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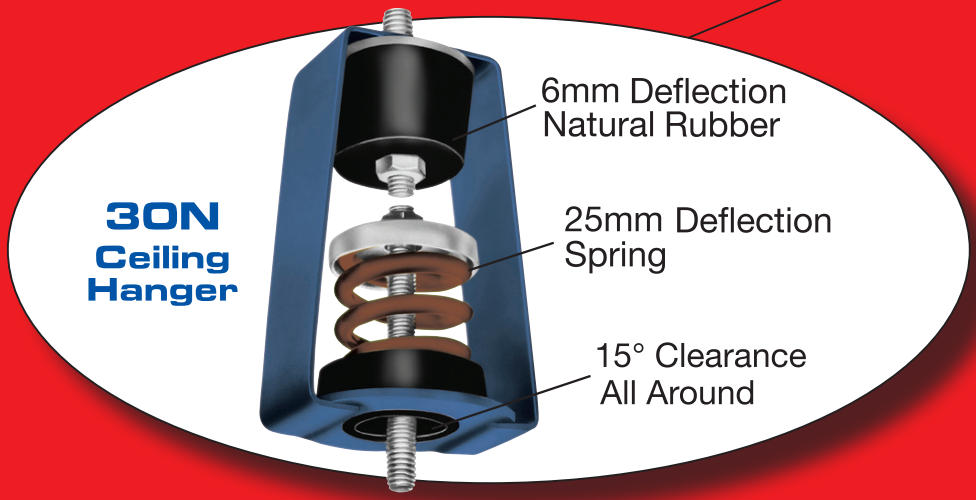

