigang Yang, Randolph Chi Kin Leung

01.01 FAN AND TURBOMACHINERY NOISE, PART 1CHANNEL 2 • **Chairs** | Randolph Leung, Cheolung Chung

Time	Paper number	Title	Authors
6:00am	1380	Optimization of Low Noise Blade of Small Axial Fan at Low Reynolds Number	Peixun YU, Junqiang Bai, Xiao Han
6:20am	1578	Aeroacoustic simulation of a cross-flow fan using lattice Boltzmann method with a RANS model	Kazuya Kusano, Masato Furukawa, Kenichi Sakoda, Tomoya Fukui
6:40am	2507	Reduced order model analysis to identify possible aerodynamic noise sources of small axial fan: POD and CNN	Wataru Obayashi, H. Aono, T. Tatsukawa, K. Fujii, K. Takemi
7:00am	2667	Numerical and experimental investigation into effects of tip-rake shape of axial-flow fan on its flow and noise performances	Seo Yoon Ryu, Cheolung Cheong, Jong Wook Kim, Byung il Park

01.01 FAN AND TURBOMACHINERY NOISE, PART 2CHANNEL 2 • **Chairs** | Zhong-Nan Wang, Carsten Spehr

Time	Paper number	Title	Authors
7:20am	2481	Design of axial flow fans for reduced noise and improved efficiency	Erika Quaranta, Malcolm Smith
7:40am	1809	Numerical simulations of flow induced noise from a dual rotor cooling fan used in electronic cooling systems	Sahan Wasala, Sahan Wasala, Yutong Xue, Lon Stevens, Tim Persoons
8:00am	1666	Computationally efficient source grid selection and source interpolation in computational aeroacoustics applied to an axial fan.	Andreas Wurzinger, Manfred Kaltenbacher, Stefan Schoder
8:20am	3114	Effects of moisturized inflow on compressor performance and aerodynamic noise	Changhong Sun, Yipeng Cao, Chen Liu
8:40am	1414	Lighthill's analogy applied to an automotive turbocharger compressor	Clemens Freidhager, Martin Heinisch, Andreas Renz, Stefan Schoder, Manfred Kaltenbacher

02.00 VIBRO-ACOUSTICS AND STRUCTURE-BORNE NOISE, GENERALCHANNEL 2 • **Chairs** | Sebastian Ghinet, Fabio Semperlotti

Time	Paper number	Title	Authors
11:00am	1730	Vibration of a stiffened pipe filled with a bubbly liquid: analysis of resonance frequencies in function of bubble fraction	Sanae Serbout, Laurent Maxit, Frédéric Michel
11:20am	2389	Acoustic analysis of impact sound on vibrating circular membranes	Evaggelos Kaselouris, Chrysoula Alexandraki, Yannis Alexandraki, Makis Bakarezos, Michael Tatarakis, Nektarios A. Papadogiannis, Vasilis Dimitriou
11:40am	2221	Experimental sound power from curved plates using the radiation resistance matrix and a scanning vibrometer	Trent Bates, Ian C. Bacon, Caleb B. Goates, Scott D. Sommerfeldt
12:00pm	2387	Influence of the plate thickness and material properties on the violin top plate modes	Evaggelos Kaselouris, Yannis Orphanos, Makis Bakarezos, Michael Tatarakis, Nektarios A. Papadogiannis, Vasilis Dimitriou
12:20pm	3246	Simulation of rubber grommets and correlation with test at low frequencies	Caoyang Li, David Herrin, John Baker, Asad M. Sardar
12:40pm	2661	Shaping acoustic radiation induced by vibrotactile rendering on a touch surface	Sangwon Park, Wheejae Kim, Dongjoon Kim, No-Cheol Park

04.00 SIGNAL PROCESSING, MEASUREMENTS, SOUND REPRODUCTION, DIAGNOSTICS FOR NOISE AND VIBRATION ENGINEERING, GENERAL, PART 2CHANNEL 2 • **Chairs** | J. Stuart Bolton, Yangfan Liu

Time	Paper number	Title	Authors
2:40pm	1035	Research on the Layout Optimization of Acoustic Radiation Power Flow Reinforcement Based on Weight-Guide method	Xiaoyan Teng, Qiang Li, Xudong Jiang, Zihua Yan
3:00pm	1950	Determination of tonal signal parameters based on zero crossing detection	Michal Luczynski, Stefan Brachmanski, Andrzej Dobrucki
3:20pm	2246	Sound power and sound energy measurements using an ellipsoidal measurement surface	Edward Zechmann
3:40pm	3510	Experimental determination of the acoustical effects of face masks on speech effort	Noah Schumaker, Andrew Barnard

13.13 THE FUTURE OF BUILDING ACOUSTICS MEASUREMENTS AND MODELLINGCHANNEL 2 • **Chairs** | Greg Coudriet, Sunit Girdhar

Time	Paper number	Title	Authors
4:20pm	1781	Quantifying sound transmission of building structures for optimization in early-stage design	Jonathan Broyles, Micah R. Shepherd, Nathan C. Brown
4:40pm	1908	Analytical model of the diffuse sound transmission loss of finite double panel structures	Javier Vazquez Torre, Jonas Brunskog, Vicente Cutanda Henriquez
5:00pm	1384	Acoustic design tools for estimation of STC and IIC of wood wall and floor assemblies	Cheng Qian, Lin Hu, Christian Dagenais, Sylvain Gagnon
5:20pm	2619	A Sound Insulation Prediction Model for Floor Structures in Wooden Buildings Using Neural Networks Approach	Mohamad Bader Eddin, Sylvain Menard, Delphine Bard, Jean-Luc Kouyoumji, Nikolas-Georgios Vardaxis
5:40pm	1757	An explicit time-domain FEM for acoustic simulation in rooms with frequency-dependent impedance boundary: Comparison of performance in 2D simulation with frequency-domain FEM	Takumi Yoshida, Takeshi Okuzono, Yui Sugimoto, Kimihiro Sakagami

13.01 ACOUSTIC REGULATIONS AND CLASSIFICATION FOR BUILDINGS, PART 1CHANNEL 2 • **Chairs** | Marcos Holtz, Jeongho Jeong

Time	Paper number	Title	Authors
7:20pm	2531	Audibility of emergency broadcasting sound in a mechanical room in an office building	Jeongho Jeong
7:40pm	3054	Incorporating acoustic requirements into the BIM object	Paola Weitbrecht, Carolina Monteiro, Cecilia Jardim
8:00pm	3063	The Brazilian performance standard revision. Summary and next steps.	Marcos Holtz, Davi Akkerman, Carolina Monteiro
8:20pm	3169	Impact sound transmission: experiments of control at the receiver room	Davi Akkerman, Paola Weitbrecht, Mariana Shieko, Marcel Borin, Leonardo Jacomussi
8:40pm	3236	A proposal for standard methods and criteria for the assessment of residential noise complaints	Mihkel Toome, Steve Meszaros

08.01 VEHICLE NOISE AND VIBRATION, PART 1CHANNEL 3 • **Chairs** | Peng Wang, Sterling McBride

Time	Paper number	Title	Authors
6:00am	1718	NEMO project: acoustic detection of vehicle engine speed	Truls Svenn Berge, Viggo Henriksen
6:20am	2505	Modeling and analysis for dynamic behavior of elevator traction system under the braking of safety gear	Xiaolong Ma, Peng Zhang, Ni Li, XI Shi, Huaiwu Zou
6:40am	2477	Experimental study on cushioning behaviors of foam with different skin-liked covers	Heye Xiao, Focai Yuan, Xudong Zhang, Chizhen Xu, Jie Zhou
7:00am	2109	Impact of a tunnel on the TL of a vehicle floor in bare and trimmed conditions and investigation on the most suitable simplified geometry able to better represent such impact	Federico Di Marco
7:20am	1689	Method for localisation of sound sources and aggregation to an acoustic centre	Yannik Weber, Matthias Behrendt, Tobias Gohlke, Albert Albers

09.01 POROUS MATERIALSCHANNEL 3 • **Chairs** | Tony Xue, Xiaolin Wang

Time	Paper number	Title	Authors
8:20am	2493	Acoustic characterization of membranes attached to sound absorbing base materials	Juan Carlos Rodríguez Vercher, Jesús Alba, Romina del Rey
8:40am	2495	Indirect determination of airflow resistance of textiles with reference samples	Juan Carlos Rodríguez Vercher, Romina del Rey, Jesús Alba

05.01 AIRCRAFT INTERIOR NOISECHANNEL 3 • **Chairs** | Sebastian Ghinet, Himanshu Dande

Time	Paper number	Title	Authors
11:00am	2671	Design, development and testing of digital MEMS pressure sensor array for full-scale vibroacoustic measurements	Pankaj Joshi, Frank Khelfa, Hendrik Lehmkuhl, Patrick Cordes, Patrick Naujoks, Thorsten Scharowsky, Kay Kochan
11:20am	3228	Noise measurements in the AS 350 helicopter under the specific operating conditions of SAR mission	Felipe Gelain, Stephan Paul
11:40am	2334	Influence of mobility completeness and source behavior on the robust-ness of Transfer Path Analysis and Source Characterization methods: A numerical study.	Simon Prenant, Thomas Padois, Thomas Dupont, Olivier Doutres
12:00pm	1382	Prediction and Improvement of Aircraft Cabin Acoustics using Statistical Energy Analysis and Sound Quality Evaluation	Nurkan Turkdogru Gurun, Jonathan Chen, Frederick Ward, Matthew Wilcox, Zhiming Luo
12:20pm	1882	Aircraft interior acoustics - background noise contamination	Ramana Kappagantu, Manuel Etchessahar, Edgar Matas, Koen Vansant
12:40pm	2417	Vibro-acoustic modeling of aircraft structures using Finite Element- informed Statistical Energy Analysis	Abderrazak Mejdj, Luca Alimonti, Bryce Gardner

05.02 AIRFRAME NOISECHANNEL 3 • **Chairs** | Michaela Herr, Takatoshi Yokota

Time	Paper number	Title	Authors
2:00pm	2326	Trailing-edge noise reduction of a wing by a surface modification	Varun Bharadwaj Ananthan, R.A.D. Akkermans, Dragan Kozulovic
2:20pm	1890	ELES and tonal noise prediction of slanted-root trailing-edge serrations	Yehia Salama, Joana Rocha
2:40pm	3202	Aeroacoustic analysis of slat tones	Hasan Kamliya Jawahar, Syamir Alihan Showkat Ali, Mahdi Azarpeyvand
3:00pm	1610	High Lift Device Modifications for Reducing Airport Noise – A Review	Daryoush Allaei, Benjamin Reydel, James Rall
3:20pm	2783	Parametric optimization of aircraft arrival trajectories for aviation noise mitigation using BADA4 performance model	Ameya Behere, Tejas Puranik, Michelle Kirby, Dimitri Mavris

05.05 IMPROVING TOOLS FOR SUBSONIC AIRCRAFT NOISE PREDICTIONCHANNEL 3 • **Chairs** | Oleksandr Zaporozhets, Vic Sparrow

Time	Paper number	Title	Authors
4:20pm	2043	Next generation aircraft noise-mapping	Ulf Tengzelius, Anders Johansson, Mats Åbom, Karl Bolin
4:40pm	2723	Empirical estimation of engine-integration noise for high bypass ra-tio turbofan engines	Incheol Lee, Yingzhe Zhang, Dakai Lin
5:00pm	2352	Improving single flyover noise prediction for subsonic aircraft	Oleksandr Zaporozhets, Alexandras Jagniatinskis
5:20pm	2855	Subtraction Analysis for Predicting the Propagation Effects of Aircraft Noise	Yiming Wang, Kai Ming Li
5:40pm	2842	Advanced procedure noise model validation using Seattle International Airport noise monitor networks	Ara Mahseredjian, Jacqueline Thomas, R. John Hansman
6:00pm	2846	Validation of the aviation environmental design tool's noise model using high fidelity weather	Ana Gabrielian, Tejas Puranik, Mayank Bendarkar, Michelle Kirby, Dimitri Marvis
6:20pm	3008	Noise shielding surrogate models using dynamic artificial neural networks	Francesco Centracchio, Lorenzo Burghignoli, Giorgio Palma, Ilaria Cioffi, Umberto Iemma

20.08 VIBROACOUSTICS FOR MEDICAL SOLUTIONSCHANNEL 3 • **Chair** | Jin Yong Jeon

Time	Paper number	Title	Authors
7:00pm	2745	Moving object detection and tracking based on Doppler ultrasound	Hyeong Geun Jo
7:20pm	3046	Cough monitoring and pneumonia diagnosis algorithm through analysis of respiratory system-based vibro-acoustic signals and AI technology	Youngbeen Chung, Narae Kim, Donggeun Lee, Sang-Heon Kim, Junhong Park
7:40pm	3138	Quantification of the sound response to the auditory system in which the acoustic transmission properties are dependent on the medium in the middle ear	Jeon Jonghoon, Jonghoon Jeon, Kyunglae Gu, Junhong Park
8:00pm	3144	Intraocular Pressure Estimation Method Based on Vibration Propagation Characteristics According to Structure Contact	Kim Deukha, Seongwook Jeon, Won June Lee, Junhong Park
8:20pm	1919	Photoacoustic medical imaging demonstration using a pulsed LED	Leah Burge, Lauryn McKenna, Murray Korman
8:40pm	3134	Non-invasive Fetal heartbeat detection using vibration sensing system	Wanseung Kim, Jonghoon Jeon, Jeongkyu Hoh, Junhong Park

20.06 UAVS AND THE FUTURE OF URBAN SOUNDSCAPECHANNEL 5 • **Chairs** | Erich Thalheimer, Lisa Lavia

Time	Paper number	Title	Authors
6:00am	2509	A Hybrid and Efficient Low-noise assessment Platform for Urban aerial mobility (HELPU)	Siyang Zhong, Peng Zhou, Yi Fang, Xin Zhang
6:20am	2256	Quantification of the psychoacoustic effect of noise from small unmanned aerial vehicles	Justine Hui, Michael Kingan, Yusuke Hioka, Gian Schmid, George Dodd, Kim Dirks, Shaun Edlin, Sean Mascarenhas, Young-min Shim
6:40am	2457	Performance evaluation on multi-channel Wiener filter based speech enhancement for unmanned aerial vehicles recordings	Yameizhen Li, Benjamin Yen, Yusuke Hioka, Yusuke Hioka
7:00am	2160	Visual and audio perception study on drone aircraft and similar sounds in an Urban Air Mobility setting	Roalt Aalmoes, Naomi Sieben
7:20am	2045	Sound, noise, annoyance? Information as a means to strengthen the public acceptance of civil drones	Hinnerk Eissfeldt, Albert End

13.16 THE FUTURE OF OFFICE PRIVACY & SOUND MASKINGCHANNEL 5 • **Chairs** | Roderick Mackenzie, Berndt Zeitler

Time	Paper number	Title	Authors
7:40am	2713	Creating a sound-designed sound masking signal for open-plan offices that is both pleasant and has a positive impact on cognitive performance.	Benjamin Johannes Mueller, Mariella Laubengeiger, Noemi Martin, Philip Leistner
8:00am	2168	Field study for the evaluation of the acoustic quality of open-plan offices	Patrick Chevret, Bonzom Th., Lenne L., J. Marchand
8:20am	3328	Impact of Partition types on Architecture design studios acoustical environment	Hany Hossam Eldien, Umaru Bongwirnsa
8:40am	1813	Biophilic Sound Masking Systems: Promoting Acoustical Comfort in Workspaces	Ethan Salter, Dylan Mills
9:00am	3199	Spatial uniformity of a sound masking system sound field in an open-plan office	Roderick Mackenzie, Roderick Mackenzie, Farideh Zarei, Vincent Le Men

13.14 BUILDING SYSTEM NOISE & VIBRATION CONTROLCHANNEL 5 • **Chairs** | Melinda Miller, Carolina Monteiro

Time	Paper number	Title	Authors
11:00am	2948	Proacustica Handbook: noise and vibration control in building installations	Jose Nepomuceno, Priscila Wunderlich
11:20am	1612	Uncertainty of sound power measurements of a reference sound source using the AHRI Standard 230 sound intensity method	Curtis Eichelberger, Paul Bauch
11:40am	2958	Post-occupancy HVAC survey: What can be learned from 1,800 measurements	Jeff Fullerton, Alexander Maurer

13.15 ACOUSTIC PERFORMANCE OF OPERABLE & DEMOUNTABLE PARTITIONSCHANNEL 5 • **Chairs** | Jim Borzým, Jerry Lilly

Time	Paper number	Title	Authors
12:00pm	2407	Operable partitions – a life of experiences, observations, and testing plus comments on standards	Noral Stewart
12:20pm	2413	Field measurements of demountable partitions	Basel Jurdy, Michael Yantis
12:40pm	2917	Operable walls: where the rubber meets the mullion	Brandon Cudequest
1:00pm	2974	Acoustical performance of horizontal-sliding-panel operable partition walls	Jim Borzým

09.02 ACOUSTIC METAMATERIALS, PART 1CHANNEL 6 • **Chairs** | Mathieu Gaborit, Xiaolin Wang

Time	Paper number	Title	Authors
6:00am	2962	Enhancement of sound absorption in a band frequency using thin porous layer-lined metasurfaces	Joong Seok Lee, Jun Hyeong Park, Pyung Sik Ma, Shin Young Kim, Yoon Young Kim
6:20am	2491	The study of ultrasonic layer-matched to penetrate bone	Lianchun li, Haijun Wu, Haijun Wu, Weikang Jiang
6:40am	2465	Design of a metamaterial-based muffler for a target frequency range	Byunghun An, Jinwoo Lee

09.02 ACOUSTIC METAMATERIALS, PART 2CHANNEL 6 • **Chairs** | Bhisham Sharma, Tony Xue

Time	Paper number	Title	Authors
11:00am	2913	Inverse metacluster design using generative modeling for minimal scattering response	Peter Lai, Feruza Amirkulova
11:20am	2567	Optimization of metamaterials with complex neck shapes for aircraft cabin noise improvement	Tenon Charly KONE, Sebastian Ghinet, Raymond Panneton, Anant Grewa
11:40am	2569	Multi-tonal low frequency noise control using Helmholtz resonators with complex cavity designs for aircraft cabin noise improvement	Tenon Charly KONE, Sebastian Ghinet, Raymond Panneton, Thomas Dupont, Anant Grewal
12:00pm	2207	An integrated toolchain for the design of aeroacoustic metamaterials: the AERIALIST H2020 project.	Umberto Iemma
12:20pm	2759	Controlling the amount of acoustic absorption by using clusters of hard cylinders	Vicente Cutanda Henriquez, José Sánchez-Dehesa
12:40pm	3078	Experimental and numerical investigations of ventilated acoustic metamaterial based in-parallel arrangement of Helmholtz resonator for façade screen	Denilson Ramos, Luís Godinho, Paulo Amado-Mendes, Paulo Mareze
1:00pm	2573	Broadband noise mitigation using coupled Helmholtz resonators: a numerical study	Mariia Krasikova, Anton Melnikov, Sergei Krasikov, Yuri Baloshin, David Powell, Andrey Bogdanov
Break			
1:40pm	2431	Design of Acoustic Cloak Using Generative Modeling and Gradient-Based Optimization	Linwei Zhuo, Feruza Amirkulova
2:00pm	1775	Band structure and defect states in acoustic phononic crystals using expansion and micro-perforated chamber mufflers	Adriano Mitsuo Goto, Victor Gustavo Ramos Costa Dos Santos, José Maria Campos Dos Santos