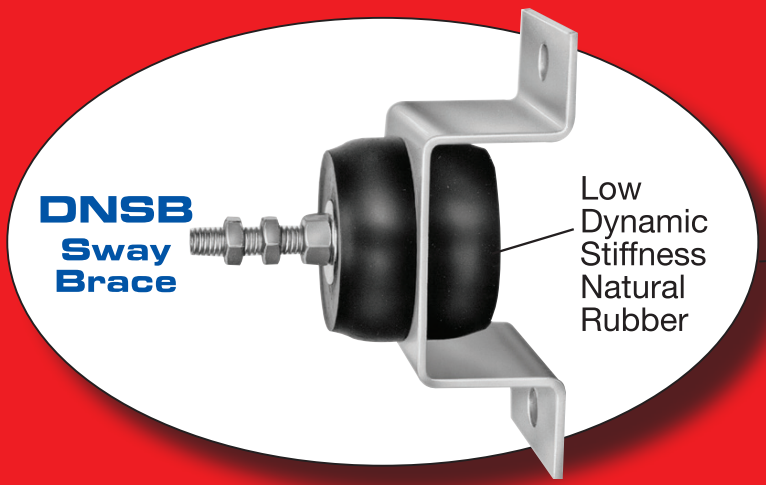

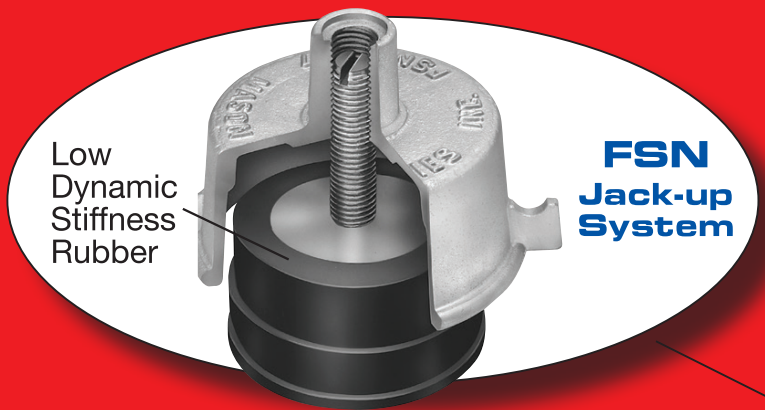

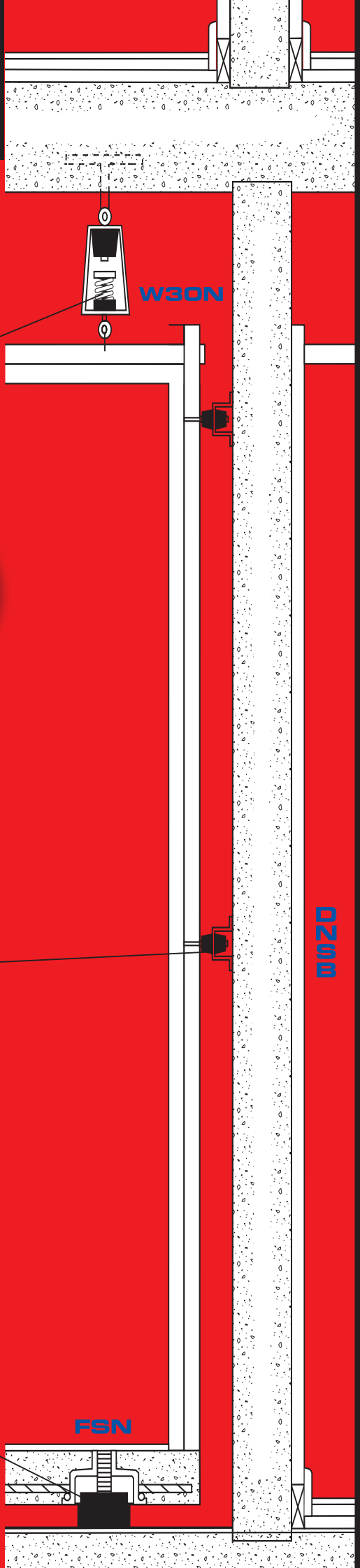

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A08.07/A09.05 Artificial intelligence for industrial applications
A09.01 Machine learning and AI in acoustics - General
A17.04 Soundscape methods, monitoring and metrics

Altinsoy E.
A14.06 Development of semantic attributes based on psychoacoustic modelling

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A05.07 Outdoor sound propagation
A10.10/A19.08 Numerical methods for wave propagation in complex media

Anda S.
A08.03 Advances in machinery noise and vibration control
A20.02 Automotive noise and vibration

Andreopoulou A.
A16.07/A24.11 Processing/individualization/interpolation of HRIRs or BRIRs

Antunes S.
A03.04 Ground borne noise

Arana M.
A05.01 Environmental acoustics - General
A05.04 Wind turbine noise

Arcos R.
A20.05 Railway noise and vibration
A23.01 Vibroacoustics

Arenas J.
A08.04/A10.04 Materials and systems for noise and vibration reduction

Aspöck L.
A19.07 Validation and benchmarks in computational acoustics

Aspuru Soloaga I.
A17.04 Soundscape methods, monitoring and metrics

Astolfi A.
A15.02 Speech production and perception in rooms

Atamer S.
A14.06 Development of semantic attributes based on psychoacoustic modelling

Aumond P.
A09.07 Events detection and localization, and acoustic scenes, using ML techniques

Ausiello L.
A11.03 Consistency of musical instrument making

Avallone F.
A07.05/A19.06 Methods for advanced computational aeroacoustics

Bai M.R.
A01.06 Signal processing for active control

Barbancho A.M.
A11.05 Instruments, hyperinstruments and beyond

Barros A.
A05.03 Environmental noise perception

Battarra M.
A08.05 NVH damage detection, condition monitoring, diagnostics of machinery

Becker S.
A07.01 Flow acoustics - General
A07.04 Fluid structures acoustic coupling

Bellows S.
A16.06 Source directivity: capturing, processing, and evaluating its effects

Bellucci P.
A05.06 Recent advances in noise mitigation methods
A20.06 Noise barriers and mitigation techniques for road traffic and railway

Ben Tahar M.
A12.02 NDT & SHM Applications

Bernardini G.
A07.05/A19.06 Methods for advanced computational aeroacoustics

Berzborn M.
A15.11/A16.05 Sound field reconstruction in rooms and enclosures

Bottalico P.
A15.02 Speech production and perception in rooms

Botteldooren D.
A09.01 Machine learning and artificial intelligence in acoustics - General

Bravo T.
A01.05/A06.07 Active metamaterials
A10.08 Modeling acoustic wave propagation in viscothermal structures

Brinkmann F.
A24.09/A24.13 Motion and rendering

Camacho J.
A12.03 Biomedical ultrasound

Campillo-Davo N.
A04.01 Education, Public outreach and history in acoustics - General
A04.02 Online resources and simulations
A04.05 Yesterday, today and tomorrow of research in acoustics
A20.04 Tyre/road noise

Campo-Valera M.
A22.03 Communication, positioning and acoustic sensor systems
A22.05 Geophysics and Distributed Acoustic Sensing (DAS)

Camussi R.
A07.01 Flow acoustics - General
A07.02 Aeroacoustics of aircraft and urban air vehicles

Carbajo San Martín J.
A08.04/A10.04 Materials and systems for noise and vibration reduction

Carlosena A.
A06.06 Acoustic-based sensors, actuators and microsystems

Carrascal T.
A03.01 Building acoustics - General
A03.02 Acoustic regulations, classification schemes and standards
A03.08 Reducing neighbour noise by acoustic retrofit in housing

Casalino D.
A07.02 Aeroacoustics of aircraft and urban air vehicles

Chatziioannou V.
A11.01 Musical acoustics - General
A11.04 Articulated musical instrument modelling

Chazot J.D.
A19.01 Numerical, computational and theoretical acoustics - General

Chehami L.
A12.02 NDT & SHM Applications

Chevillotte F.
A10.07/A15.07 Characterization of acoustic materials

Chmelík V.
A03.09 Acoustic and thermal retrofit of office building stock in EU

Cobos M.
A09.06/A16.03 Machine learning for array processing

Cosarinsky G.
A12.02 NDT & SHM Applications

Cuenca J.
A10.03 Metamaterials for noise and vibration reduction

Cummins N.
A18.01 Speech - General

D'Orazio D.
A15.03 Modern offices: challenges and solutions

Dalmont J.P.
A11.03 Consistency of musical instrument making

Davies B.
A02.01 Bio-acoustics - General

Dazel O.
A10.06/A19.05 Numerical methods for acoustic materials and metamaterials

de la Prida D.
A14.07 Robust and unbiased psychoacoustical experimentation
A15.10 Modeling room impulse responses with machine learning

De Marqui Jr C.
A01.05/A06.07 Active metamaterials

Debut V.
A11.01 Musical acoustics - General

Deckers E.
A10.03 Metamaterials for noise and vibration reduction

Declercq N.
A12.01 Physical acoustics and ultrasound - General

Del Palú D.
A21.03 Listening experience in sound-driven design

Del Val L.
A16.04 Airborne sonar

Delle Monache S.
A21.04 Methodologies for sound-driven design and education

Deng J.
A10.05/A23.05 Metamaterials and acoustic black holes in vibro-acoustics

Díaz A.
A03.10 Acoustic consultancy projects and BIM

Diego-Tortosa D.
A22.03 Communication, positioning and acoustic sensor systems
A22.05 Geophysics and Distributed Acoustic Sensing (DAS)

Diviacco P.
A22.04 Traffic ship noises

Ducceschi M.
A11.01 Musical acoustics - General

Duocastella M.
A12.07 Acousto-optics

Dupont S.
A12.07 Acousto-optics

Durand S.
A06.02 Microphones (theory, measurement, MEMS, etc.)

Ech-Cherif El-Kettani M.
A12.02 NDT & SHM Applications

Encina Llamas G.
A18.04 Speech perception pathologies

Engel M.S.
A14.06 Semantic attributes based on psychoacoustic modelling
A17.02 Restorative soundscapes

Estévez-Mauriz L.
A05.05 Urban sound planning
A20.03 Road traffic noise and vibration

Fernández-Grande E.
A15.11/A16.05 Sound field reconstruction in rooms and enclosures

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A06.06 Acoustic-based sensors, actuators and microsystems

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A07.04 Fluid structures acoustic coupling

Ferrer Contreras M.
A01.07/A08.06 Innovative noise barriers to enhance acoustic comfort