09.08 NEW GENERATION MATERIALSCHANNEL 6 • **Chairs** | J. Stuart Bolton, Xiaoshi Su

Time	Paper number	Title	Authors
2:40pm	2074	A design framework for absorption and diffusion panels with sustainable materials	Jonathan Dessi-Olive, Timothy Hsu
3:00pm	3086	Nonlocal acoustic metasurface absorber for ultra-broadband sound absorption	Yifan Zhu, Badreddine Assouar
3:20pm	1458	Acoustic space filling curve metamaterials for grazing flow in Jet engine inlets	Jennifer Glover, Dan O'Boy
3:40pm	2320	Diffraction in phase gradient acoustic metagratings: multiple reflection and integer parity design	Mohammad Uzair, Xiao Li, Yangyang Fu, Chen Shen
4:00pm	2437	Predicting acoustic performance of high surface area particle stacks with a poro-elastic model	Zhuang Mo, Guochenhao Song, J. Stuart Bolton, Seungkyu Lee, Yongbeom Seo

09.00 ACOUSTIC MATERIALS - AEROSPACE APPLICATIONSCHANNEL 6 • **Chairs** | David Herrin, Tony Xue

Time	Paper number	Title	Authors
4:40pm	2126	The challenges and successes of passive acoustic treatments on the International Space Station	Holly Smith-Dalenberg, Christopher S. Allen, Jose G. Limardo-Rodriguez
5:00pm	1568	Development of acoustic mufflers for cabin noise reduction in Orion spacecraft	Indranil Dandaroy, S. Reynold Chu, Jeffrey Dornak, Christopher S. Allen
5:20pm	1886	A review of variable-impedance acoustic liner concepts developed at NASA	Michael Jones

09.02 ACOUSTIC METAMATERIALS, PART 3CHANNEL 6 • **Chairs** | Bhisham Sharma, Tony Xue

Time	Paper number	Title	Authors
6:00pm	3472	Adjustable sound insulation frequency band through the combination of membrane-type acoustic metamaterial array	Xiang Wu, TengLong Jiang, JianWang Shao, GuoMing Deng, Chang Jin
6:20pm	2182	Sound reflection of acoustic porous metasurfaces under uniform mean flow	Renhao Qu, Jingwen Guo, Yi Fang, Siyang Zhong
6:40pm	2162	Tunable frequency bandgaps in elastic metamaterials with internal contacts	Eunho Kim, Guenil Kim, Kyeong Min Cho, Yeongtae Jang

09.06 SOUND ABSORPTION MEASUREMENTS, PART 1CHANNEL 6 • **Chairs** | Umberto Berardi, David Herrin

Time	Paper number	Title	Authors
7:20pm	2729	Trial applications at gymnasiums of in-situ sound absorption measurement method by ensemble averaging technique	Toru Otsuru, Reiji Tomiku, Noriko Okamoto, Siwat Lawanwadeekul
7:40pm	3158	Finite element sound field analysis on measurement of absorption coefficient in a reverberation room -Relationships between inclination of walls and measurement results-	Reiji Tomiku, Noriko Okamoto, Toru Otsuru, Shun Iwamoto, Shoma Suzuki
8:00pm	3163	Calculation of statistical absorption coefficient using ensemble averaged surface normal impedance of material	Noriko Okamoto, Toru Otsuru, Reiji Tomiku, Masahiro Masuda, Arisa Tabaru
8:20pm	2324	"A flow and acoustic facility for characterization of liner and meta-acoustic surfaces under grazing flow condition"	Wei Yi, Jingwen Guo, Yi Fan, Renhao Qu, Siyang Zhong, Xin Zhang
8:40pm	2262	Measurement of sound absorption coefficient in a reverberant room using probability density function of damping constant	Kosuke Goto, Takehiko Nakagawa, Yoshinari Yamada

14.07 OUTDOOR NOISE PROPAGATIONCHANNEL 7 • **Chairs** | Tyler Dare, Keith Attenborough

Time	Paper number	Title	Authors
6:00am	2679	A study on variations in excess attenuation due to ground surface and meteorological conditions based on a long-term outdoor sound propagation experiment	Takatoshi Yokota, Koichi Makino, Genki Iizumi, Takuya Tsutsumi
6:20am	3165	A comparison of the ground excess attenuation model in Harmonoise with finite-difference time-domain solutions under grounds with mixed types	Yusaku Koshihara, Takuya Oshima
6:40am	2170	Landscape depressions can create silent zones in noise polluted parks	Timothy Van Renterghem, Pieter Thomas, Dick Botteldooren
7:00am	2405	Ground Attenuation Factor Based on Measurements	Dan Lin, Andrew Eng
7:20am	2130	Accurate noise modeling for petrochemical plants – impact of compressor Piping	Arindam Ghosh
7:40am	2070	Open source acoustic model development for natural and protected environments	Adwait Ambaskar, Victor Sparrow

11.06 WIND TURBINE NOISECHANNEL 7 • **Chairs** | Murat Inalpolat, Kristin Cody

Time	Paper number	Title	Authors
8:00am	1125	Experimental study of particle dampers applied to wind turbine blades to reduce low-frequency sound emission	Braj Bhushan Prasad, Fabian Duvigneau, Daniel Juhre, Elmar Woschke
8:20am	2449	Attenuation of Torsional Vibration in the Drivetrain of a Wind Turbine using a Centrifugal Pendulum Absorber	Hyeongill Lee, Youkyung Han, Byeongil Kim
8:40am	2589	Amplitude modulations increase annoyance due to wind turbine noise immission	Christoph Pörschmann, Stephan Großarth, Johannes M. Arend, Sebastian Schmitter, Dirk Schreckenberg, Klaus Wunder

14.03 NOISE BARRIERSCHANNEL 7 • **Chairs** | Jean-Pierre Clairbois, Judy Rochat

Time	Paper number	Title	Authors
11:00am	2485	Characterizing noise barriers: SOPRANOISE half-term progress report	Jean-Pierre Clairbois, Massimo Garai, Wolfram Bartolomaeus, Michael Chudalla, Fabio Strigari, Marco Conter, Andreas Fuchs
11:20am	2302	SOPRANOISE – update and analysis of noise barrier database including new current results	Marco Conter, Andreas Fuchs, Paul Reiter
11:40am	1324	Insertion loss (IL) of finite sound barriers of different contours – An introduction to geometrical solutions in 3-D space	Giora Rosenhouse
12:00pm	2310	Additional noise reduction with diffracting elements on barriers using numerical and standard calculation methods	Frits van der Eerden, Rafal Kurylek, Sandra Blaak, Erik Salomons, Tessel Van der Laan, Willem Jan van Vliet
12:20pm	2194	Additional noise reduction with diffracting elements on barriers: experimental testing	Wout Schwanen, Mark Mertens, Ysbrand Wijnant, Willem Jan van Vliet
12:40pm	1846	A FEM/Kirchhoff-Helmholtz integral model for noise diffractors on low height noise barriers	Ysbrand Wijnant, Judith L. Rochat, Bart Willems, Wout Schwanen

14.00/14.01/14.04 ENVIRONMENTAL NOISECHANNEL 7 • **Chairs** | Ken Kaliski, Robert O'Neal

Time	Paper number	Title	Authors
2:00pm	2280	Merging science education, citizen science and general population noise exposure data collection in the battle against noise pollution	Luc Dekoninck
2:20pm	2615	The uncertainty in the acoustic annoyance evaluation	Mário Mateus, Manuel Carlos Gameiro da Silva
2:40pm	2645	Noise Control and its relationship with the UN Sustainable Development Goals	Eoin King
3:00pm	2603	The interplay of tourism and noise: A literature review	Lisa-Marie Wadle, Noemi Martin
3:20pm	2826	Long Term Ambient Sound Level Survey	Henk de Haan, Virgini Senden
3:40pm	2966	Assessing the Potential for Noise Complaints due to Backyard Chickens	Charles Moritz
4:00pm	2581	Bibliographic review of socio economic effects of environmental noise for public policies in Chile	Alexis Campos, Felipe Raimann Arias, Pablo Gonzáles Padilla

14.05 NOISE MAPPINGCHANNEL 7 • **Chairs** | Timothy Van Renterghem, Eoin King

Time	Paper number	Title	Authors
6:00pm	2591	Acoustic Prediction Modeling and Sound Mapping of public transport users' exposure at a bus stop.	Dayane Cristina Lima Estercio, Paulo Fernando Soares
6:20pm	3069	A closer look at rail methodology in the BTS National Transportation Noise Map	Amanda Rapoza, Meghan Shumway, Gary Baker, Peter Wilke
6:40pm	1616	Route survey research of US military aircraft at Futenma Air Base and Kadena Air Base in Okinawa Prefecture	Takeshi Tokashiki

20.01 ARTIFICIAL INTELLIGENCE FOR NOISE AND VIBRATION CONTROL, PART 1CHANNEL 7 • **Chairs** | Tyler Dare, Christian Adams

Time	Paper number	Title	Authors
7:40pm	2397	Experimental force reconstruction on plates of arbitrary shape using neural networks	Tyler Dare
8:00pm	2479	Generative Adversarial Neural Network for Unsupervised Bearing Fault Detection	Gyuwon Kim, Seungchul Lee
8:20pm	2415	A machine learning-based methodology for computational aeroacoustics predictions of multi-propeller drones	Cesar Legendre, Cesar Legendre, Vincent Ficat-Andrieu, Athanasios Poulos, Yoshitaka Nakashima, Wataru Kobayashi, Gaku Minorikawa
8:40pm	1490	Combination of gated recurrent unit and Network in Network for underwater acoustic target recognition	Shuang Yang, Xiangyang Zeng

17.03 PSYCHOACOUSTIC NOISE EVALUATION: BASICS & APPLICATIONS, PART 1CHANNEL 8 • **Chairs** | Sonoko Kuwano, Hugo Fastl

Time	Paper number	Title	Authors
6:00am	1304	Application of loudness level to temporally varying sounds	Sonoko Kuwano, Seichiro Namba
6:20am	2062	Pitch strength and annoyance of acoustic analogs of flutter echo – a pilot study	Anne Balant, Heather Lai, Vayda M. Wilson
6:40am	2701	Impressions and interpretations of vehicle horn sounds with acoustic characteristics of speech	Masayuki Takada, Kanji Goto
7:00am	3252	Effects of speed and road condition on annoyance caused by motorcycle noise emission	Omid Samani, Anna Martius, M. Ercan Altinsoy
7:40am	2777	Equivalent sound level as a predictor for road traffic noise annoyance assessment	Jan Felcyn, Anna Preis
8:00am	1435	Experimental investigation on acoustics and efficiency of rotor configurations for electric aerial vehicles	Ronja König, André Gerlach, Henry Schmidt, Eike Stumpf
8:20am	2830	Temporal integration of partial loudness of helicopter-like sounds	Josef Schlittenlacher, Brian C. J. Moore, Brian C. J. Moore
8:40am	2180	Exposure to industrial noise: impacts on cognitive performance	Luiz Henrique Mesa Casa Pereira, Björn Knöfel, Jan Troge, Welf-Guntram Drossel, Marcel Klein, Jörn Hübelt

17.03 PSYCHOACOUSTIC NOISE EVALUATION: BASICS & APPLICATIONS, PART 2CHANNEL 8 • **Chairs** | Hugo Fastl, Shashikant More

Time	Paper number	Title	Authors
11:00am	2487	Improvement of sound atmosphere in the compartment of construction machine	Takeo Hashimoto, Shigeko Hatano
11:20am	2727	Research on commercial vehicle sound quality objective evaluation	Kun Qian, Zhichao Hou, Ruixue Liu, Dengke Sun, Rongkang Luo
11:40am	1686	Loudspeaker-based sound reproduction for evaluating noise transmission into the car cabin	Matthieu Kuntz, Gregor-Johannes Müller, Peter Kalinke, Bernhard U. Seeber
12:00pm	1484	Development of a metric for predicting people's responses to gusting wind noise in automobiles	Daniel Carr, Patricia Davies
12:20pm	1630	Psycho-acoustic evaluation of the automotive acoustic comfort using vibro-acoustic prediction methods	Valentin Miqueau, Etienne Parizet, Sylvain Germes
12:40pm	2096	Relationships between prior experience with fan noise and fan noise ratings in laboratory listening tests	Stephan Töpken, Steven van de Par
1:00pm	2100	Loudness- and preference-equivalent levels of fan sounds at different absolute levels	Eike Claaßen, Stephan Töpken, Steven van de Par

17.04 SELL & BUY QUIETCHANNEL 8 • **Chair** | Fabian Heisterkamp

Time	Paper number	Title	Authors
2:00pm	2027	Sell and Buy Quiet – the extended concept to reduce noise (at work and at home)	Fabian Heisterkamp, Johanna Bengtsson Ryberg, Jean Jacques, Alwin Verdaasdonk
2:20pm	2240	“Buy Quiet” with the added benefit of considering all safety, health, and cost factors	Edward Zechmann
2:40pm	1448	How to make sell and buy quiet a reality in Britain	Tao Wu, Paul Brereton, Jacqueline Patel
3:00pm	2623	Societal obstacles to Selling and Buying Quiet	David Nelson

17.03 PSYCHOACOUSTIC NOISE EVALUATION: BASICS & APPLICATIONS, PART 3CHANNEL 8 • **Chairs** | Sonoko Kuwano, Shashikant More

Time	Paper number	Title	Authors
6:20pm	2041	An experiment on the feeling of separation when multiple aircraft noises are overlapped	Makoto Morinaga, Takanori Matsui, Sonoko Kuwano, Seiichiro Namba
6:40pm	1478	Study on psychological evaluation model of a good conversation in knowledge creative activity by multiple people	Sohei Tsujimura, Motoki Yairi, Takayoshi Okita, Mayu Nidaira
7:00pm	1900	Impact of COVID-19 on the sound environment in a dental office - a case study	Tomomi Yamada, Kazunori Nozaki, Sonoko Kuwano, Mikako Hayashi

16.00/16.01/16.04 NOISE AND HEALTH, PART 1CHANNEL 8 • **Chairs** | Erica Ryherd, Michelle Vigeant

Time	Paper number	Title	Authors
7:40pm	2451	Using noise control principles when evaluating the acoustic impacts of face coverings during the coronavirus pandemic	Richard Ruhala, Laura Ruhala
8:00pm	3020	Medical debates and musical interpretations of vibroacoustic disease in Vieques, Puerto Rico	Alejandra Bronfman
8:20pm	3128	Change in the self-reported health status of residents associated with the reduced aircraft noise around Tan Son Nhat Airport after the epidemic outbreak	Bach Lien Trieu, Tran Thi Hong Nhung Nguyen, Thu Lan Nguyen, Makoto Morinaga, Yasuhiro Hiraguri, Takashi Yano, Yosiaki Sasazawa
8:40pm	2513	Relationship between noise-induced annoyance and age based on data of previous literatures	Ke Ni, Yu Huang

06.02 ROAD NOISE TREATMENTCHANNEL 1 • **Chairs** | Jean-Pierre Clairbois, Kohei Yamamoto

Time	Paper number	Title	Authors
6:00am	2260	Comparison of Noise Reduction Performance Evaluation Methods for Low-Noise Pavement in Korea- Part III	Byungchae Kim, Hyunjin Kim, Wonuk Kang
6:20am	2268	Noise reduction of Parallel barrier integrated with compact flexible panel device	Yat Sze Choy, Wang Zhibo, Yang Waiping
6:40am	2383	Empirical study on the correlation between measurement methods under diffuse and direct sound field conditions for determining sound absorption and airborne sound insulation properties of noise barriers	Andreas Fuchs, Reinhard Wehr, Marco Conter
7:00am	2105	Confusion in the evaluation of sound barriers under harmonized standard	Pavel Rubáš
7:20am	2066	Corn plants as temporary acoustic barrier to limit the effects of noise pollution	Gino Iannace, Virginia Puyana-Romero, Giuseppe Ciaburro
7:40am	2421	Control of low frequency noise from an environmental test facility	Malcolm Smith, Erika Quaranta
8:00am	1783	The Performance of a Low Berm in Reducing Traffic Noise	Paul Donovan, Carrie Janello

02.03 NUMERICAL METHODS IN VIBRO-ACOUSTICS, PART 1CHANNEL 1 • **Chairs** | Oriol Guasch, Laurent Maxit

Time	Paper number	Title	Authors
11:00am	1712	Vibrational energy distribution in plate excited with random white noise	Tyrode Victor, Nicolas Totaro, Laurent Maxit, Alain Le Bot
11:20am	2186	Subtractive modeling using the reverse condensed transfer function method: influence of the numerical errors	Florent Dumortier, Laurent Maxit, Valentin Meyer
11:40am	2535	Development of a hybrid SmEdA/SEA model for predicting the power exchanged between low and high modal density subsystems	Guang ZHU, Laurent Maxit, Nicolas Totaro, Alain Le Bot
12:00pm	1740	Solving linear systems from dynamical energy analysis - using and reusing preconditioners	Martin Richter, Gregor Tanner, Bruno Carpentieri, David Chappell
12:20pm	1906	Finite element method and dynamical energy analysis in vibro-acoustics - A comparative study	Sebastian Zettel, René Winter, Marco Norambuena, Marc Böswald, Martin Richter, Gregor Tanner

01.03 EXPERIMENTS IN FLOW-INDUCED NOISE & VIBRATIONCHANNEL 1 • **Chairs** | Carsten Spehr, Murat Inalpolat

Time	Paper number	Title	Authors
1:40pm	2851	Acoustical analysis of sound generated by synthetic jet actuators	Song Wang, Rayane Ait Oubahou, Zixin He, Anthony Mickalauskas, David Menicovich, Luc Mongeau
2:00pm	2072	"The answer is blowin' in the wind" - case study of a perforated roof screen	Anthony Nash
2:20pm	2711	An experimental investigation of turbulent flow over a two-dimensional obstacle on a flat plate	Shivam Sundeep, Xin Zhang, Siyang Zhong, Huanxian Bu
2:40pm	2719	Empirical prediction of flight effect on subsonic coaxial-jet noise by introducing an adjusted flight velocity term	Incheol Lee

02.07 VIBRO-ACOUSTICS OF METAMATERIALSCHANNEL 1 • **Chairs** | Elke Deckers, Sebastian Ghinet

Time	Paper number	Title	Authors
3:20pm	2052	(Generalized) Bloch mode synthesis for the fast dispersion curve calculation of 3D periodic metamaterials	Vanessa Cool, Lucas Van Belle, Claus Claeys, Elke Deckers, Wim Desmet
3:40pm	1842	Predicting robust complete and full band gaps in three-dimensional frame structures	Luiz Henrique Marra da Silva Ribeiro
4:00pm	2344	Resonant metamaterial designs for a broadband mitigation of flow-induced vibrations	Felipe Alves Pires, Luca Sangiuliano, Noé Geraldo Rocha de Melo Filho, Hervé Denayer, Elke Deckers, Wim Desmet, Claus Claeys
4:20pm	2571	Metamaterial plate with an arrangement of different resonators	Giovanna Pisicchio Zanoni, Alberto Luiz Serpa
4:40pm	2098	Phononic crystal sandwich for broadband and low frequency acoustic insulation under diffuse field	Natacha Aberkane-Gauthier, Miguel Moleròn, Damien Lecoq, Clément Lagarrigue, Charles Pézerat, Vincente Romero-García

03.02 - MODELING & NUMERICAL SIMULATION, PART 2CHANNEL 2 • **Chairs** | Elke Deckers, Steve Hambric

Time	Paper number	Title	Authors
6:00am	3124	Efficient prediction of construction equipment exterior and cabin interior noise over broad frequency range using novel SEA method	Hiromitsu Emoto, Taisei Yamaguchi, Hiroki Suganuma, Atsushi Kawano
6:20am	1660	An isogeometric formulation of locally-conformal perfectly matched layer for acoustic scattering problems	Yongzhen Mi, Xiang Yu
6:40am	1708	3D shape optimization of loudspeakers	Peter Risby Andersen, Vicente Cutanda Henríquez, Niels Aage, Junghwan Kook
7:00am	2909	The effect of bamboo clip dimension and position towards the frequency spectrum of a vibrating inhomogeneous bundengan string	Indraswari Kusumaningtyas, Ayrton Fithiadi Sedjati, Asadulloh Julda Hifzhuddin, Gea Oswah Fatah Parikesit
7:20am	1763	Bubble curtain modelling: analytical prediction of piling noise mitigation	Marco Huisman, Louis Lederwasch, René Smidt Lützen
7:40am	2879	Using simulation to predict reverberation room performance: Validation and parameter study	Jared Schmal, David Herrin, Jennifer Shaw, Charlie Moritz, Alexis Talbot, Nikhil Ghaisas

02.08 MACHINE LEARNING APPROACHES IN VIBRO-ACOUSTICSCHANNEL 2 • **Chairs** | Christian Adams, Semiha Yilmazer

Time	Paper number	Title	Authors
8:00am	2294	Optimizing the acoustic properties of a meta-material using machine learning techniques	Alessandro Casaburo, Dario Magliacano, Giuseppe Petrone, Francesco Franco, Sergio De Rosa
8:20am	2342	Explainable machine learning: A case study on impedance tube measurements	Merten Stender, Mathies Wedler, Norbert Hoffmann, Christian Adams
8:40am	2094	Deep learning-enhanced single point sound source localization for spherical microphone array	Soo Young Lee, Jiho Chang, Seungchul Lee

02.03 NUMERICAL METHODS IN VIBRO-ACOUSTICS, PART 2CHANNEL 2 • **Chairs** | Bryce Gardner, Himanshu Dande

Time	Paper number	Title	Authors
2:00pm	1002	Tutorial on Acoustic Fluid Loading of Structures	Stephen Hambric
2:20pm	2643	Computing Radiated Sound Power using Quadratic Power Transfer Vector (QPTV)	Rajendra Gunda, Sandeep Vijayakar
2:40pm	2236	A hybrid method for broadband vibroacoustic simulations	Jared Miller, Scott D. Sommerfeldt, Jonathan D. Blotter, David C. Copley
3:00pm	3044	SEA model for structural acoustic coupling by means of periodic finite element models of the structural subsystems	Luca ALIMONTI, Abderrazak Mejdi, Andrea Parrinello
3:20pm	2791	Power balance analysis of nonperiodic structural components from a model converted from FEM to SEA.	Mathias Hinz, Júlio Apolinário Cordioli, Luca Alimonti, Bryce Gardner

05.04 URBAN AIR MOBILITY COMMUNITY NOISE, PART 1CHANNEL 3 • **Chairs** | Michael Bauer, Stephen Rizzi

Time	Paper number	Title	Authors
6:00am	2541	Simulation of multi-rotor powered urban aerial mobility noise for environmental assessment	Qichen Tan, Haoyu Bian, Siyang Zhong, Xin Zhang
6:20am	2203	Techniques for adaptive metamodelling of propeller arrays far-field noise	Umberto Iemma, Caterina Poggi, Monica Rossetti, Giovanni Bernardini
6:40am	2278	Noise prediction for urban air taxi operation	Mark Koehler, Frank Baader, Peter Brandstät
7:00am	1638	ATEFA – A first German approach on UAM community noise and air-taxi certification	Michael Bauer, Daniel Redmann, Lis Weilandt
7:20am	1333	Community noise from urban air mobility (UAM) and its control by traffic management	Michael Bauer

08.03 TIRE NOISE, PART 1CHANNEL 3 • **Chairs** | Tan Li, Ulf Sandberg

Time	Paper number	Title	Authors
7:40am	2964	Artificial Neural Network Model for Road Pavement Classification using Features of Tire-Pavement Noise and Road Surface Images	Seo Il Chang, Bo Kyeong Kim, Jae Kwan Lee
8:00am	1822	Advanced design of Close-Proximity (CPX) trailer enclosure acoustics on tyre/road noise measurement	Dongfang Li, Dong Fang Li, Randolph Chi Kin Leung
8:20am	1830	Temperature influence on tire/road noise measurements: recently collected data and discussion of various issues related to standard testing procedures	Erik Bühlmann, Felix Schlatter, Ulf Sandberg
8:40am	2031	Why do clogged porous asphalt pavements give better traffic noise reduction than a dense-graded asphalt pavement?	Ulf Sandberg
9:00am	2365	Monitoring trends in road surface impact on rolling noise emissions	Dick Botteldooren, Wout Van Hauwermeiren, Karlo Filipan, Bert De Coensel
9:20am	1431	Uncertainty in the standardized method "Characterization of the acoustic properties of road surfaces" by CEN TC227 WG5	Gijsjan van Blokland, Luc Goubert

05.04 URBAN AIR MOBILITY COMMUNITY NOISE, PART 2

CHANNEL 3 • **Chairs** | Michael Bauer, Stephen Rizzi

Time	Paper number	Title	Authors
11:00am	2555	Towards predicting noise-power-distance curves for propeller and rotor powered aircraft	Daniel Amargianitakis, Rodney H. Self, Antonio J. Torija, Anderson R. Proença
11:20am	1570	An investigation into the impact of unmanned aerial vehicles on soundscape perception in urban and rural environments	Rory Nicholls, Antonio Torija Martinez
11:40am	1482	Community noise assessment of urban air mobility vehicle operations using the FAA Aviation Environmental Design Tool	Stephen Rizzi, Menachem Rafaelof
12:00pm	1488	The AIRNOISE-UAM tool and verification with FAA aviation environmental design tool	Jinhua Li, Jinhua Li, Yun Zheng, Menachem Rafaelof, Stephen Rizzi
12:20pm	1650	Comparison of two community noise models applied to a NASA urban air mobility concept vehicle	Juliet Page, Stephen A. Rizzi, Rui Cheng

07.01 RAILROAD AND GROUND-BORNE NOISE, PART 1CHANNEL 3 • **Chairs** | Oludare Owolabi, Roberto Della Neve Luongo

Time	Paper number	Title	Authors
7:00pm	2242	Rail noise grade separation alternative analysis case study	Paul Burge, Jim Cowan
7:20pm	2381	Rail noise grade separation alternative analysis case study, Palo Alto, California	Joelle Suits
7:40pm	3031	Cancer research lab, a challenging micro-vibration design	Siddharth Mahajan, Ahmad Bayat, Michael Georgalis
8:00pm	2503	Effect of sound source movement at low Mach number on radiated noise level	Yusuke Makino, Yasushi Takano
8:20pm	1582	Use of a transient SEA for calculation of structure-borne interior noise in trains from an induction motor controlled by multi-mode PWM	Yosuke Tanabe, Takashi Yoshizawa, Shinji Sugimoto, Takafumi Hara
8:40pm	1476	Realizing a Self-powered Real-time Monitoring System on High-speed Trains	S.K. Lai, C. Wang, L.H. Zhang, Y.Q. Ni

01.02 COMPUTATIONAL METHODS IN FLOW-INDUCED NOISE & VIBRATION, PART 3CHANNEL 4 • **Chairs** | Becket Zhou, Randolph Leung

Time	Paper number	Title	Authors
6:00am	1410	A numerical investigation of flow-induced cavity noise control	Zhenan Song, Daoqing Chang, Hongling Sun
6:20am	1791	A method to predict the flow-induced noise of an open cavity of a complex geometry	Tingsheng Zhong, Cheng Yang
6:40am	1498	Validation setup for the investigation of aeroacoustic and vibroacoustic sound emission of confined turbulent flows	Paul Maurerlehner, Stefan Schoder, Sebastian Floss, Johannes Tieber, Helfried Steiner, Günter Brenn, Manfred Kaltenbacher
7:00am	3035	Numerical study on the contribution of surface and volume components of flow-induced noise in baffle silencers	Bartosz Chmielewski, Iván Herrero-Durá, Paweł Nieradka

01.05 AERO & HYDRO-ACOUSTICSCHANNEL 4 • **Chairs** | Cheolung Chung, Becket Zhou

Time	Paper number	Title	Authors
7:20am	1290	Broadband force spectrum of a pump-jet under inflow turbulence	Shuaikang Shi, Huang Xiuchang, Rao Zhiqiang, Hua Hongxing
7:40am	1958	Numerical investigation into effects of gas concentration and bubble collapse on tip vortex cavitation noise of NACA16-020 wing	Garam Ku, Cheolung Cheong, Hanshin Seol, Hongseok Jeong
8:00am	2258	Numerical Study of Airfoil Tonal Noise Reduction using Segmented Elastic Panel Configuration	Arif Muhammad Irsalan, Garret C. Y. Lam, Randolph C. K. Leung
8:20am	2695	The multi-functional rotor aerodynamic and aeroacoustic test platform at HKUST	Han Wu, Chuntai Zheng, Peng Zhou, Ryu Fattah, Xin Zhang, Guocheng Zhou, Bao Chen
8:40am	2697	Experimental assessment of the noise characteristics of propellers for commercial drones	Han Wu, Peng Zhou, Siyang Zhong, Xin Zhang, Kunyu Luo

06.01 ROAD AND TRANSPORTATION NOISE, PART 1

CHANNEL 4 • **Chairs** | Eoin King, Adam Alexander

Time	Paper number	Title	Authors
11:00am	2725	Assessing traffic noise in teh City of Sharjah using prediction models	Hussein Elmehdi
11:20am	3010	The influence of link characteristics on road traffic noise mapping by using Big Data	Gaetano Licitra, Antonino Moro, Luca Teti, Lara Ginevra Del Pizzo
11:40am	1342	A case study of noise pollution levels during the restrictions period due to COVID-19.	David Montes-González, Juan Miguel Barrigón-Morillas, Ana Cristina Bejarano-Quintas, Manuel Parejo-Pizarro, Guillermo Rey-Gozalo, Rosendo Vílchez Gómez, Pedro Atanasio-Moraga
12:00pm	1925	NEMO project: developing a N-RSD (Noise Remote Sensing Device) to identify high noise emitters in the road traffic flow	Maximilian Ertsey-Bayer, Nikolas Kirchhoff, Sonia Alves, Bert Peeters, Viggo Henriksen, Truls Berge
12:20pm	2304	Implementing auralized CPB sounds on a pedestrian simulator	Francisco Soares, Frederico Pereira, Emanuel Silva, Carlos Silva, Emanuel Sousa, Elisabete Freitas
12:40pm	2423	Analyzing transportation noise during the pandemic.	Josh Curley, Kody Snow
1:00pm	1840	Automate TNM Input Process Using Python	Ronald Ying, Nish Patel

06.01 ROAD AND TRANSPORTATION NOISE, PART 2

CHANNEL 4 • **Chairs** | Yousof Azizi, Rabah Hadjit

Time	Paper number	Title	Authors
7:00pm	2980	Influence of vehicle source directivity in Japanese and European outdoor sound prediction models under a semi-finite thick barrier configuration	Takuya Oshima, Fumiya Takeda, Yumi Kurosaka
7:20pm	2663	Extensive study of receiver point interpolation methods for drawing estimated road traffic noise maps in Japanese city blocks.	Yudai Yamashiro, Akiko Sugahara, Yasuhiro Hiraguri, Kazunori Harada, Takuya Oshima, Yoshinori Saito, Satoshi Atobe
7:40pm	3130	Road traffic noise mapping based on aerial photographs - sound power level determination of road vehicles	Shinichi Sakamoto, Taiki Fukuda, Miki Yonemura, Hyojin Lee
8:00pm	2659	Methodology of estimating the number of inhabitants to assess the population exposure to environmental noise in Japan	Shota Suda, Akiko Sugahara, Yasuhiro Hiraguri, Kazunori Harada, Takuya Oshima, Yoshinori Saito, Satoshi Atobe
8:20pm	2248	Field measurement of the window sound insulation index and the average reverberation time / absorption of one building room by road traffic noise penetrating one closed window-Part I: Principle	Jiping Zhang, Zheming Wang, Heng Ma, Weike Wang
8:40pm	1505	Determination of passenger car noise equivalent for mid-sized cities in India	Adarsh Yadav, Manoranjan Parida, Brind Kumar

20.01 ARTIFICIAL INTELLIGENCE FOR NOISE AND VIBRATION CONTROL, PART 2CHANNEL 5 • **Chairs** | Christian Adams, Kian Sepahvand

Time	Paper number	Title	Authors
6:00am	1864	Sound Field Reconstruction in Rooms with Deep Generative Models	Xenofon Karakonstantis, Efren Fernandez Grande
6:20am	1492	Deep Learning-based Health Indicator for Better Bearing RUL Prediction	Taewan Kim, Seungchul Lee
6:40am	2373	Partial discharge monitoring using deep neural networks with acoustic emission	Saichand Gourishetti, David Johnson, Sara Werner, András Kátai
7:00am	11598	A neural network based noise suppression method for transient noise control with low-complexity computation	Yiya Hao

20.13 EDUCATION IN ACOUSTICSCHANNEL 5 • **Chairs** | Andrew Barnard, Lily Wang

Time	Paper number	Title	Authors
7:20am	1618	Practical and artificial intelligence. Hannah Arendt's ethics in "Vita Activa and The Human Condition"	Monika Gatt, Marcus Maeder, Steffen Marburg
7:40am	2653	Auditory training system for improvement of auditory perception ability in blind soccer.	Mari Ueda
8:00am	2617	Learning effect of active learning coursework in engineering acoustics course	Yusuke Hioka, Michael Kingan, George Dodd, George Dodd
8:20am	1115	Teaching Acoustics under COVID: Lab in a Box for Experiments at Home	Stephen Dance
8:40am	1691	Case study - lesson plan for noise control engineering concepts for use in ABET accredited engineering programs	Lily Wang, Bryan Beamer, Keegan J. Moore, Katie Krainc

20.01 ARTIFICIAL INTELLIGENCE FOR NOISE AND VIBRATION CONTROL, PART 3

CHANNEL 5 • **Chairs** | Semiha Yilmazer, Andrew Barnard

Time	Paper number	Title	Authors
11:00am	3186	Learning-based estimation of individual absorption profiles from a single room impulse response with known positions of source, sensor and surfaces	Stéphane Dilungana, Antoine Deleforge, Cédric Foy, Sylvain Faisan
11:20am	2375	Investigating the influence of microphone mismatch for acoustic traffic monitoring	Saichand Gourishetti, Jakob Abeßer, Sascha Grollmisch, András Kátai
11:40am	2463	Investigating the relationship between train speed and ground vibrations using random forest machine learning models	F.L.H. Klein Schaarsberg, A.C. de Niet, H. Zandberg, G.J. Dijkgraaf
12:00pm	2907	Scalable Machine Learning Approach to Classifying Transportation Noise at Two Urban Sites in Greater Boston, Massachusetts	Tiange Wang, Ruijie Jiang, YuLun (Elain) Lin, Kyle Monahan, Douglas Leaffer, Stephen Doroff, Brian Tracey

13.08 ACOUSTICS IN INDOOR SPACES, PART 1CHANNEL 5 • **Chairs** | Ted Pyper, Berndt Zeitler

Time	Paper number	Title	Authors
12:40pm	2637	Development and application of an integrated virtual thermal-acoustic manikin design used inside an office space	Eusebio Conceição, M ^a Ines Conceição, M ^a Manuela Lúcio, João Gomes
1:00pm	1888	Studying acoustical capacity and quality of verbal communication in occupied restaurants	Jared Paine, Lily M. Wang
1:20pm	2132	Room acoustics criteria and measurements of lobbies and atria for various building types	Ted Pyper, Matt Whitney, David Porter, David Porter
1:40pm	2595	Occupant noise exposure in a fitness classroom setting	Madeline Didier, Gina Jarta
2:00pm	2952	Measurement survey using acoustic measurement network and sound environment evaluation system by experience sampling	Kengo Togashi, Kazunori Harada, Kazunori Harada, Yasuhiro Nagasawa, Yasuhiro Hiraguri, Kentaro Suga, Aya Onoe

13.03 VENTILATION-ENABLING SOUND INSULATION DEVICES, PART 1CHANNEL 5 • **Chairs** | Melinda Miller, Karl Peterman

Time	Paper number	Title	Authors
2:40pm	2176	Assessing a parallel baffle splitter, an experimental and numerical study on insertion loss and pressure drop	Juan Escudero, Héctor Fuentes
3:00pm	2361	Acoustic Window - Natural Ventilation	Vinicius Ávila Ferreira
3:20pm	1866	Noise reduction of plenum window with add-in dual staggered sound scatterer arrays	Xiaolong LI, Shiu Keung Tang, Shiu-Keung, Tang
3:40pm	2871	The effect of aspect ratio on the insertion loss of lined ducts	Caoyang Li, David Herrin