Fiebig A.
A17.01 Soundscape, environmental quality, health and well-being
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Fink N.
A13.04 Advancements and challenges in military acoustics

Fraga de Frieta E.
A20.04 Tyre/road noise

Fuente M.
A03.07 Acoustics of wooden buildings

Fusaro G.
A03.11/A05.11 Heat pump sounds in residential settings
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A03.05 Structure-borne sound and noise from building services
A20.06 Noise barriers and mitigation techniques

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Godinho L.
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A10.06/A19.05 Numerical methods for acoustic materials

Gómez-García J.A.
A18.03 Speech production pathologies

González A.
A01.07/A08.06 Innovative noise barriers to enhance acoustic comfort

Guasch O.
A23.01 Vibroacoustics

Guigou Carter C.
A03.04 Ground borne noise

Guillén S.
A11.05 Instruments, hyperinstruments and beyond

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A03.11/A05.11 Heat pump sounds in residential settings
A03.12 Ventilation noise in dwellings

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A18.02 Forensic phonetics and acoustics

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A03.05 Structure-borne sound and noise from building services

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A07.06 Modern experimental techniques in aeroacoustics

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A02.07/A09.03 AI and machine learning in bioacoustics

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A10.07/A15.07 Characterization of acoustic materials
A10.08 Modeling wave propagation in viscothermal structures

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A10.05/A23.05 Metamaterials and acoustic black holes in vibro-acoustics

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A12.01 Physical acoustics and ultrasound - General

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A01.07/A08.06 Innovative noise barriers
A17.03 Soundscape practice and interventions

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A18.04 Speech perception pathologies

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A09.07 Events detection and localization using ML

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A05.10/A14.09 Advanced air mobility noise

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A05.05 Urban sound planning

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A19.01 Numerical, computational and theoretical acoustics - General
A19.07 Validation and benchmarks in computational acoustics

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A14.01 Psychoacoustics - General
A14.04 Spatial hearing: modeling and applications

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A10.02 Acoustic, vibroacoustic and elastic metamaterials

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A15.04/A24.06 Virtual reconstructions in archaeoacoustic research

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A12.03 Biomedical ultrasound

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A03.10 Acoustic consultancy projects and BIM

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A14.10 Experiments for noise annoyance, comfort, and soundscape

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A10.08 Modeling wave propagation in viscothermal structures

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A10.02 Acoustic, vibroacoustic and elastic metamaterials

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A21.02 Applied sound-driven design

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A01.02/A01.03 Active sound and vibration control

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A04.05 Yesterday, today and tomorrow of research in acoustics

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A03.01 Building acoustics - General

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A18.05 Speech technologies: diarization, emotion, enhancement

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A21.02 Applied sound-driven design

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A21.03 Listening experience in sound-driven design

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A01.02/A01.03 Active sound and vibration control
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A05.01 Environmental acoustics - General

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A20.01 Transportation noise and vibration - General
A20.03 Road traffic noise and vibration

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A05.04 Wind turbine noise

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A24.01 Virtual acoustics - General

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A11.06/A24.07 Networked music performances and virtual environments

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A03.05 Structure-borne sound and noise from building services

Schoder S.
A07.05/A19.06 Methods for advanced computational aeroacoustics
A19.07 Validation and benchmarks in computational acoustics

Schoenwald S.
A03.07 Acoustics of wooden buildings

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A17.06 Soundscape and inclusion, from theory to practice

Schulz A.
A07.03 Active and passive noise reduction technologies

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A03.01 Building acoustics - General

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A19.01 Numerical, computational and theoretical acoustics - General

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A15.05 Acoustic comfort in hospitals

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A24.09/A24.13 Motion and rendering

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A10.03 Metamaterials for noise and vibration reduction

Siebein K.
A17.03 Soundscape practice and interventions

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A02.02/A22.02 Underwater soundscape and noise

Slabbekoorn H.
A02.05 Effects of multimodal stimuli on wildlife

Sobreira M.
A09.01 Machine learning and artificial intelligence in acoustics - General