13.12 CASE STUDIES IN BUILDING ACOUSTICSCHANNEL 5 • **Chairs** | Jeanette Hesedahl, Matt Golden

Time	Paper number	Title	Authors
5:20pm	1987	Acoustic study in a main avenue and its effects in classrooms and offices of a university in Mexico City	Antonio Bautista Kuri, Antonio Bautista Kuri
5:40pm	1622	Review of acoustically-related design factors for three recent music studios	Michael Brown
6:00pm	2391	Case Study: Floating Jack-Up Slabs for Multi-Story Cinema in Manhattan	Bradlay Hunt, Florian Sassmannshausen
6:20pm	2425	A case study in the measurement of door sound isolation with ASTM test standards	Christopher Ono, Todd Beiler, Devin Clausen
6:40pm	3238	Noise Control design for a Ventilation Fan - Case Study	Jonathan Bonnett, Carmel Cuschieri, Joseph M. Cuschieri
7:00pm	1832	Countermeasures against floor impact sound by heavy impact source of a box floor structure in a reinforced concrete wall construction testing device	Ryuta Tomita, Kyoko Abe
7:20pm	1336	The measurements of crowd noise in a large waiting hall of ShenYang Station in China	Hongshan Liu, Hui Ma, Chao Wang, Chao Wang
7:40pm	2226	Are online meetings noisier than conventional meetings?	Nicholas Boulter, Jim White

13.16 THE FUTURE OF OFFICE PRIVACY & SOUND MASKING

CHANNEL 5 • **Chairs** | Roderick Mackenzie, Berndt Zeitler

Time	Paper number	Title	Authors
8:20pm	2990	Just noticeable difference of Lp,A,S,4m specified ISO 3382-3	Haram Lee, Haram Lee, Hyunin Jo, Jin Yong Jeon
8:40pm	3215	The effect of sound masking on employees' acoustic comfort and performance in open-plan offices in Canada	Roderick Mackenzie, Roderick Mackenzie, Joonhee Lee, Vincent Le Men, Farideh Zarei

15.05 SOUNDSCAPE EVALUATIONSCHANNEL 7 • **Chairs** | Jian Kang, Bhan Lam

Time	Paper number	Title	Authors
6:00am	3048	The effects of aural and visual factors on appropriateness ratings of residential spaces in an urban city.	Johann Kay Ann Tan, Siu-Kit Lau, Yoshimi Hasegawa
6:20am	2001	Which aspects of soundscape can the soundscape attributes measure?	Koji Nagahata
6:40am	2138	Do visual and audio experiences affect overall satisfaction and restorative potential of the soundscape for different visiting duration in urban blue space?	Ying Qi, Xingyue Fang, Tian Gao, Ling Qiu
7:00am	3118	Psychoacoustic evaluation of soundscapes by means of repeated measurements	Andre Fiebig

15.06 SOUNDSCAPE AND ITS APPLICATIONCHANNEL 7 • **Chairs** | Brigitte Schulte-Fortkamp, Andy Chung

Time	Paper number	Title	Authors
7:40am	1654	Soundscape composition analysis combined with acoustics and musicology: a case study on the music piece of Daybreaking	Zhanjie Ju, Zhiyong Deng, Xushan Xue, Aili Liu
8:00am	2976	Soundscape assessment of non-acoustic factors for effective stakeholder engagement in airport expansion projects in the UK	Lisa Lavia, Caroline Brown, Lisa Lavia
8:20am	2755	A research on assessment of soundscape in urban area by means of Caption Evaluation Method: effects of context on evaluation of soundscape	Takeshi Akita, Masahiro Tomioka, Hanui Yu, Naoko Sano, Ayako Matsuo
8:40am	2891	Physiological and psychological responses to soundscapes and their connections using machine learning	Ming Yang, Christian Laufs

14.08 NOISE MONITORINGCHANNEL 7 • **Chairs** | Douglas Manvell, Ahmed El-Aassarg

Time	Paper number	Title	Authors
11:00am	2035	ConvTasNet-based anomalous noise separation for intelligent noise monitoring	Han Li, Kean Chen, Bernhard U. Seeber
11:20am	2316	Exploiting data from the NoiseCapture application for environmental noise measurements with a smartphone	Judicaël Picaut, Erwan Bocher, Gwendall Petit, Nicolas Fortin
11:40am	3018	Accurate and controlled vehicle pass-by noise emission quantification in real life traffic	Lucille Pinel Lamotte, Fabien Lepercque, Valentin Baron
12:00pm	2350	Audio recording analysis in an urban park of the city of Milan (Italy)	Roberto Benocci, Roberto Benocci, Alessandro Bisceglie, Fabio Angelini, H. Eduardo Roman, Giovanni Zambon
12:20pm	1672	Applicability of MEMS microphones for environmental sound level monitoring	James Oatley, Craig Storey

14.18 DRONE NOISE IN COMMUNITIESCHANNEL 7 • **Chairs** | Erich Thalheimer, Jacob Poling

Time	Paper number	Title	Authors
2:00pm	1848	'Attack of the Drones' Exploration of Sound Power Levels Emitted and the Impact Drone's could have upon Rural Areas, Roxwell, Essex, UK	Josephine Nixon, Stephen Dance
2:20pm	1694	Community Acceptance of Drone Noise	Erich Thalheimer
2:40pm	1652	Community noise from a drone delivery distribution center: challenges and options	Jacob Poling
3:00pm	2222	Examination of spectral content, peak frequency relationships, and annoyance for unmanned aerial vehicle operations	Judy Rochat, Herb Singleton, Keith Yoerg

15.00 SOUNDSCAPES, GENERAL, PART 1

CHANNEL 7 • **Chairs** | Bhan Lam, Jin Yong Jeon

Time	Paper number	Title	Authors
6:40pm	2084	Development of a feedback interface for in-situ soundscape evaluation	Furi Andi Karnapi, Bhan Lam, Trevor Wong, Kenneth Ooi, Zhen-Ting Ong, Woon-Seng Gan, Jooyoung Hong, Samuel Yeong
7:00pm	2086	Assessment of inter-IC sound microelectromechanical systems microphones for soundscape reporting	Trevor Wong, Bhan Lam, Furi Andi Karnapi, Kenneth Ooi, Woon-Seng Gan
7:20pm	3156	The influence of the community soundscape on Neighbourhood social cohesion(for example, the Dong'an family area in Harbin, China)	Wei Zhao, Jingrui Li, Xun Zhu
7:40pm	2244	An objective evaluation method and experiment on the impact of road traffic noise on the soundscape: The case of West Lake	Jiping Zhang, Jiping Zhang
8:00pm	3261	Efforts to improve the unique sound of Indonesian cities	Christina E. Mediatika, Anugrah S. Sudarsono, Sentagi S. Utami, Isnen Fitri, Rizka Drastiani, M.I. Ririk Winandari, Akbar Rahman, Asniawaty Kusno, N.W. Meidayanti Mustika, Yuliana B. Mberu
8:20pm	2290	Soundscape restoration model based on psycho-physiological response with audio-visual interaction in natural environment	Hyun In Jo, Jin Yong Jeon
8:40pm	3150	Research on the Relationship between Acoustic Environment Perception and Landscape Evaluation in Historic Districts——A Case Study of Central Street in Harbin	Wei Zhao, Qingxuan Rui, Xun Zhu

17.01/17.02/17.08 PERCEPTION, PART 1CHANNEL 8 • **Chairs** | Ercan Altinsoy, Takeo Hashimoto

Time	Paper number	Title	Authors
6:00am	2885	Frequency dependence of vertical whole-body vibration perception - is your car rattling or humming?	Anna Schwendicke, M. Ercan Altinsoy
6:20am	2006	Influence of steering vibration on vehicle speed recognition and comfortableness in cabin.	Eiji Yoshioka, Shin Itou, Junji Yoshida
6:40am	2107	Perception thresholds for whole-body vibrations on an airplane seat	Louis Krause, Stephan Töpken, Steven van de Par

17.05/17.07 SOUND QUALITY AND CONSUMER PRODUCT NOISECHANNEL 8 • **Chairs** | Ercan Altinsoy, Katsya Yamauchi

Time	Paper number	Title	Authors
7:20am	1745	Understanding the relationship between onomatopoeic expressions and sound quality for rotary switch operating sounds	Toru Miyairi, Takeshi Shirasaka, Hisato Shimomura, Takeshi Toi
7:40am	2238	Parameter study of Variation noise in outdoor of air conditioner	Minkyu KIM, Byoungcha Ahn, Simwon Chin
8:00am	1767	MOSQITO: an open-source and free toolbox for sound quality metrics in the industry and education	Roberto San Millán-Castillo, Eduardo Latorre-Iglesias, Martin Glesser, Salomé Wanty, Daniel Jiménez-Caminero, José María Álvarez-Jimeno
8:20am	1968	Sound quality evaluation for luxury refrigerator door closing sound	Kanta Imamori, Atsuya Yoshiga, Junji Yoshida
8:40am	1884	Digitalizing sound in your personal space	Ramana Kappagantu, Karl Karlson, Koen Vansant

16.00/16.01/16.04 NOISE AND HEALTH, PART 2

CHANNEL 8 • **Chairs** | Irene van Kamp, Charlotte Clark

Time	Paper number	Title	Authors
11:00am	3088	Health effects related to wind turbine sound: A review	Irene van Kamp, Frits van den Berg
11:20am	2188	The test bench for the assessment of the impact of wind turbine noise on human performance	Dariusz Pleban, Grzegorz Szczepański, Jan Radosz, Łukasz Kapica
11:40am	2761	Annoyance from community and neighborhood noise during the COVID-19 lockdown in Serbia: a pilot study	Katarina Paunovic, Branko Jakovljević, Radmila Mirčić
12:00pm	2019	Health impact assessment of road traffic noise in the EU in 2020-2035	Erik Salomons, Michael Dittrich
12:20pm	2282	Cardiovascular mortality and transportation noise: a prospective Swiss cohort study	Danielle Vienneau, Benjamin Flückiger, Apolline Saucy, Louise Tangermann, Beat Schäffer, Jean Marc Wunderli, Martin Rööslü
12:40pm	2359	Road traffic noise disease burden estimates for a model study of varying urban morphology cases	Jens Forssén, Andreas Gustafson, Meta Berghauser Pont, Marie Haeger-Eugensson, Niklas Rosholm
1:00pm	2340	Integrating environmental noise considerations into public policy: the case of Ireland	Jon Paul Faulkner, Enda Murphy
1:20pm	2354	Association between noise annoyance and mental health outcomes – an evidence review	Xiangpu Gong, Benjamin Fenech, Claire Blackmore, John Gulliver, Anna Hansell

17.01/17.02/17.08 PERCEPTION, PART 2CHANNEL 8 • **Chairs** | Katsuya Yamauchi, Takeo Hashimoto

Time	Paper number	Title	Authors
7:20pm	2547	Differences in perceived loudness between men and women: A cross-cultural comparison among Japanese, Chinese, and Malaysians	Mariko Tsuruta-Hamamura, Kumi Nakada, Ryoga Kikuchi, Naoki Watanabe
7:40pm	3052	Evaluation of recognition performance of guidance direction present-ing by sequential emitting sound in evacuation guidance system	Tetsuya Miyoshi
8:00pm	2148	Spatial release from masking in varying spatial acoustic under higher order ambisonic-based sound reproduction system	C. T. Justine Hui, Yusuke Hioka, Catherine I. Watson, Hinako Masuda
8:20pm	2134	Head related transfer function measurements of common PPE	Megan Ewers, Sam Kincaid, Marco Beltman
8:40pm	1771	Psycho-physiological evaluations of low-level impulsive sounds produced by air conditioners	Yoshiharu Soeta, Ei Onogawa

07.01 RAILROAD AND GROUND-BORNE NOISE, PART 2CHANNEL 1 • **Chairs** | Hans J.A. van Leeuwen, Chris Layman

Time	Paper number	Title	Authors
6:00am	3136	TMD Tunable for Railway Groundborne Noise Control	Wilson Ho, Ghazaleh Soltanieh, Wylong Wang
6:20am	2834	DISC BRAKE SQUEAL ANALYSIS USING NONLINEAR MATHEMATICAL MODEL	Akif Yavuz, Osman Taha Sen
6:40am	2853	The effect of two trains passing at the same time on the ground borne vibration level	Carel Ostendorf
7:00am	3000	Methods for the assessment of low-frequency noise from mining activities in the Netherlands	Jelle Assink, Rosan Nusselder, Kim White, Olivier den Ouden, Erik de Graaff, Edwin Nieuwenhuizen
7:20am	2785	Vibration source properties of cargo trains: free field vibration and trackside measurement analysis	Eliam Vlijm
7:40am	2385	Development of a dynamic model of the axisymmetric railway wheel for sound radiation prediction	Victor Andrés, Jose Martínez-Casas, Javier Carballeira, Francisco Denia

02.06 NONLINEAR VIBRO-ACOUSTICSCHANNEL 1 • **Chairs** | Taha Sen, Steve Hambric

Time	Paper number	Title	Authors
11:00am	2192	Variation in vibro-acoustic noise due to the defects in an automotive drum brake	Ananthapadmanabhan Ramesh, Sundar Sriram
11:20am	1836	Comparison of noise generated from simplex and duplex configurations of drum brake using non-linear vibro-acoustic models	Akash Yella, Sriram Sundar
11:40am	1858	Development of experimental vibro-acoustic transfer function for a system with combined rolling-sliding motion	Kumar Milind Rewanand Shripad, Sriram Sundar
12:00pm	3080	Development of a Unique Experimental System Investigating Vibroacoustic Characteristic of Geared Transmission Systems	Umut Murat GÖK, Osman Taha Sen
12:20pm	1795	Vibration level induced by the friction of two rough surfaces weakly loaded	Modeste Assemien, Alain Le Bot

02.04 UNCERTAINTY AND VARIABILITY IN VIBRO-ACOUSTICSCHANNEL 1 • **Chairs** | Kheirollah Sepahvand, Andrew Wixom

Time	Paper number	Title	Authors
12:40pm	2844	Welding distortion generated uncertainties in the vibrational behavior of a ladder-like structure	David Sipos, Marcell Ferenc Treszkai, Daniel Feszty
1:00pm	1670	Comparison of quadrature and regression based generalized polynomial chaos expansions for structural acoustics	Gage Walters, Andrew Wixom, Sheri Martinelli
1:20pm	2211	Variance Quantification of Different Additive Manufacturing Processes for Acoustic Meta Materials	Manuel Bopp, Arn Joerger, Matthias Behrendt, Albert Albers
1:40pm	2543	Assessment of digital image correlation vibrometry in the presence of thermal flow disturbance	Kenji Homma, Paul R. Braunwart, Patrick L. Clavette

04.03 SPATIAL AUDIO, PART 1CHANNEL 1 • **Chairs** | Georgina Lizaso, Andrew Barnard

Time	Paper number	Title	Authors
2:20pm	1751	3-D sound field reproduction with reverberation control on surround sound system by combining parametric and electro-dynamic loudspeakers	Yuna Harada, Kenta Iwai, Masato Nakayama, Takanobu Nishiura
2:40pm	2820	Regularized spherical harmonics-domain spatial active noise cancellation in a reverberant room	Shoken Kaneko, Nirupam Roy, Nail Gumerov, Ramani Duraiswami
3:00pm	2956	Head tracker using webcam for auralization	William D'Andrea Fonseca, Davi Rocha Carvalho, Jacob Hollebon, Paulo Henrique Mareze, Filippo Maria Fazi
3:20pm	2190	Precision of inertial measurement unit sensors in head-tracking systems used for binaural synthesis	Kristian Jambrosic, Vedran Planinec, Marko Horvat, Peter Francek

02.02 INVERSE APPROACHES IN VIBRO-ACOUSTICSCHANNEL 2 • **Chairs** | Christian Adams, Li Cheng

Time	Paper number	Title	Authors
6:00am	2565	Effect of junction type on the vibroacoustic response of a system of plates	Marcell Treszkai, Daniel Feszty
6:20am	1696	Traveling-wave control of the bending wave in a beam for high quality sound radiation	Ki-Ho Lee, Jeong-Guon Ih, Donghyun Jung
6:40am	2655	Computation analysis of regularization methods and parameter selection for acoustics radiation modes source reconstruction of vibrating plates	Luis Corral, Pablo E. Román
7:00am	1966	Vehicle interior noise and vibration prediction by combination analyses of Component and Operational TPA	Takuma Tanioka, Junji Yoshida

02.03 NUMERICAL METHODS IN VIBRO-ACOUSTICS, PART 3CHANNEL 2 • **Chairs** | Taha Sen, Li Cheng

Time	Paper number	Title	Authors
7:40am	2721	The vibrational response of a fluid-loaded baffled plate near a free surface	Jamie Kha
8:00am	3986	Study on target energy transfer of 3D acoustic cavity - plate coupling system with the membrane nonlinear energy sink	Jinmeng Yang, JianWang Shao, GuoMing Deng, Xian Wu
8:20am	2164	Joint modeling for the analytical estimation of dynamic behaviors of beam-coupled structures	Hansol Park, Yeon June Kang, Hee Soo Pyo
8:40am	1634	Predicting vibration transmission across junctions using diffuse field reciprocity	Wannes Stalmans, Cédric Van hoorickx, Edwin Reynders
9:00am	1636	Impact sound prediction of finite floor structures with the modal transfer matrix method	Jasper Vastiau, Cédric Van hoorickx, Edwin Reynders

04.00 SIGNAL PROCESSING, MEASUREMENTS, SOUND REPRODUCTION, DIAGNOSTICS FOR NOISE AND VIBRATION ENGINEERING, GENERAL, PART 3

CHANNEL 3 • **Chairs** | Woon-Seng Gan, Efren Fernandez-Grande

Time	Paper number	Title	Authors
6:00am	1037	Research on Optimization method of power flow of cylindrical shell stiffener based on BESO	Xiaoyan Teng, Zhihua Yan, Xudong Jiang, Qiang Li
6:20am	2804	A study of the effects of structural delamination location on delamination detection using a non-linear chaotic oscillator method	Xuan Li, Dunant Halim, Xiaoling Liu
6:40am	2806	Assessment of delamination location in composite laminates based on a chaotic oscillator method	Xuan Li, Dunant Halim, Xiaoling Liu
7:00am	2537	Novel features for the detection of bearing faults in railway vehicles	Matthias Kreuzer, Alexander Schmidt, Walter Kellermann
7:20am	2403	Influence of the bolt size on the source of damping in automotive joints	Shaan Sanjeev, Dan J. O'Boy, Paul Cunningham, Steve Fisher

04.02 SIGNAL IDENTIFICATION AND SOURCE SEPARATIONCHANNEL 3 • **Chairs** | Murat Inalpolat, Yangfan Liu

Time	Paper number	Title	Authors
7:40am	11599	A real-time music detection method based on convolutional neural network using Mel-spectrogram and spectral flux	Yiya Hao
8:00am	2205	CNN-based multi-class multi-label classification of sound scenes in the context of wind turbine sound emission measurements	Nils Poschadel, Christian Gill, Stephan Preihs, Jürgen Peissig
8:20am	1753	Speech extraction with RGB-intensity gradient on rolling-shutter video	Tsubasa Yoshizawa, Atsushi Yoshida, Kenta Iwai, Takanobu Nishiura
8:40am	2599	Subjective hearing sensation of process variations at a milling machine. How reliable will chatter marks be detected?	Florian Trautmann, Björn Knöfel, Welf-Guntram Drossel, Jan Troge, Markus Freund, Lars Penter, Damian Anders