Spagnol S.
A21.02 Applied sound-driven design

Stoppel F.
A06.03 Loudspeakers and headphones

Susini P.
A21.04 Methodologies for sound-driven design and education

Taghipour A.
A14.10 Experiments for noise annoyance, comfort, and soundscape

Talebzadeh A.
A17.06 Soundscape and inclusion, from theory to practice

Temboury Gutiérrez M.
A13.06 Audiology diagnostic techniques

Thebaud T.
A18.05 Speech technologies: diarization, emotion, enhancement

Theodossiades S.
A20.01 Transportation noise and vibration - General
A20.02 Automotive noise and vibration

Torija Martínez A.
A05.10/A14.09 Advanced air mobility noise

Torrent D.
A10.02 Acoustic, vibroacoustic and elastic metamaterials

Torresin S.
A17.05 Indoor soundscapes

Undurraga J.
A13.06 Audiology diagnostic techniques

Valier-Brasier T.
A10.09/A12.10 Acoustic wave propagation in complex media

Van Belle L.
A10.03 Metamaterials for noise and vibration reduction

Van Damme B.
A10.02 Acoustic, vibroacoustic and elastic metamaterials

Van Renterghem T.
A02.05 Effects of multimodal stimuli on wildlife
A05.03 Environmental noise perception

Van Walstijn M.
A11.04 Articulated musical instrument modelling

Vanhamel J.
A12.07 Acousto-optics

Vida Manzano J.
A17.01 Soundscape, environmental quality, health and well-being - General
A17.04 Soundscape methods, monitoring and metrics

Vidaña-Vila E.
A02.01 Bio-acoustics - General

Villacorta J.J.
A16.04 Airborne sonar

Visentin C.
A15.03 Modern offices: challenges and solutions
A15.06 Acoustic and multidomain comfort in learning spaces

Waddington D.
A02.01 Bio-acoustics - General

Want W.
A09.01 Machine learning and artificial intelligence in acoustics - General

Weger M.
A13.04 Advancements and challenges in military acoustics

Whitehead H.
A02.01 Bio-acoustics - General

Willemsen S.
A11.06/A24.07 Networked music performances and virtual environments

Williges B.
A13.05 Asymmetric hearing loss - clinical solutions and functionality

Witew I.
A15.01 Room acoustics - General

Wrona S.
A01.07/A08.06 Innovative noise barriers

Yorukoglu P.N.D.
A17.05 Indoor soundscapes

Yue Z.
A18.03 Speech production pathologies

Zaffaroni-Caorsi V.
A02.02/A22.02 Underwater soundscape and noise

Zambon G.
A02.02/A22.02 Underwater soundscape and noise

Zirn S.
A13.05 Asymmetric hearing loss - clinical solutions and functionality

Zotter F.
A16.02 Spatial audio signal processing

Plenary Sessions

Plenary Session 1

Sounds of the Ocean: understanding marine life and its interactions with sound

Author: Ana Širović
Affiliation: Norwegian University of Science and Technology, Norway
Date: Monday, June 23rd

Biography:

Ana Širović is a marine bioacoustician and a professor at the Norwegian University of Science and Technology (NTNU) in Trondheim, Norway. Originally from Croatia, she obtained a Bachelor's degree from the University of California Santa Barbara and a PhD in Oceanography from the Scripps Institution of Oceanography at the University of California San Diego in the United States. She is interested in the development and use of new methods to improve understanding of highly exploited and endangered marine species. She also conducts research on ambient sound and the effects of anthropogenic noise on marine life. Her group uses acoustic tools to answer ecological, population-level questions relevant to the management of animal resources. Prior to joining NTNU, Prof. Širović was a faculty member at Texas A&M University at Galveston and Alaska Pacific University, and a research oceanographer at the Scripps Institution of Oceanography. She is the recipient of the Medwin prize from the Acoustical Society of America and the US Antarctic Service Medal.

Abstract:

Sound allows us to investigate the ocean on a much finer time scales than other methods of study as it is feasible to collect continuous underwater recordings over months or years at a time. At the same time, sound is critical for successful functioning of many marine animals. It helps them find food and mates, fend off threats, and sense their environment. I will present case studies that highlight how we have been gaining valuable ecological and biological knowledge about baleen whale and fish species through long-term passive acoustic monitoring effort. Some of these highlights include an improved understanding of animal occurrence and coupling of the occurrence of predators and prey into dynamic ecosystem patterns dynamics, leading ultimately to a fuller understanding of their roles in the ocean. In addition, I will reflect on the concerns that increases in ocean sound levels raise regarding functioning of marine life and ecosystems, again highlighting the issues via several case studies. Effects of exposure to seismic noise studies also show mixed impact across taxa. In lab-based experiments, we found that exposures to sounds of seismic airguns on red drum (Sciaenops ocellatus) juveniles did not induce an increase in water-borne and tissue-measured steroid hormone levels. Pile driving noise often results in hearing impairment in marine mammals and injury in fishes. Currently, impacts from other industrial noise sources are poorly documented across taxa. One such source of increasing interest is offshore wind farms. In 2023 and 2024, we conducted microcosm and mesocosm experiments to investigate the response of plankton community to sounds of operational wind farms. Our preliminary results indicate impacts across trophic levels. Overall, given the limited number of species used in noise impact experiments, development of categorizing principles and modeled response pathways will be necessary to better elucidate mechanistic framework for observed impacts. Combined with multi-stressor impact assessment framework and integration and interplay of effects across ecosystems, improved understanding of underlying impact mechanisms should contribute to a better understanding and ultimately a more efficient management of marine resources.

Plenary Sessions

Plenary Session 2

AI for Acoustics: Recognition, Captioning, Visualization, Separation and Generation of Everyday Sounds

Author: Prof. Mark Plumbley
Affiliation: University of Surrey, UK
Date: Tuesday, June 24th

Biography:

Prof. Mark Plumbley is Professor of Signal Processing at the Centre for Vision, Speech and Signal Processing (CVSSP) at the University of Surrey, in Guildford, UK. He is an expert on analysis and processing of audio, using a wide range of signal processing and machine learning methods. He led the first international data challenge on Detection and Classification of Acoustic Scenes and Events (DCASE), and is a co-editor of the book "Computational Analysis of Sound Scenes and Events" (Springer, 2018). He currently holds a 5-year EPSRC Fellowship "AI for Sound" on automatic recognition of everyday sounds. He is a Member of the IEEE Signal Processing Society Technical Committee on Audio and Acoustic Signal Processing, and a Fellow of the IET and IEEE.

Abstract:

The last few years has seen a rapid increase of interest in the application of AI to everyday sounds. Starting a decade ago with acoustic scene classification and sound event detection, the challenges and workshops on Detection and Classification of Acoustic Scenes and Events (DCASE) have brought together researchers from academia and industry to establish a new research community. In this talk, I will highlight some of the work taking place in this area at the University of Surrey, including pretrained audio neural networks (PANNs), audio captioning, audio visualization, audio source separation and audio generation (AudioLDM). I will also mention some cross-cutting issues such as dataset collection, algorithm efficiency, and large language models (LLMs), and discuss how we might design future AI applications for acoustics, to benefit of people and society.

Plenary Sessions

Plenary Session 3

Standardizing soundscape perception and other tales

Author: Francesco Aletta
Affiliation: University College London, UK
Date: Wednesday, June 25th

Biography:

Dr Francesco Aletta is a Lecturer in Building Physics and Soundscape at Institute for Environmental Design and Engineering, University College London (UCL). His research focuses on environmental acoustics and soundscape studies. Francesco is committed to advancing soundscape research through his contribution to the ISO 12913 series on soundscapes, which provides a comprehensive framework for assessing and managing urban sound environments. Francesco's research has informed international policy discussions. He authored a United Nations Environment Programme report in 2022, addressing emerging environmental concerns related to noise and its impact on public health and urban environments. His work is frequently referred in policy documents and guidelines aimed at promoting healthier and more sustainable sound environments globally. As part of his standardization efforts, Francesco coordinated the Soundscape Attributes Translation Project, an international collaboration of more than 100 scholars worldwide. He is also an active member of editorial boards for leading journals, including the Journal of the Acoustical Society of America (Coordinating Editor for TC Noise), and member of the organizing committee of several international conferences, including the Urban Sound Symposium, and the Lancet UK Public Health Science Conference. Francesco is a member of the Italian Acoustical Society (AIA), the Acoustical Society of America (ASA), and serves as secretary of the Technical Committee Noise of the European Acoustics Association (EAA). With over 200 publications, 6,000 citations and multiple awards, including the ASA Science Communication Award in 2023, Francesco aims to contribute to the global discourse on soundscape design, urban acoustics, and public health.