08.05 TRANSMISSION AND DRIVETRAIN NOISECHANNEL 4 • **Chairs** | Murat Inalpolat, Luke Fredette

Time	Paper number	Title	Authors
6:00am	1860	A study on the development and application of program for planetary gear design considering planetary gear noise and efficiency	Hyun Ku Lee, Moo Suk Kim, Sa Man Hong, Dong Kyu Yoo, Ahmet Kahraman, Jonny Harianto
6:20am	2140	Performance of a friction ring DVA for vibration control of a flywheel	Xiaodong He, Xiuchang Huang, Xiuchang Huang, Hongxing Hua
6:40am	1799	Low excitation spur gears with variable tip diameter	Joshua Götz, Sebastian Sepp, Michael Otto, Karsten Stahl
7:00am	1876	Acoustical behavior of loss-optimized involute gears	Sebastian Sepp, Joshua Goetz, Karsten Stahl
7:20am	1852	Vibrational Monitoring of Nested Planetary Geartrain with Unground Pinion	Jianxiong Feng, Yangfan Liu, Kai Ming Li
7:40am	2377	An experimental methodology to study engine gear rattle problems	Ata Donmez, Ahmet Kahraman

10.01 UNDERWATER AND MARITIME ACOUSTICSCHANNEL 4 • **Chairs** | Paul Donavan, Michael Bahtiarian

Time	Paper number	Title	Authors
8:00am	1820	Underwater acoustic target classification based on u-shaped network	lingzhi xue, Xue Lingzhi, Zeng Xiangyang
8:20am	2411	Acoustic survey at Genova (Italy) Aquarium aiming at characterizing the acoustic of tropical marine environment	Giovanni Zambon, Alessandro Bisceglie, Chiara Confalonieri, Silvia Lavorano, Roberto Benocci
8:40am	2060	Ferry M/V Kramer noise mitigation	Michael Bahtiarian

08.01 VEHICLE NOISE AND VIBRATION, PART 2CHANNEL 4 • **Chairs** | Tan Li, Sterling McBride

Time	Paper number	Title	Authors
2:00pm	1642	An adjustable bearing seat stiffness element for targeted vibration influencing	Carolin Sturm, Andreas Lindenmann, Thomas Gwosch, Sven Matthiesen
2:20pm	2561	Test bench development and validation for blocked force measurements in six degree of freedom	Martin Burkhardt, Eric Hensel, Welf-Guntram Drossel
2:40pm	2501	OTPA method-based contribution analysis of components on the vibration of fuel cell in fuel cell vehicles	Zequn Nan, Matthias Behrendt, Mengting Lu, Manuel Petersen, Albert Albers
3:00pm	2865	Development of disc spring stack containment methods for vibration isolation	Paul Gilmore, Umesh Gandhi
3:20pm	1917	Silencer for high-frequency turbocharger compressor noise via an acoustic straightener	Pranav Sriganesh, Rick Dehner, Ahmet Selamet
3:40pm	2184	Innovative elastomeric shear leg mount concepts for quasi-zero stiffness isolation	Luke Fredette, Rajendra Singh

08.03 TIRE NOISE, PART 2CHANNEL 4 • **Chairs** | Rui Cao, Kiran Patil

Time	Paper number	Title	Authors
7:20pm	2455	Comparison of roadwheel and roadway noise generated by a mono-pitch tire tread	Richard Ruhala, Courtney Burroughs, Laura Ruhala
7:40pm	3224	Experimental Observations in Tire Cavity Resonance and Interactions with Periodic Noise Components	Kiran Patil, Jordan Schimmoeller, James Jagodinski, Sterling McBride
8:00pm	2889	Simulation of the frequency split of the fundamental air cavity mode of a loaded and rolling tire by using steady-state transport analysis	Won Hong Choi, J. Stuart Bolton
8:20pm	2609	A multibody dynamic model for predicting operational load spectra of dual clutch transmissions	Murat Inalpolat, Enes Timur Ozdemir, Bahadir Sarikaya, Hyun Ku Lee
8:40pm	1706	Design and simulation of Helmholtz resonator assembly used to attenuate tire acoustic cavity resonance noise	Wei Zhao, Xiandong Liu, Yingchun Shan, Tian He

12.00 ACTIVE NOISE CONTROL, GENERALCHANNEL 6 • **Chairs** | Yawen Wang, Woon-Seng Gan

Time	Paper number	Title	Authors
6:00am	1824	Optimal ANC System Arrangement Based on Complete System Analyses Applying COSMOL Multiphysics and Matlab	Miqing Wang, Shulin Wen, Woon-Seng Gan, Shulin Wen
6:20am	1962	Acoustic analysis of snoring sound from different microphones	Yuhe Yao, Jiecheng Zhu, Shaowei Guo, Wei Liu, Li Ding, Jianxin Peng
6:40am	1755	Multi-channel feedforward active noise control system for reducing snore noise with snore noise-term detection	Koki Nakamura, Kenta Iwai, Takanobu Nishiura
7:00am	1472	Global feedforward active noise control using a linearly constrained loudspeaker beamformer and a sensor interpolation approach	Yi-Cheng Hsu, Mingsian R. Bai, Ma, Chenghung
7:20am	2306	Active noise control for open windows	Shahin Sohrabi, Peter Svensson, Teresa Pàmies Gómez, Jordi Romeu Garbi
7:40am	2393	A compact active structural acoustic control method for minimizing radiated sound power	Scott Sommerfeldt

12.02 SMART MATERIALSCHANNEL 6 • **Chairs** | Tao Feng, Woon-Seng Gan

Time	Paper number	Title	Authors
8:00am	1769	Designing a tuned-shunt electrodynamic metamaterial in the presence of uncertainties	Lawrence Singleton, Jordan Cheer, Stephen Daley
8:20am	3110	Wave-based control for nonreciprocal acoustics using a planar array of secondary sources	Joe Tan

09.06 SOUND ABSORPTION MEASUREMENTS, PART 2CHANNEL 6 • **Chairs** | Umberto Berardi, David Herrin

Time	Paper number	Title	Authors
11:00am	2120	Numerical study of the impact of reverberation room design and test parameters on sound absorption measurements	Paul Didier, Cédric Van Hoorickx, Edwin Reynders
11:20am	2118	An optimization method for reverberation room design	Paul Didier, Cédric Van Hoorickx, Edwin Reynders
11:40am	2575	Loudspeaker configuration in reverberation rooms for sound absorption measurement using room mode determination	Niels Peter Moos, Cheol-Ho Jeong, Mads Bolberg, Rasmus Stahlfest Holck Skov
12:00pm	2810	High-frequency acoustic impedance tube based on MEMS microphones	Roman Schlieper, Song Li, Jürgen Peissig, Stephan Preihs
12:20pm	2103	How small-scale variation in mineral wool products effect random incidence sound absorption	Mads Bolberg
12:40pm	3197	Diffusion equation modelling for energy flow analysis in reverberation chambers	Ryan Hao, Ning Xiang

09.09 ACOUSTIC MATERIAL DESIGN, PART 1CHANNEL 6 • **Chairs** | Frank Simon, Mike

Time	Paper number	Title	Authors
1:20pm	3332	Experimental Investigation of Mean Flow Profile Effects on Impedance Eduction	Victor Kopiev, Nikolay Ostrikov, Stanislav Denisov, Mikhail Yakovets, Maxim Ipatov
1:40pm	1308	Design and optimization of acoustic liners with a shear grazing flow: OPAL software platform applications	Remi Roncen, Pierre Vuillemin, Patricia Klotz, Frank Simon, Fabien Méry, Delphine Sebbane, Estelle Piot
2:00pm	1496	Design and optimization of acoustic liners with a shear grazing flow: OPAL software platform description	Frank Simon, R. Roncen, P. Vuillemin, P. Klotz, Fabien Méry, E. Piot
2:20pm	2521	Influence of the Poisson's ratio on the efficiency of viscoelastic damping treatments	Lucie Rouleau, Isadora Ruas Henriques, Jean-François Deū
2:40pm	3027	Towards fully controlled anisotropy in cellular porous media: an overview	Mathieu Gaborit, Huina Mao, Romain Rimpler, Peter Göransson
3:00pm	2217	Sound absorption of polydisperse heterogeneous porous composites	Gabriel Núñez, Rodolfo Venegas, Tomasz G. Zielinski, François-Xavier Bécot

09.07 LOW FREQUENCY NOISE CONTROLCHANNEL 6 • **Chairs** | Yutong Xue, Bhisham Sharma

Time	Paper number	Title	Authors
6:20pm	2215	Low-frequency noise control using layered granular aerogel and limp porous media	Yutong Xue, Amrutha Dasyam, J. Stuart Bolton, Bhisham Sharma
6:40pm	1807	Low frequency vibration suppression of a moderate thick cabin structure by multiple piezoelectric patches shunted with RL-double negative capacitance circuits	Zhiwei Zheng, Feng Li, Xiuchang Huang, Zhiwei Su, Hongxing Hua
7:00pm	3171	Theoretical and numerical study of nonlinear acoustic absorbers for low frequency noise control	Min Yang, Xianhui Li, Zenong Cai, Junjuan Zhao, Peng Zhang, Yunan Liu

12.01 ALGORITHMS AND HARDWARE FOR ACTIVE NOISE CONTROLCHANNEL 6 • **Chairs** | Guohua Sun, Woon-Seng Gan

Time	Paper number	Title	Authors
7:20pm	1736	A conjugate gradient least square based method for sound field control	Pierangelo Libianchi, Finn T. Agerkvist, Elena Shabalina
7:40pm	1995	Active noise control without secondary path modeling: algorithm and implementation	Xing Ren, Hongwei Zhang
8:00pm	2793	"Simplified fast transversal filter algorithms for multichannel active noise control"	Lei Wang, Kean Chen, Jian Xu, Wang Qi
8:20pm	2254	Active Noise Control Algorithm with Saturated Actuator	Hakjun Lee, Youngjin Park
8:40pm	2004	Implementation of coherence-based-selection multi-channel wireless ANC in headphone	Xiaoyi Shen, Dongyuan Shi, Woon-Seng Gan, Santi Peksi

15.00 SOUNDSCAPES, GENERAL, PART 2CHANNEL 7 • **Chairs** | Andre Fiebig, Jian Kang

Time	Paper number	Title	Authors
6:00am	3291	Noise perception assessment in urban green spaces using soundwalk approach	Omid Samani, Verena Zapf, M. Ercan Altinsoy
6:20am	3295	Sound evaluation of urban spaces in the central area of São Paulo	Ranny Michalski, Giovanna Milani Caparroz, Laís de Gusmão Coutinho
6:40am	3120	Relational analysis in soundscape preservation	Pamela Jordan

15.15 EXPOSURE-RESPONSE FUNCTIONS FOR COMMUNITY NOISE AND THE EFFECT OF NON-ACOUSTIC FACTORSCHANNEL 7 • **Chairs** | Truls Gjestland, Ricardo Luis d'Avilia

Time	Paper number	Title	Authors
7:20am	2972	Effects of the reduction of aircraft noise emission due to the travel restriction during the COVID-19 pandemic at residential areas around Tan Son Nhat Airport	Thulan Nguyen, Tran Thi Hong Nhung Nguyen, Bach Lien Trieu, Makoto Morinaga, Yasuhiro Hiraguri, Takashi Yano, Yosiaki Sasazawa
7:40am	1296	Annoyance due to road traffic noise: an attempt to describe the effects of non-acoustic factors	Truls Gjestland
8:00am	2047	The impact of COVID-19 lockdown on the noise pollution: case study in the city of Skopje	Simona Domazetovska, Maja Anachkova, Viktor Gavriloski, Ankica Sokolij, Sandra Stojkovska
8:20am	1997	Shooting noise annoyance in communities around German military training areas	Dirk Schreckenber, Stephan Großarth
8:40am	2563	Monte Carlo method for uncertainty evaluation of noise annoyance prevalence	Ricardo Luís d'Avila Villela

15.03 SOUNDSCAPES IN URBAN PLANNING AND ARCHITECTURECHANNEL 7 • **Chairs** | Dick Botteldooren, Ranny Michalski

Time	Paper number	Title	Authors
11:00am	2651	An investigation on the methods of noise countermeasures for safeguarding Intangible Cultural Property-Attempt of noise compatibility planning rooted in the local community -	Mari Ueda
11:20am	2998	Soundscape related to emotional evoke in memorial open places	Wei Zhao, Hongyu Li, Xun Zhu
11:40am	2789	The relevance of psychoacoustic percentiles for the description of morphological characteristics in urban areas	Daniel de la Prida, Margret Sibylle Engel, Janina Fels, Antonio Pedrero
12:00pm	1761	An interdisciplinary sound classification framework for environmental sound design	Kivanc Kitapci, Dogukan Ozdemir

14.06 URBAN SOUND PLANNINGCHANNEL 7 • **Chairs** | Dick Botteldooren, Ranny Michalski

Time	Paper number	Title	Authors
12:40pm	1834	Relation between soundscape and spatial configuration in different urban contexts	Benameur Okba, Valerio Cutini, Francesco Leccese, Giacomo Salvadori, Noureddine Zemmouri
1:00pm	2296	Further investigation on pockets of quiet within historical city centres: the case of widenings	Massimiliano Okba, Roxana Adina Toma, Luigi Maffei
1:20pm	3553	Acoustic balance between highway and metro: a case study of Dos Hermanas	Gabriel Piza, Gabriel Piza, José Ancela
1:40pm	2939	Air-cooled chiller screening noise analysis with preliminary building project information	Mark Storm

17.06 INFORMATION TECHNOLOGY NOISECHANNEL 8 • **Chairs** | Takashi Toi, Roland Sottek

Time	Paper number	Title	Authors
6:00am	1698	Round-robin testing on Sound power level measurement for Reference Sound Source and Office printer	Kohei Shimoda
6:20am	1700	Statistical assessment of A-weighted sound power level for printer with electrophotographic engine	Kohei Shimoda
6:40am	2174	Application of psychoacoustic analyses according to ECMA-418-2	Julian Becker, Roland Sottek, Thiago Lobato
7:00am	2172	High-resolution spectral analysis (HSA) vs. discrete fourier transform (DFT)	Roland Sottek, Thiago Lobato
7:20am	2921	New ECMA 74 operating conditions for personal computers and workstations	Willem Beltman, Seth Bard, Travis North, Charles Oppenheimer, Paul Waters, Andrew Wiltzius, Sean Zimmerman

16.03 OCCUPATIONAL NOISE & HEALTH

CHANNEL 8 • **Chairs** | Paul Brereton, Bryan Beamer, Kathryn Krainc

Time	Paper number	Title	Authors
11:00am	3002	A comparison of standardized methods for sound attenuation test of hearing protectors	Sakae Yokoyama
11:20am	1720	Pilot studies of noise annoyance in relation to time, amplitude and frequency characteristics of sound	Jan Radosz
11:40am	2733	How well does Spain manage occupational noise and vibration risks?	Rafael Sánchez-Guardamino Elorriaga, María José García Tomás
12:00pm	1728	Priorities for occupational noise in Britain	Chris Steel, Paul Brereton
12:20pm	1910	Evaluating worker noise exposure levels in the presence of complex noise	William Murphy, Wei Qiu, Meibian Zhang
12:40pm	2219	Status - International Space Station (ISS) Crewmembers' Noise Exposures	Jose Limardo, Christopher S. Allen, Richard W. Danielson, Andrew J. Boone
1:00pm	2877	The evolution of quiet lawn mowers and their impact on community noise and hearing conservation	Leslie Blomberg, Dave Trezza
1:20pm	2925	Hearing protection and communication in high noise environments using vibration sensing and neural network voice transformation	Willem Beltman, Hector Cordourier, Paulo Lopez Meyer

08.04 VEHICLE SOUND DESIGN AND SIMULATIONCHANNEL 1 • **Chairs** | Yawen Wang, Yousof Azizi

Time	Paper number	Title	Authors
6:00am	2250	Auralization of electric vehicle's interior noise SEA simulation	Eunsoo Jo, Ki Sang Chae, Dong Chul Park, Wookeun Song, Moonju Hwangf
6:20am	2154	Acceleration sound design for vehicles using distortion products	Yu Aburagi, Natsuki Yamagiwa, Noriyuki Tanimoto, Shunsuke Ishimitsu, Mitsunori Matsumoto, Yasuki Murakami
6:40am	2629	Perceptual Difference on HVAC Sound Quality between Electric and Conventional Vehicles	Katsuya Yamauchi, Minori Dan, Federico Cioffi, Luigi Maffei, Massimiliano Masullo
7:00am	1805	Design of an In-cabin Personal Audio Zone System Using an Optimized Acoustic-Contrast-Control-Pressure-Matching Algorithm	Zhe Zhang, Junjie Wu, Junjie Wu, Minghui Yang, Yonggang Leng
7:40am	1874	Suggestive Sound Design – How to use Active Interior Sound Design to improve traffic safety	Manuel Petersen, Marc Etri, Matthias Behrendt, Albert Albers, Manuel Spekker, Tim Jonathan Lefringhausen
8:00am	2601	An analytical model for predicting noise radiated by switch reluctance electric motors	Murat Inalpolat, Bahadir Sarikaya, Enes Timur Ozdemir, Hyun Ku Lee
8:20am	2605	A dynamic shell model for diagnostics of rotating machinery under periodic excitation	Murat Inalpolat, Enes Timur Ozdemir

SPECIAL SESSION: TECHNOLOGY FOR A QUIETER AMERICA AND A QUIETER WORLD

CHANNEL 1 • **Chairs** | Bob Hellweg, George Maling

Time	Paper number	Title	Authors
11:00am	2545	Progress on consumer and industrial product noise control and technology transfer: summaries of the 2015 and 2016 TQA workshops	George Maling, Adnan Akay, Eric W. Wood
11:20am	2551	Commercial Aviation, A New Era: summary of the 2017 TQA workshop	Gregg Fleming
11:40am	2611	Noisy Motorcycles and Barriers and Quieter Pavements for Traffic Noise Abatement: Summaries of Two TQA Workshops	Paul Donovan
12:00pm	2707	Noise Control Engineering Education: Recommendations from the 2019 TQA Workshop	Adnan Akay
12:20pm	2893	TQA-1: The 2010 NAE Technology for a Quieter America (TQA) report and ten years of workshops	Eric Wood, George Maling, George C. Jr. Maling
12:40pm	2899	Unmanned air systems (UAS/UAV) (drone) and aerial mobility: summaries of the 2018 and 2020 TQA workshops	Robert Hellweg, Gregg G. Fleming
1:00pm	2911	Protecting National Park Soundscapes: Summary of the 2012 NAE workshop	Gregg Fleming, Karen Trevino, Robert D. Hellweg
1:20pm	3033	Reducing Employee Noise Exposure in Manufacturing: A Review of the 2014 workshop	William Murphy

04.01 ACOUSTIC HOLOGRAPHY, BEAMFORMING AND ARRAY TECHNIQUESCHANNEL 2 • **Chairs** | Efren Fernandez-Grande, Yangfan Liu

Time	Paper number	Title	Authors
6:00am	3095	Sensor placement for sound field reconstruction in enclosures.	Samuel A. Verburg, Efren Fernandez-Grande
6:20am	1898	Optimization of underdetermined hologram points in reconstructing the vibro-acoustic source field based on ESM	Laixu Jiang, Jeong-Guon Ih
6:40am	2144	A new technology for locating very low frequency and negative signal-to-noise ratio sound sources	Yazhong Lu, Sean Wu, Zeyu Yuan, Wen He
7:00am	1797	Sound Field Projection System using Optical See-Through Head Mounted Display	Atsuto Inoue, Wataru Teraoka, Yasuhiro Oikawa, Takahiro Sato, Masahito Kobayashi
7:40am	3084	Deconvoluting acoustic beamforming maps with a deep neural network	Wagner Gonçalves Pinto, Michaël Bauerheim, H�el�ene Parisot-Dupuis
8:00am	2439	A basic study on estimating location of sound source by using distributed acoustic measurement network	Itsuki Ikemi, Kazunori Harada, Akiko Sugahara, Yasuhiro Hiraguri
8:20am	2288	MEMS microphone intensity array for cabin noise measurements	Carsten Spehr, Daniel Ernst, Hans-Georg Raumer
8:40am	2709	Demonstration of a unified approach to beamforming	Christof Puhle

13.02 IMPACT AND STRUCTURE-BORNE NOISE, PART 1CHANNEL 2 • **Chairs** | Berndt Zeitler, Sunit Girdhar

Time	Paper number	Title	Authors
11:00am	2274	Thickness-resonance waves in underlays of floating screed	Charlotte Crispin, Wuyts Debby, Dijckmans Arne
11:20am	1113	Impact sound pressure values - Field measurements for different configurations of concrete slabs on the ground	Bernt Mikal Larsen
11:40am	2111	Robust prediction metrics for structure-borne noise in timber buildings	Ola Flodén, Peter Persson
12:00pm	2840	Vibration transmission across fractured beam-to-column junctions of reinforced concrete	Marios Filippoupolitis, Carl Hopkins
12:20pm	1644	Measuring the force due to standard tapping machine and floor impedance for ASTM standards	Sunit Girdhar, Andrew R. Barnard, John LoVerde, Wayland Dong

13.02 IMPACT AND STRUCTURE-BORNE NOISE, PART 2CHANNEL 2 • **Chairs** | Berndt Zeitler, Sunit Girdhar

Time	Paper number	Title	Authors
1:00pm	2080	Isolating an above grade MRI from traffic induced vibration	James Moore, Kaolin Kinsey
1:20pm	2033	Simplified parametric modeling to predict vibration attenuation provided by on-grade slabs	Steven Lank, Hal Amick, Hal Amick
1:40pm	2068	Effectiveness of neoprene pad vibration isolators at high frequencies	Jerry Lilly
1:20pm	2549	Effect of stud material and structural properties on the transmission loss of partitions	Wayland Dong, John LoVerde, Benjamin Shafer, Lin Hu
1:40pm	2960	Subjective studies on impact sound in times of a pandemic -- a comparison between a laboratory study and an online listening test	Markus Mueller-Trapet, Iara Batista da Cunha, Jeffrey Mahn
2:00pm	2796	Prediction of one-third-octave band sound and vibration levels from heavy-hard impacts	Matthew Golden, John LoVerde, Wayland Dong, Samantha Rawlings, Richard Silva

04.03 SPATIAL AUDIO, PART 2CHANNEL 3 • **Chairs** | Georgina Lizaso, Andrew Barnard

Time	Paper number	Title	Authors
6:00am	1438	Sound field reproduction using multilayer equivalent source method	Xi Hong, Xiangyang Zeng, Du Bokai
6:20am	1442	A two-zone sound field reproduction based on the region energy control	Bokai Du, Xiangyang Zeng, Haitao Wang
6:40am	2150	Comparative study of loudspeaker position optimization techniques for multizone sound field reproduction	Sipei Zhao, Sipei Zhao, Qiaoxi Zhu, Ian Burnett
7:00am	1749	Upper hemisphere sound image control with horizontal-arranged loudspeakers based on parametric head-related transfer functions	Syumpei Miura, Kenta Iwai, Yoshiharu Soeta, Takanobu Nishiura

02.01 ACOUSTIC BLACK HOLESCHANNEL 3 • **Chairs** | Li Cheng, Adrien Pelat

Time	Paper number	Title	Authors
7:20am	1664	Wavenumber domain analysis of full-band energy harvesting and damping dissipation characteristics of plate embedded with heterogeneous ABH array	Yue Bao, Haoming Liang, Xiandong Liu, Yingchun Shan, Tian He
7:40am	1656	Optimization of Damping Configurations in a Plate Embedded with ABH Array	Haoming Liang, Yue Bao, Xiandong Liu, Yingchun Shan, Tian He
8:00am	1632	Effects of annular acoustic black holes on sound radiated by cylindrical shells	Oriol Guasch, Jie Deng
8:20am	1560	Sound absorption based on Micro-perforated panels and Acoustic Black Hole principle	Xiaoqi Zhang, Li Cheng
8:40am	1801	A semi-analytical method for the vibration of cylindrical shells with embedded acoustic black holes	Jie Deng, Oriol Guasch, Laurent Maxit, Ling Zheng

13.01 ACOUSTIC REGULATIONS AND CLASSIFICATION FOR BUILDINGS, PART 2CHANNEL 3 • **Chairs** | Birgit Rasmussen, Marcos Holtz

Time	Paper number	Title	Authors
11:00am	2228	Neighbour noise in multi-storey housing – Annoyance and potential health effects	Birgit Rasmussen, Ola Ekholm
11:20am	2230	Acoustic regulations for hospital bedrooms – Comparison between selected countries in Europe	Birgit Rasmussen, Teresa Carrascal Garcia, Simone Secchi
11:40am	1556	Perception of the Home Environment. The 2019 Study	Ric Van Poll
12:00pm	1904	Dutch building code regulates noise limits for outside placed heat pumps	Wim Beentjes, Theo Campmans
12:20pm	2943	An overview of room acoustics requirements in North American, nonresidential, building standards	Gary Madaras

05.03 AIRPORT COMMUNITY NOISE, PART 1CHANNEL 4 • **Chairs** | Idar L N Granøien, Naoaki Shinohara

Time	Paper number	Title	Authors
6:00am	2330	Study on aircraft noise directivity of behind the start of takeoff roll	Toshiyasu Nakazawa, Naoaki Shinohara
6:20am	2753	Sound arrival direction and acoustic scene analysis for the monitoring of airport noise	Keishi Sakoda, Ichro Yamada, Kenji Shinohara
6:40am	2984	Daily fluctuations in aircraft noise exposure around civil airports and military airfields in Japan	Koichi Makino, Naoaki Shinohara
7:00am	1668	Evaluation method of military aircraft noise using AI analysis of aircraft images	Etsushi Fujita, Taichi Higashioka, Manabu Sugiura, Osamu Kohashi
7:20am	1765	Noise assessment of taxibotted versus conventional taxiing operations using a phased microphone array	Bieke von den Hoff, Mirjam Snellen, Dick G. Simons

05.03 AIRPORT COMMUNITY NOISE, PART 2CHANNEL 4 • **Chairs** | Idar L N Granøien, Micah Downing

Time	Paper number	Title	Authors
11:00am	1742	Sound source modelling by nonnegative matrix factorization for virtual reality applications	Christian Dreier, Michael Vorländer
11:20am	1564	Virtual reality simulated aircraft flyovers: Influence of the landscape on the overall pleasantness of the environment.	Romain Dedieu, Catherine Lavandier, Roalt Aalmoes, Henk Lania, Ingrid Legriffon, Isabelle Boullet, Umberto Iemma
11:40am	1494	Operational noise optimization of aircraft approaches – Initial findings	Bengt Moberg, Anders Johansson, Johan Rignér, Per Näsman
12:00pm	2023	Exemplification case studies as a focus for the implementation of best practices related to aircraft noise management at airports	Barbara Ohlenforst, N.E. Burtea, G. Heyes, S. Jeram, O. Konovalova, O. Zaporozhets, B. Peerlings, R. Aalmoes
12:20pm	3210	Development of Fly Neighborly helicopter model specific operational noise abatement guidance from acoustic flight test data	Juliet Page, Amanda Rapoza, Eric Jacobs

05.03 AIRPORT COMMUNITY NOISE, PART 3CHANNEL 4 • **Chairs** | Idar L N Granøien, Micah Downing

Time	Paper number	Title	Authors
2:00pm	1586	Aircraft Noise Management	Francesca Remigi, Daniele Sepulcri, Shanti Wisniewska, Kalil Nayer Nouri
2:20pm	1722	A strategic approach to noise action planning?	Graeme Heyes
2:40pm	3300	US Federal Aviation Administration Neighborhood Environmental Survey: Study Design and Survey Methodology	Eric Jodts, Jean Opsomer
3:00pm	3302	U.S. Federal Aviation Administration Neighborhood Environmental Survey: Study Motivation and Results	Sean Doyle, Donald Scata, James Hileman
3:20pm	3304	U.S. Federal Aviation Administration Neighborhood Environmental Survey: Noise Methodology	Joseph Czech, Mary Ellen Eagan

08.06 ELECTRIC, HYBRID AND ALTERNATIVE POWERTRAINSCHANNEL 4 • **Chairs** | Song He, Chengwu Duan

Time	Paper number	Title	Authors
6:20pm	1373	Measurement and Analysis of Torque Ripple in Inverter Driven Electric Machines	Mitchell Marks
6:40pm	2124	Eccentricity Effects on NVH Performance of Interior Permanent Magnets Machines for Hybrid and Electric Vehicles	Peng Zhang, Song He, Michael C. Muir, G. S. J. Gautam
7:00pm	2399	Application of Blocked Force Methodology in NVH development of Electrical Machines	Keyu Chen, Marcus Hartwig
7:20pm	2409	Automated Material Parameter Calibration for an Electric Motor Stator	Hasan Pasha, Gil Jun Lee, Henry Zhang, Steve Hale, Santosh Kottalgi
8:00pm	2631	Measurement and Assessment on Environmental Noise Impact of Electric Vehicles in Accelerating Condition	Katsuya Yamauchi, Jo Yoshino
8:20pm	2779	An influence of characteristics of amplitude fluctuation on detectability of alert sound of electric powered vehicles	Nozomiko Yasui, Masanobu Miura, Tetsuya Shimamura
8:40pm	3148	Design and performance exploration of a cymbal piezoelectric energy harvester under the excitation of power transformer vibration	Xishan Jiang, Xu Lu, Jing Zheng

13.08 ACOUSTICS IN INDOOR SPACES, PART 2CHANNEL 5 • **Chairs** | Ted Pyper, Berndt Zeitler

Time	Paper number	Title	Authors
6:00am	2703	Re-evaluation acoustic quality in lecture halls using G and C50: University of Sharjah Case Study	Hussein Elmehdi, Monica Sanjinez
6:20am	1624	Numerical study in sound absorption ability of curtain in random incidence condition	Zenong Cai, Xianhui Li, Xiaoling Gai, Tuo Xing, Fang Wang, Xiwen Guan, Zenong Cai
6:40am	2197	Noise and acoustics in complicated rooms with the sound particle method	Thomas Judd, Stefan Weigand, Jochen Schaal
7:00am	2166	The effects of different ceiling structures and plan typologies on acoustical conditions of historical mosques	Fatma Yelkenci Sert, Özgül Yılmaz Karaman, Özgül Yılmaz Karaman
7:20am	1972	Does the wall sound different? Variable acoustics in rehearsal rooms using small resonator structures in an acoustic panel.	Björn Knöfel, Paula van Brummelen, Tobias Behrens, Hartmut Schirmer

13.03 VENTILATION-ENABLING SOUND INSULATION DEVICES, PART 2CHANNEL 5 • **Chairs** | Melinda Miller, S.K. Tang

Time	Paper number	Title	Authors
8:00am	1976	Numerical simulation of air inlet sound insulation	Julien Puig
8:20am	3050	Noise reduction of enhanced acoustic balconies on a high-rise building block	SK Tang, Rudolf YC Lee
8:40am	3208	Aerodynamic and acoustical effects caused by placing two prefabricated duct silencers in series	Karl Peterman

13.06 PERFORMANCE HALL AND AUDITORIUM ACOUSTICSCHANNEL 5 • **Chairs** | Chris Springthorpe, Ted Pyper

Time	Paper number	Title	Authors
11:00am	1640	Acoustical modelling of a Swedish 13th century church ruin, and its use for musical production.	Sebastian Holm
11:20am	2445	Concert hall: acoustic design comparing analytical results and ray tracing	Karina Sá, Raquel Rossatto Rocha, Bárbara Fengler
11:40am	2058	Big Acoustics in Small Spaces - Achieving HS Auditorium Design Goals with Space Constraints	Robert Tanen, Alexander M. Aquila
12:00pm	2515	Reuse of coffee waste and paper cups for acoustical panel applications in architectural studios	Ece Sel, İpek Düzova, Anıl Ege Şireli, Beyza Yazıcı, Zühre Sü Gül

13.05 SOUND INSULATION MEASUREMENTCHANNEL 5 • **Chairs** | Greg Coudriet, Jeffrey Fullerton

Time	Paper number	Title	Authors
2:40pm	2322	A review of uncertainty in sound isolation testing	Jameson Dickman
3:00pm	2553	Gauge repeatability and reproducibility study of airborne sound isolation measurements	Wayland Dong, Devin Wong, John LoVerde
3:20pm	2824	Interlaboratory and proficiency tests for buildings sound insulation field measurements in Brazil - 4th Edition 2020	Priscila da Silva Wunderlich, Carolina Monteiro, Juan de Frias Pierrard
3:40pm	3307	Study of various wood stud partitions with various gypsum board and proprietary acoustical sound insulation products	Kristin Salenger

13.00 BUILDING NOISE & VIBRATION AND ARCHITECTURAL ACOUSTICS, GENERALCHANNEL 5 • **Chairs** | Berndt Zeitler, Carolina Monteiro

Time	Paper number	Title	Authors
4:20pm	2583	The impact of the cracks in the window	Vinicius Ávila Ferreira, Edison Claro de Moraes
4:40pm	2585	Impact of lamination on acoustic performance	Vinicius Ávila Ferreira
5:00pm	2234	Acoustic decoupling for structural elements by affixed supports - inherent contradiction or perfect complement? Restrained vibration isolation supports - a critical review	Adam Wells, Patrick Carels
5:40pm	1648	Subjective and objective evaluation of the impact and airborne sound insulation of multi-unit residential buildings	Maedot S. Andargie, Marianne Touchie, William O'Brien
6:00pm	2639	The effects of acoustical ceiling panel type and penetrations for services on vertical sound isolation inside buildings	Gary Madaras
6:20pm	1892	Acoustical Conformance with FGI for Tenant Improvements in Outpatient, Medical Office or Clinic Facility Sound Isolation/Privacy Design	Jack B Evans, Edward Logsdon

13.02 IMPACT AND STRUCTURE-BORNE NOISE, PART 3CHANNEL 5 • **Chairs** | Atsuo Hiramitsu, Jeongho Jeong

Time	Paper number	Title	Authors
7:20pm	2523	Subjective responses between real impact sound and rubber ball im-pact sound	Jeongho Jeong
7:40pm	3006	Apparent impact sound insulation performance of cross laminated timber floors with floating concrete toppings	Jianhui Zhou, Zijian Zhao
8:00pm	2088	Using Inverse Transient Statistical Energy Analysis to determine the transient power input from a heavy impact on floating floors	Susumu Hirakawa, Carl Hopkins
8:20pm	2298	Effect of ceiling and dry-type double floor on heavy-weight floor impact sound in concrete building and CLT building.	Takashi Yamauchi, Atsuo Hiramitsu, Susumu Hirakawa
8:40pm	2693	Effect of different types of ceilings on floor impact sound insulation performance in CLT model building	Atsuo Hiramitsu, Susumu Hirakawa, Takahiro Tsuchimoto, Takashi Yamauchi

09.03 MICROPERFORATED MATERIALSCHANNEL 6 • **Chairs** | Teresa Bravo, Jorge Arenas

Time	Paper number	Title	Authors
6:00am	3116	Proposal of Acoustic Liners Combined with Fine-Perforated-Film	Yo Murata, Tatsuya Ishii, Shunji Enomoto, Hideshi Oinuma, Kenichiro Nagai, Junichi Oki, Hirofumi Daiguji
6:20am	2470	Sound absorption of a finite flexible micro-perforated panel absorber back by a rigid air cavity filled with a fibrous porous material	Ho Yong Kim, Yeon June Kang
6:40am	2529	Experimental study of smart sound absorber using multimode electromechanical coupling control in the low-frequency range	Xiang Liu, Keming Wu, Lixi Huang, Keming Wu
7:00am	1129	Ultralight micro-perforated sandwich panel with double-layer hierarchical square honeycomb core for broadband sound absorption	Wei He

09.04 SOUND ABSORBERS AND DIFFUSORSCHANNEL 6 • **Chairs** | David Herrin, Xiaolin Wang

Time	Paper number	Title	Authors
7:20am	2308	Numerical analysis of the transmission loss of dissipative mufflers with polygonal cross-section	Thomas Geyer, Christopher Mai, Anna-Sophia Henke
7:40am	1444	Diffuse sound absorption modelling of complex finite absorbers using a hybrid deterministic-statistical energy analysis approach	Cédric Van hoorickx, Paul Didier, Edwin Reynders
8:00am	2056	Optimization of an absorbing surface with 2D Helmholtz resonators for reduced sensitivity to the incidence angle	Diana Maria Garza-Agudelo, Vicente Cutanda Henriquez, Cheol-Ho Jeong, Peter Risby Andersen
8:20am	2497	Estimation and experimental test of the sound-absorption coefficient of a pin-holder structure (Case of sound waves incidence upon the side surfaces of a group of cylinders)	Takamasa Sato, Shuichi Sakamoto, Isami Nitta, Shunsuke Unai, Takunari Isobe, Kenta Iizuka, Katsuhiko Tasaki
8:40am	2731	An experimental study on acoustical performance of cross rib diffuser	Takumi Yoshida, Yasutaka Ueda, Norimasa Mori, Yumi Matano

09.03 MICROPERFORATED MATERIALSCHANNEL 6 • **Chairs** | Teresa Bravo, Jorge Arenas

Time	Paper number	Title	Authors
11:00am	2489	Customized sound mitigation with micro-perforated panels	Manfred Kaltenbacher, Sebastian Floss
11:20am	1402	Optimization of space-constrained micro-perforated absorbers by causality criteria	Teresa Bravo, Cedric Maury
11:40am	1404	Enhanced modal matching method for perforated and micro-perforated partitions	Cédric Maury, Teresa Bravo
12:00pm	2621	Broadband sound absorbers of multilayered micro-slit panels using Bayesian probabilistic inference	Michael Hoefl, Cameron J. Fackler, Ning Xiang

09.05 ADDITIVE MANUFACTURING FOR ACOUSTIC APPLICATIONSCHANNEL 6 • **Chairs** | François-Xavier Bécot, Bhisham Sharma

Time	Paper number	Title	Authors
12:40pm	2314	Optimization of 3D printed porous materials accounting for manufacturing defects	Jean Boulvert, Théo Cavalieri, Vicente Romero-García, Gwénaél Gabard, Jean-Philippe Groby
1:00pm	3177	3D printed multifunctional, load-bearing, low-frequency sound absorbers	William Johnston, Pulitha Godakawela Kankanamalage, Bhisham Sharma
1:20pm	2683	Evaluation of additively manufactured stacks for thermo-acoustic devices	Samarjith Biswas, James M. Manimala, James M. Manimala

12.03 SIGNAL PROCESSING FOR ACTIVE CONTROLCHANNEL 6 • **Chairs** | Guo Long, Yawen Wang

Time	Paper number	Title	Authors
2:00pm	2808	Semi-adaptive active noise cancellation headphones	Song Li, Roman Schlieper, Jürgen Peissig
2:20pm	2128	Simulation of LMS based adaptive noise cancellation using Labview	Maja Anachkova, Simona Domazetovska, Zlatko Petreski, Viktor Gavriloski
2:40pm	1816	"A constrained optimal hear-through filter design approach for earphones"	Yongjie Zhuang, Yangfan Liu

09.01 POROUS MATERIALSCHANNEL 6 • **Chairs** | Tony Xue, Xiaolin Wang

Time	Paper number	Title	Authors
3:20pm	1446	Characterization of multi-layer porous media in an impedance tube	Remi Roncen, Zine El Abiddine Fella, Erick Ogam
3:40pm	2869	Simulations of poroelastic materials in a complex acoustic system using frequency-dependent parameters in the mid-frequency range	János Kun, Daniel Feszty, Dániel Feszty
4:00pm	2859	Investigation of frequency dependent mechanical properties of porous materials using dynamic mechanical analyzer and frequency-temperature superposition theory	Attila Schweighardt, Balazs Vehovszky

09.09 ACOUSTIC MATERIAL DESIGN, PART 2CHANNEL 6 • **Chairs** | Frank Simon, Mike Jones

Time	Paper number	Title	Authors
4:40pm	2903	Compressed acoustic sealing foam optimization investigation using statistical approach	Mathieu Gontier, Barbara Romeyns
5:00pm	2076	Multilayer treatment for subwavelength and broad absorption	Josué Costa Baptista, Edith Roland-Fotsing, Jacky Mardjano, Daniel Therriault, Annie Ross
5:20pm	2863	Modelling sound wave propagation through corrugated macro-geometry arrangement of porous material for combined heat sink and noise reduction applications	Harshavardhan Ronge, Shankar Krishnan, Sripriya Ramamoorthy

11.00 INDUSTRIAL NOISE, GENERALCHANNEL 6 • **Chairs** | Jim Thompson, Himanshu Dande

Time	Paper number	Title	Authors
7:40pm	1868	Modeling Industrial Pipe Insulation Performance	Kevin Herreman
8:00pm	1870	Modeling Large Diameter Industrial Pipe Insulation Performance	Kevin Herreman
8:20pm	3102	Machining and Fabrication Equipment in Workplaces	William Rosentel
8:40pm	1927	Power generator noise evaluation considering conversation audibility and improvement	Junji Yoshida, Yoshiki Nishimura, Senta Uegaki

15.01 INDOOR SOUNDSCAPES

CHANNEL 7 • **Chairs** | Semiha Yilmazer, Pyong Jik Lee

Time	Paper number	Title	Authors
6:00am	2988	Effect of visual elements on Indoor soundscape perception in open-plan office	Beta Bayu Santika, Hyun In Joo, Jin Yong Jeon
6:20am	2539	Soundscape evaluation to identify audio visual aspects in café for student's activities	Rizky Octaviani, Diandra Rizkiyani, Anugrah Sabdono Sudarsono, Sugeng Joko Sarwono
6:40am	2015	Understanding the Effect of Geometric Forms on Indoor Soundscape Assessment: A Case Study in CSO Concert Halls in Ankara, Turkey	İlayda Erdoğan, Semiha Yilmazer
7:00am	2017	Exploring the Audio-Visual Interaction in a Dental Clinic Through the Restorative Environment	Zeynep Uğurlu, Semiha Yilmazer
7:20am	2021	Electroencephalogram (EEG) responses to indoor sound sources in wooden residential buildings	Alessia Frescura, Pyoung Jik Lee, Jeong-Ho Jeong, Yoshiharu Soeta
7:40am	1732	Understanding the Effect of Restorativeness in Indoor Soundscapes through a Conceptual Model	Cemre Orhan, Semiha Yilmazer

14.14 COMMUNITY NOISECHANNEL 7 • **Chairs** | Ahmed El-Aassar, Gaetano Licitra

Time	Paper number	Title	Authors
11:00am	1628	Design of noise barriers for the mitigation of construction noise	Heow Pueh Lee
11:20am	3142	Managing Construction Noise in Hong Kong – Facing a New Decade with Confidence	Wilson Ho, Kin-Che Lam, Morgan Cheng, Max Yiu, Hannah Chin-Wing Lo, Jamie Chi-Ting Lai, Cheung-Lam Wong
11:40am	1826	Prediction of the variability of noise emissions from construction sites using Monte-Carlo simulation	Dave Davis, Craig Beyers
12:00pm	1468	Gazex avalanche control system noise and vibration assessment	Paul Bollard
12:20pm	1880	Noise codes and acoustical design criteria for distribution facilities	Michael Conaway, Benjamin Mueller, Joseph Keefe
12:40pm	1878	Montevideo, walkable city: pedestrianization of a large avenue during 2020 pandemic	Alice Elizabeth Gonzalez, Pablo Gianoli Kovar, Lady Carolina Ramirez, Micaela Luzardo Rivero

★ POSTER GALLERY INFORMATION ★
MONDAY, 2 AUGUST 2021

POSTER Q&A SESSION 1

8:00am - 9:00am

Paper number	Title	Authors
2635	Passive control of the flow-induced noise from a rectangular cylinder using porous walls	Reon Nishikawa
1456	The theoretical analysis and simulation of acoustic absorber for nonlinear shunted loudspeaker	Wenjiang Wang, Xianhui Li, Junjuan Zhao, Peng Zhang, Xinyun Li, Liying Zhu, Yueyue Wang
1702	Study on sound absorption characteristics of cubic nonlinear sound absorption structure	Congshuang Jiang, Xianhui Li, Min Yang, Weimin Xiao
2705	Background Noise Removal Technique using Deep Learning Segmentation Network without Segmentation Map	Hyunsuk Huh, Seungchul Lee
3146	Structural vibration design of a pod structure including an optical system of a fighter aircraft	Taeyoung Yoon, Jaemyung Cho, Sungsoo Na, Seongho Yoon
1614	Simulation research on low frequency sound absorption of monostable metamaterials	Tuo Xing, Xianhui Li, Xiaoling Gai, Zenong Cai, Xiwen Guan
1803	Numerical feasibility study for transverse vibration control of rotating shaft with a neural network-based tracking algorithm	Dongwoo Hong, Hyeongill Lee, Youkyung Han, Byeongil Kim
1620	Phase calibration method for microphone array based on multiple sound sources	Bo Jiang, XiaoQin Liu, Xing Wu
1856	Sub-array equalization technique for the parametric array loudspeaker to reduce nonlinear distortion	Chi Zhang, Jing Ren, Chuang Shi
1894	Virtual bass preprocessing and carrier frequency optimization for the parametric array loudspeaker	Shengqi Tao, Jing Ren, Chuang Shi

★ POSTER GALLERY INFORMATION ★
MONDAY, 2 AUGUST 2021

2647	Measurement of very high frequency (VHF) sound in our daily experiences	Koki Harusawa, Yumi Inamura, Masaaki Hiroe, Hideyuki Hasegawa, Kentaro Nakamura, Mari Ueda
2673	Non-linear beamformer with long short-term memory network	Mitsunori Mizumachi, Ryotarou Oka
2747	An improved voice activity detection method based on spectral features and neural network	Liu Ting, Luo Xinwei
2919	Estimation of otoacoustic emission and excitation force of bone conduction actuator by combined lumped parameter model	Akiko Fujise
1576	Two-dimensional finite difference-time domain analysis of focus boom noise with velocity disturbance in the atmosphere	Takao Tsuchiya, Masashi Kanamori
1960	Field Test Research on Environmental Noise Characteristics in the Throat Area of Metro Depot	Lei He, Ruixiang Song, Jie Yang, Yubin Wu, Yanan Wu
1428	The Analysis and Optimization of the Exhaust Manifold Flow-induced the Interior Abnormal Noise under the Vehicle Acceleration Condition	Jun Zhang, Yongjiang Xu, Hao Song
1921	Detection and identification of illegal-modified private cars through frequency band analysis	Hok Man Joyce Chow, Sau Cheong Cheung, Kit Wing Cheng, Chee Kwan Lee, Terence Tsang, Hin-long Ng
2533	On the resonance sound generated in a vehicle cabin moving at low speed due to breaking force	Zhe Li, Ryo Kiyotaki, Osamu Terashima, Vinay Poddar, Takashi Murakami
2992	A study on the effects of compression of the felt on flow resistance and acoustic characteristics	Yoon-sang Yang, Seung Lee
3289	Influence of automobile sealing rib structure on sound insulation performance and optimization of section parameters	Xian Wu, TengLong Jiang, JianWang Shao, GuoMing Deng, Meng Zhao
1785	Effect of fiber cross-section on the transport and acoustic properties of fibrous materials	Sung Soo Yang, Ju Hyun Jeon, Yeon June Kang

★ POSTER GALLERY INFORMATION ★
WEDNESDAY, 4 AUGUST 2021

POSTER Q&A SESSION 2

12:00pm - 1:00pm

Paper number	Title	Authors
2717	Calculation tool NoBel for sound propagation assessment of noise from gasturbines on the ground	Oleksandr Zaporozhets, Sergii Karpenko, Larisa Levchenko
2049	Noise emission of combustion engines and road vehicles – a historical review	Bruno Spessert, Martin Fischer
3188	Influence of different materials used for 3D printing in miniature speaker enclosure development	Bartlomiej Chojnacki, Jan Pawlik, Tadeusz Kamisinski
1777	Are on board comfort classes noise and vibration levels really suitable?	Luigi Bregant, Flavia D'Agostin, Martina Lorenzino
1991	Evaluation of floating floors performances using the reception plate method	Fabio Serpilli, Valter Lori, Samantha Di Loreto
1999	The acoustics of a medieval room	Silvana Sukaj, Ilaria Lombardi, Amelia Trematerra
2577	Use of masks inside the classrooms	Silvana Sukaj, Amelia Trematerra, Giuseppe Ciaburro, Gino Iannace
2312	Influence of green space design on individual noise perception	Verena Zapf
1369	Analysis of the interaction of helmholtz resonators in periodic acoustic metamaterials depending on its orientation with the acoustic source.	David Ramírez, Sergio Castiñeira-Ibáñez, Jose María Bravo-Plana-Sala, Juan Vicente Sánchez-Pérez, Rubén Picó

★ POSTER GALLERY INFORMATION ★
WEDNESDAY, 4 AUGUST 2021

2822	Noise and errors in hospitals	Silvester Siegmann
2318	Physical and perceptual dimensions of open urban spaces in Biskra, Algeria	Luigi Maffei, Samiha Boucherit, Djihed Berkouk, Djihed Berkouk
2338	Noise control engineering on neonatal incubators	Christian Adams, Regine Stutz, Elisabeth Kaiser, Michelle Bous, Sybelle Goedicke-Firtz, Franziska Hornberger, Michael Zemlin
2657	Elastic wave propagation in metamaterial rods with periodic shunted piezo-patches	Edson J.P. de Miranda Jr., Edilson D. Nobrega, Leopoldo P.R. de Oliveira, José M.C. Dos Santos
2284	An innovative X-shaped vibration isolation mount with tunable quasi-zero-stiffness property	Jing Bian, Xingjian Jing, Yishen TIAN
1838	Acoustic characterization of Zea Mays culm fibers (corn) and Musa X Paradisiacal (banana) stem fibers in proportion 50% - 50%.	Yesika Alvarez Ruiz, José Alcides Ruiz
1132	Analysis of the acoustical environment of classrooms in three brazilian public schools through measurements and 3d simulation	Fernanda Horst Andrade, Rodrigo Scoczynski Ribeiro, Manuel Teixeira Braz César
3232	Influence of microclimatic elements on sound propagation in Amazonian cities: The case of urban noise in Belem.	Vânia Raposo de Moura dos Santos, Gustavo Melo
2064	A novel corpus developed to evaluate the impact of hospital noise on speech intelligibility	Sydney Perry, Tessa Bent, Erica Ryherd, Melissa Baese-Berk

★ POSTER GALLERY INFORMATION ★
THURSDAY, 5 AUGUST 2021

POSTER Q&A SESSION 3

8:00am - 9:00am

Paper number	Title	Authors
1416	Optimum tuning of multiple piezoelectric patches shunted with series LR-negative capacitance circuits for broadband vibration control	Feng Li, Xiuchang Huang, zhiwei Zheng, Zhiwei Su, Hongxing Hua
1440	Effect of different magnets and iron-platelets on the low frequency performance of membrane sound absorber	Junjuan Zhao, Liying Zhu, Xinyun Li, Yueyue Wang, Wenjiang Wang, Xianhui Li, Yunan Liu
1474	Influence of the acoustic structures placement on the measurements in a reverberation room	Yueyue Wang, Xianhui Li, Junjuan Zhao, Xingyun Li, Liying Zhu, Wenjiang Wang
1954	Development of Dash insulation with PU elastomer based sound insulation materials for increasing the sound insulation performances of electric vehicle noise derived from motor	Minji Yu, Jang-Seok Park
2689	Intelligibility of bone-conducted speech detected on the scalp	Satoshi Nanri, Taishi Shinobu, Sho Otsuka, Seiji Nakagawa
1626	Underwater acoustic communication using nonlinear frequency modulation waveform with low side-lobe characteristics	Jeongha An, Hyoungin Ra, Changhyun Youn, Kiman Kim
2737	Underwater Acoustic Target Recognition Based on Generative Adversarial Network Data Augmentation	Minghong Zhang, Xinwei Luo

★ POSTER GALLERY INFORMATION ★
THURSDAY, 5 AUGUST 2021

1902	Study on acoustic environment of canteens in South China University of Technology	Ziyu Zhou, Hongwei Wang
1956	Investigating acoustics and wave behaviour in cross-laminated timber panels	Chiaki Fenemore, Yi Yang, Michael Kingan, Brian Mace
2039	Design and simulation of acoustics for the home theatre	Liyong Zhu, Junjuan Zhao, Xianhui Li, Bin Zhang, Yueyue Wang, Wenjiang Wang, Yunan Liu
2978	Prediction and analysis of 220kV substation based on geometric acoustic simulation	Longxiang Zhang, Peng Chen, Haitao Sun
3004	Study on Sound Insulation Performance of Pressure Relief Wall of Transformer Chamber	Fabing Rong, Zhongjie Cheng, Peijie Liu
3108	Noise impact assessment of onshore and offshore wind turbine	Hyosung Sun
3258	Abnormal drone noise detection system based on the microphone array and self-supervised learning	Hao Wu, Huitian Jiang, Haifeng Wen, Chuang Shi
1854	Subjective evaluation of the combining effect between the virtual bass and head related transfer functions	Yunqi Chen, Chuang Shi, Hao Mu
2453	On the performance sound design of a stringed instrument by the control of the stiffness and mass of the component part	Ryoma Morisaki, Osamu Terashima, Toshiro Miyajima
2687	Effects of degree of consonance and temporal pattern of the auditory signals on the auditory impression of warning	Rikako Abe, Sho Otsuka, Seiji Nakagawa

VIDEO CHATS WITH POSTER AUTHORS

Poster Q&A (part 1)

Monday, 2 August from 8:00am - 9:00am

Poster Q&A (part 2)

Wednesday, 4 August from 12:00pm - 1:00pm

Poster Q&A (part 3)

Thursday, 5 August from 7:00am - 8:00am

NETWORKING SESSIONS

These will be informal, live sessions on selected topics since the focus will be on personal interactions, conversations, and Q&A. All such sessions would be via the video-chats feature in the Cadmium CD e-platform (these cannot be recorded and thus all sessions will be LIVE). Ideal number of participants for the 1-hour session is about 25 to 35 though the video chat can accommodate up to 75. All attendees will be on a “walk-in” basis since advanced sign-ups are not possible. Moderators will be assigned (in the Cadmium system) to lead the discussion and encourage attendees to exchange views or ask questions.

See below for a list of the sessions for each day. Note that the Congress schedule is in the New Yorktime zone, and the 12-hour clock format is used. Please go to <https://www.timeanddate.com/> to see local times). These sessions are coordinated by Alexis Kurtz.

Day/Time(s)	Networking Session Title
Day 1: Sunday, 1 August 2021	
8:00am - 9:00am	Virtual Coffee Break and Conversation
11:00am - 12:00pm	Accompanying Persons Program 1
12:00pm - 1:00pm	Virtual Coffee Break and Conversation
12:00pm - 1:00pm	Accompanying Persons Program 2
3:00pm - 4:00pm	Noise & Vibration Control in Latin America
Day 2: Monday, 2 August 2021	
6:00am - 7:00am	Hot Topics in Soundscapes / sound quality
7:00am - 8:00am	Integrating virtual and in person in future Internoise conferences
8:00am - 9:00am	Poster Q&A (part 1)
8:00am - 9:00am	Virtual Coffee Break and Conversation
11:00am - 12:00pm	Meet the I-INCE President
12:00pm - 1:00pm	Virtual Coffee Break and Conversation
12:00pm - 1:00pm	INCE Digital Library
1:00pm - 2:00pm	Hot Topics in Quiet Drones

2:00pm - 3:00pm	I-INCE Activities
3:00pm - 4:00pm	Meet George Maling
3:30pm - 4:30pm	Sell and Buy Quiet Panel Discussion
4:00pm - 5:00pm	Hearing conservation
5:00pm - 6:00pm	Hot Topics in Active Control
6:00pm - 7:00pm	How can I become Board Certified?
7:00pm - 8:00pm	How can I become more involved in INCE

Day 3: Tuesday, 3 August 2021

6:00am - 7:00am	Noise & Vibration Control in Asia/Pacific
7:00am - 8:00am	How can the emeritus assist those entering noise and vibration control field
8:00am - 9:00am	Meet the NCEJ / NNI Editors
8:00am - 9:00am	Virtual Coffee Break and Conversation
11:00am - 12:00pm	Meet the INCE-USA President
12:00pm - 1:00pm	Noise & Vibration Control in Europe/Africa
12:00pm - 1:00pm	Virtual Coffee Break and Conversation
1:00pm - 2:00pm	Hot Topics in Wind Turbines
2:00pm - 3:00pm	Increasing involvement of women in Noise Control
3:00pm - 4:00pm	Hot Topics in AI, Machine Learning and Computing with Noise Control Applications
4:00pm - 5:00pm	Hot Consulting Topics in Noise & Vibration Control
5:00pm - 6:00pm	Constraints in Product Noise Control
6:00pm - 7:00pm	Hot Topics in Aero-Acoustics
7:00pm - 8:00pm	Technical Committee Meeting A (INCE-USA)
7:00pm - 8:00pm	Technical Committee Meeting B (INCE-USA)
7:00pm - 8:00pm	Technical Committee Meeting C (INCE-USA)
7:00pm - 8:00pm	Technical Committee Meeting D (INCE-USA)

Day 4: Wednesday, 4 August 2021

6:00am - 7:00am	Students in Noise & Vibration Control and Acoustics
8:00am - 9:00am	Meet the JSV Editor
8:00am - 9:00am	Virtual Coffee Break and Conversation
11:00am - 12:00pm	Meet IN21 Organizers
12:00pm - 1:00pm	Poster Q&A (part 2)
12:00pm - 1:00pm	Virtual Coffee Break and Conversation

1:00pm - 2:00pm	Technology for Quieter America and the World
2:00pm - 3:00pm	Meet the INCE-USA Board Members
3:00pm - 4:00pm	Hot Topics in Tire-Road Noise
4:00pm - 5:00pm	Meet the NCEJ / NNI Editors
5:00pm - 6:00pm	Sound of a Motorcycle
6:00pm - 7:00pm	Hot Topics in Soundscapes / sound quality
7:00pm - 8:00pm	Hot Topics in Acoustic Materials

Day 5: Thursday, 5 August 2021

7:00am - 8:00am	Meet the I-INCE Board Members
7:00am - 8:00am	Poster Q&A (part 3)
8:00am - 9:00am	Inter-Noise 2022 Congress
8:00am - 9:00am	Virtual Coffee Break and Conversation
11:00am - 12:00pm	Integrating virtual and in person in future Internoise conferences
11:00am - 12:00pm	Accompanying Persons Program 3
12:00pm - 1:00pm	Students in Noise & Vibration Control and Acoustics
12:00pm - 1:00pm	Virtual Coffee Break and Conversation
12:00pm - 1:00pm	Accompanying Persons Program 4
1:00pm - 2:00pm	Hot Topics in Structureborne Noise
2:00pm - 3:00pm	Education in Noise Control
3:00pm - 4:00pm	Academics in Noise & Vibration Control and Acoustics
4:00pm - 5:00pm	Case Histories in Noise Control
5:00pm - 6:00pm	Hot Topics in Vibration Isolation and Damping
6:00pm - 7:00pm	Hot Topics in Building Noise & Vibration Control
7:00pm - 8:00pm	Integrating virtual and in person in future Internoise conferences

EXHIBITOR DESCRIPTIONS



4Silence

To reduce traffic noise exposure, 4Silence has developed several diffracting elements (resonators), which can be installed next to roads and railways. By means of tuning and resonance, the diffractor is capable of bending noise in an upward direction, creating a zone of noise reduction behind the element. All products significantly reduce the height of noise barriers – 2 meters.

Besides the fact that we add a third disruptive solution for the reduction of traffic noise, we differentiate in cost-effectiveness and aesthetics. Are solutions lead to a 40% cost reduction (direct CAPEX savings and LCC), 50% carbon savings and minimal visual impact (aesthetics). Furthermore, the installation is super fast – 300 meters a day - and the products can be re-used very easy.

ACÚSTICA & DESIGN SAINT-GOBAIN - Gold

The Saint-Gobain Acoustic & Design Portfolio is the largest and most complete on the market with acoustic solutions for those looking for creative freedom with excellent performance.

Composed of the Placo, Ecophon and Sonex brands, they offer products that fit the most varied types of projects and needs, ensuring versatility and safety.

In addition to a complete portfolio, we have a specialized team ready to serve at all stages of the project, combining aesthetics and acoustic performance.

Acoustics and Design Portfolio. Performance you feel, design that impresses.

DataKustik GmbH

DataKustik GmbH, based in Gilching near Munich, develops software for the calculation, evaluation and presentation of noise immission and sound distribution. Next to the software development, DataKustik GmbH is extensively researching and consulting in these fields

DataKustik GmbH is a modern software and service company with worldwide business connections. The sound propagation software CadnaA (outdoor noise), CadnaR (indoor sound) and CadnaB (building acoustics) are being used by road authorities, railway administrations, airport operators and industrial companies in more than 60 countries. In order to ensure the high standard of our software and consulting operation in the future, we are continuously engaged in the development of guidelines and standards and in the screening of international methods of noise calculation.

Eckel Noise Control

With expertise in creating optimal sound environments, including 'the quietest place on earth' as certified by The Guinness Book of World Records, Eckel Noise Control Technologies has been at the forefront of acoustic analysis and testing for more than 65 years. Eckel's full and hemi-anechoic chambers are custom engineered structures designed to create the ideal acoustic environment in which to conduct testing and research within an array of industries and disciplines. By allowing engineers to take precise acoustic measurements Eckel chambers and reverberation rooms

help companies improve existing product designs and conceptualize and develop innovative products for the future.

ESI North America

ESI VA One is a single environment for vibro-acoustics analysis and design. It allows engineers to perform accurate predictive noise and vibration design assessments early in the design cycle to meet product performance objectives. Users can meet aggressive design-time constraints, ensuring engineering decisions can be made when they most benefit the demands of a multi-disciplinary development environment.

The VA One environment is accessed from a standard user interface, covering the full frequency spectrum through a set of seamlessly coupled and proven modeling methods. With VA One, users achieve optimal design productivity without the need to deploy separate solutions requiring training for different user interfaces and data exchange between environments.

Benefits of VA One

- Meet operating targets (quality, cost) and achieve project milestones with accurate noise prediction models early in the design process
- Integrate noise prediction tools into existing design environments to quickly assess prototype designs with rapid model creation
- Access an optimal set of seamlessly coupled, fast methods to minimize simulation time
- Evaluate your design and rapidly test countermeasures to meet attribute targets
- Achieve design objectives for interior and exterior noise within a single environment

- Eliminate expensive, late-stage modifications

Founded in 1973, ESI Group envisions a world where Industry commits to bold outcomes, addressing high stakes concerns - environmental impact, safety & comfort for consumers and workers, adaptable and sustainable business models. ESI provides reliable and customized solutions anchored on predictive physics modeling and virtual prototyping expertise to allow industries to make the right decisions at the right time, while managing their complexity.

ETS-Lindgren Inc.

ETS-Lindgren has a diverse acoustical product line, allowing our customers to select the ideal test solution for their individual project. Each of our products is designed to meet specific test applications and is available in a wide range of sizes to meet your testing needs and host facility conditions. In addition to our standard products and custom products, ETS-Lindgren is also a leader in acoustical services.

From consulting to chamber relocation, testing to custom product design, ETS-Lindgren has dedicated experts committed to the success of our customers. ETS-Lindgren understands how downtime can impact our customers' product development, production and testing schedules. With more than 750 professionals in locations in the Americas, Europe, the Middle East and Asia, ETS-Lindgren has the global experts to provide you with the best service possible. When it comes to service, put your trust in ETS-Lindgren.

For more information please visit our website at www.ets-lindgren.com/industries/acoustic.

HEAD acoustics Inc.

Since foundation in 1986, HEAD acoustics has been a reliable partner wherever acoustics, vibrations, or speech, audio and sound quality play an important role. We are not only one of the world's leading companies in the comprehensive analysis of sound and vibration; our expertise and pioneering role in the measurement and optimization of speech and audio quality in all areas of communications technology are also recognized worldwide. Our customers value the combination of cutting-edge measurement technology with decades of experience in an industrial setting. With our hardware and software, we offer scalable solutions for the specific problems posed by a wide variety of applications. As a service, our experts develop acoustic optimization approaches – in close cooperation with our customers and tailored to their individual needs.

Hottinger Bruel & Kjaer Inc. - Silver

In 2019 the HBM & Bruel & Kjaer joined forces as HBK - Hottinger, Brüel & Kjaer to form the world's foremost provider of integrated test, measurement, control, and simulation solutions. Through unified capabilities, resources, and expertise, HBK can deliver a more complete portfolio of offerings for measurement and analysis of product physics in the mechanical, electrical, sound and vibration domains. By creating a scalable and open data acquisition hardware, software and simulation ecosystem, product developers can cut time-to-market, drive innovation, and take the lead in a highly competitive global marketplace.

I-INCE

The International Institute of Noise Control Engineering (I-INCE) was founded in 1974. It is a worldwide consortium of organizations concerned with noise control, acoustics and vibration. The primary focus of the Institute is on unwanted sounds and on vibrations producing such sounds when transduced. I-INCE is the sponsor of the INTER-NOISE Series of International Congresses on Noise Control Engineering held annually in leading cities of the world. I-INCE also co-sponsors symposia on specialized topics within the I-INCE field of interest.

INCE-USA

INCE-USA is a non-profit professional organization whose primary purpose is to promote, through its members, noise control solutions to environmental, product, machinery, industrial and other noise problems. INCE-USA is a Member Society of the International Institute of Noise Control Engineering, an international consortium of organizations with interests in acoustics and noise control.

Internoise 2022 - Silver

We invite you to join us for Internoise 2022 which will be held at the SEC, Glasgow from the 21st - 24th of August 2022.

The theme of the conference is 'Noise control in a more sustainable future'

Visit our booth to view our reasons why delegates and sponsors should join us next year.

We look forward to welcoming you to Scotland!

Mecanum

Mecanum is a Canadian company specialized in the field of acoustic materials and noise and vibration tests and designs. We provide our clients with laboratory equipment, acoustic material characterization and modelling software as well as expertise and test service in the previously mentioned field.

Merford Group

Merford Group are specialists in noise control, acoustic materials, room acoustics and acoustic doors. Merford offers further specialisation in the reduction of low frequency noise using the patented NoiseTrap(R) technology of its sister company Sonobex.

We reduce any form of noise nuisance and turn desired noise into a real experience. Merford stands for innovative and high-quality solutions, engineered and produced made-to-measure.

National Council of Acoustical Consultants [NCAC]

The National Council of Acoustical Consultants [NCAC] is an international organization committed to supporting the acoustical profession through:

- *recognizing expert Acoustical Consultants and Engineers.
- *promoting opportunities for peer interaction.
- *providing a reference tool for the public to learn more about the profession and to find a consultant matched to their needs.

Since 1962, NCAC member firms have led their profession in technical expertise, research, innovation, and development of real-world applications in all types of environments. NCAC accepts professional firms that specialize in acoustical consulting

based upon education, references, and most importantly – the proven experience of the principals of the firm.

To qualify to be an NCAC member, the firm principals who practice acoustical consulting must be full members of either the Acoustical Society of America (ASA) or Institute of Noise Control Engineering (INCE). Both associations have their own rigorous standards applying to education, demonstrated experience, and references from professional peers. NCAC requires its members to adhere to a strong Canon of Ethics supporting the highest standards of business practice, technical consulting and client service.

NTi Audio Inc.

NTi Audio's mission is to provide innovative high-quality measurement solutions tailored for:

Audio-Acoustic Installations

Noise Monitoring

Live Sound

Room- and Building Acoustics

Industrial R&D and Quality Control

Hand held sound level and vibration meters, Audio analyzers, Environmental noise monitoring, with web based access, Signal generators, Microphones. Speech Intelligibility systems Dodecahedron sound source.

Ono Sokki

Ono Sokki is a measuring instrument manufacturer focused on the tasks of applying digital technology to measurement applications, and has a proud history in that field, including development of Japan's first digital counter 40 years ago, and myriad products using digital technology. Our

taste for innovation, however, is not limited to hardware; more than 20 years ago we adopted flex-time, and continue to provide a casual, young-at-heart environment for our team members.

Ono Sokki first in Japan (in 1973) to apply digital technology to the development of a practical FFT analyzer, a valuable tool in the reduction of noise and vibration. Today, these analyzers can be found not only in industry, but in fields such as medicine as well, and have earned Ono Sokki a leading market share.

While we have a proud tradition as a digital technology company, we are not content to merely boast about our past, and are highly committed to meeting the tough challenges ahead with innovative change and flexible solutions. The future belongs to those willing to change, and we look forward to being your partner in building that future.

PAC International, LLC

PAC International, LLC is a manufacturer of noise control products. We have been in the noise control business for over 20 years developing new and innovative products for the construction industry. We continue to improving the quality of construction projects world wide.

PCB Piezotronics, Inc. - Gold

PCB Piezotronics, Inc. manufactures sensors used by design engineers and predictive maintenance professionals to test and measure vibration, pressure, force, acoustics, load, and shock in research and development as well as industrial applications.

PCB Piezotronics, Inc. was established in August of 1967 by Robert W. Lally and James F. Lally. The focus of their technical efforts was primarily on the development

and application of integrated circuit technology to piezoelectric sensors. Beginning with the creation of sensors to measure cylinder combustion pressure, PCB's product line quickly expanded to include vibration and force sensors.

Other products such as impact hammers, multichannel signal conditioners, and actuators followed to meet increasing customer demand. It was this flexibility in design/manufacturing, coupled with PCB's commitment to "Total Customer Satisfaction", that is responsible for the success of PCB®.

Pliteq - Gold

Pliteq® creates building products by re-engineering unusable material diverted from landfill for a more sustainable built built environment.

Trusted by global Acoustic Consultants, Architects, Engineers, Designers and Contractors for products which are engineered for superior performance, backed by third party test data and recognized for their sustainable credentials.

This makes Pliteq one of the preeminent global manufacturers and engineering resources.

RION CO., LTD.

Rion sound and vibration measuring instruments meet the various needs of environment-related administration and industries. For instance, sound level meters are useful to monitor a variety of noise, such like road traffic noise, industrial noise, construction work noise and aircraft noise; vibration meters are indispensable for maintenance work of plant facility, performance tests in product development or measures for vibration hazard; and even devices such as seismometers that help to maintain socio-infrastructures.

Major Products

- Sound Level Meters
- Vibration Meters
- Frequency Analyzers
- Recorders

Scantek, Inc.

We are the leader in vibration and sound measuring equipment sales, service, rental, and calibration. Our mission is to sell, service, and rent the finest products while providing expert support on their use. The Scantek Calibration Laboratory is accredited for microphones, calibrators, sound level meters, dosimeters, sound and vibration FFT, and real-time analyzers, preamplifiers and signal conditioners, accelerometers, velocity sensors, vibration meters, and vibration exciters. At Scantek, we understand how important correct sound reading and output needs to be in professional settings. That is why we strive to provide each client with a caring sale experience as well as unparalleled support with their sound measuring equipment.

Softnoise GmbH

Softnoise is the first worldwide on-line provider of quality assured environmental noise mapping solutions for Authorities, Consultants, Industries and Educational institutes. Our new Predictor-LimA Cloud Calculation option is a unique multi-user solution for calculation of noise models according to several international noise prediction standards such as CNOSSOS-EU, ISO 9613, NMPB-2008, Harmonoise and CRTN.

Softnoise is involved in development of software products for noise calculations as well as noise mapping and noise consultancy for over 30 years. This results in an unique team of acousticians, software developers and IT specialists with a focus on development, sales and support of the Predictor-LimA software.

SoundPLAN GmbH

SoundPLAN GmbH in Backnang, Germany is an engineering company with the main focus on noise control, and software development. Its interdisciplinary team consists of engineers, geographers, physicists and computer science specialists. The team generates cutting edge engineering solutions delivered to the global market in the format of its SoundPLAN software. Its SoundPLAN noise modeling software has maintained the status of the market leader for more than 35 years.

Use SoundPLAN to map and assess any transportation, industry or leisure noise, including indoor noise and room acoustics. It works for any size project with even the smallest version. Outstanding features include the cost/benefit capabilities for Wall Design and Expert System Industry, extensive documentation features, and it is the only integrated suite of software that models interior noise levels, sound transmission through building walls and sound propagation into the environment. SoundPLAN's famous graphics are both stunning and easy to use. Especially for Indoor Calculations and Room Acoustics the additional capabilities of the Sarooma software accompanied with a huge absorber database is a perfect companion.

Vlacoustics

Systems and Software for acoustic measurement using National Instruments Digital Signal Analyzer and GRAS Sound and Vibration Transducers.

- Sound Power Level Determination and Sound Pressure Level Measurement.
- Sound Quality Analysis.
- Acoustic Material Properties - Sound Transmission and Sound Absorption.
- Alarm Analysis.
- Turnkey measurement systems with installation, training and support.
- Acculab Reference Sound Sources.

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Latin American Symposia Sponsor



Cirrus Research plc



Hottinger Brüel & Kjaer H



Internoise 2022

Networking Sessions (Thursday) Sponsor



EXHIBITORS

Thank you to our exhibitors in the Noise Control community for your continued support of the INTER-NOISE Exposition.

4Silence



i-INCE



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INCE-USA



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Ono Sokki Co., Ltd.

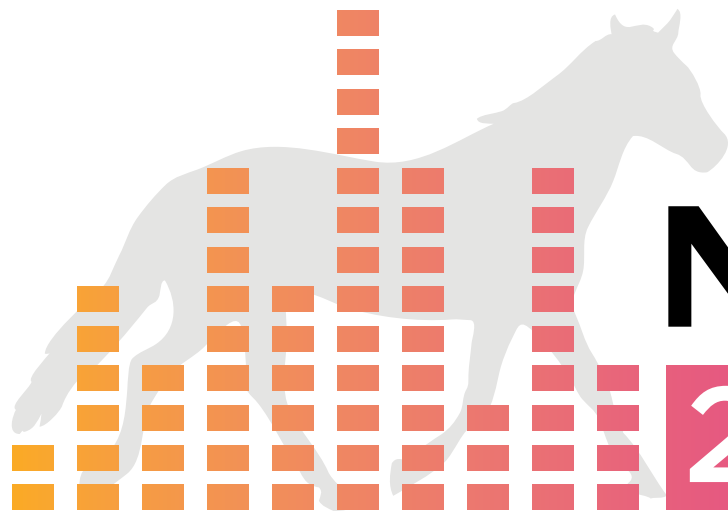


Vlacoustics



More details about sponsors and exhibitors to come in the final version of the program book! Once the Cadmium website is open to all attendees, please visit the **Sponsors & Exposition** pages where you can read about each company, get contact information, visit their website, and request more information.

★ MARK YOUR CALENDARS FOR NOISE-CON 2022 – JOIN US IN LEXINGTON, KY! ★



NOISE-CON

2022

June 12-15
Lexington, KY