Abstract:

The way we experience soundscapes is deeply personal, shaped by cultural, environmental, and psychological factors. Yet, as urbanization accelerates and noise management becomes a global priority, the need for standardized approaches to assessing and designing soundscapes has never been greater. This keynote explores the evolving efforts to establish frameworks for soundscape perception, from the development of international standards to the challenges of ensuring their widespread adoption. While standardization provides a necessary foundation for consistency, the reality of soundscape experience is far from universal. People from different cultural and linguistic backgrounds perceive, interpret, and encode sounds in diverse ways, highlighting the limitations of rigid frameworks. Addressing this complexity requires a balance between structured methodologies and adaptability to local contexts. Advances in cross-cultural research and translation efforts are helping to refine these approaches, making soundscape assessment more inclusive and representative. At the same time, new methods for quantifying soundscape quality are emerging, offering ways to integrate perceptual and contextual dimensions into meaningful metrics. These developments not only enhance our ability to compare and evaluate soundscapes but also provide valuable tools for urban planners, policymakers, and designers to create environments that support well-being. This talk will explore the intersection of standardization, perception, and measurement, reflecting on how soundscapes can be assessed in a way that respects both scientific rigor and human experience.

Plenary Sessions

Plenary Session 4

Sculpting sound fields with acoustic holograms

Author: Dr. Noé Jiménez
Affiliation: Spanish Research Council (CSIC), Spain
Date: Thursday, June 26th

Biography:

Noé Jiménez is a Senior Scientist at the CSIC since 2024. He develops his work at the Institute of Instrumentation for Molecular Imaging, a joint centre of the Universitat Politècnica de València (UPV) and the CSIC. He is a Telecommunications Engineer, holds a Master's degree in acoustics and a PhD (2015) from the UPV. He has been a Ramón y Cajal senior researcher, Juan de la Cierva - Incorporation, Juan de la Cierva - Training, has worked at the CNRS (France) as a postdoctoral researcher for two years, and has made stays at Columbia University (NYC, USA), the University of Salford (UK), and the University of Le Mans (France). He has over 15 years' experience in developing imaging and therapeutic ultrasound systems, wavefront shaping techniques and acoustic metamaterials. His recent research interest ranges from the application of acoustic metamaterials for biomedical ultrasound applications, novel therapeutic ultrasound techniques, acoustic holograms, and acoustic vortices.

Abstract:

Using optical holograms, we can modulate light wavefronts to generate visible images. Can we do the same with sound waves? Acoustic holograms can render sonic images, shaping the areas where mechanical waves present a high amplitude, and areas where the media is at rest. In this plenary talk, we will present an overview of the use of acoustic holograms, and how they can be applied in biomedical ultrasound applications, in particular in emerging therapeutic applications of focused ultrasound, but also in other fields like audible engineering acoustics or contactless particle trapping, to tailor sound waves in unprecedented ways.

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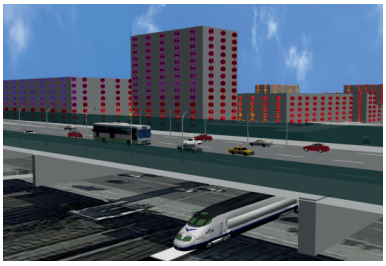

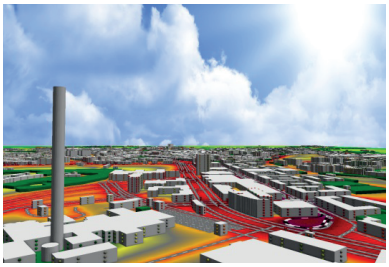

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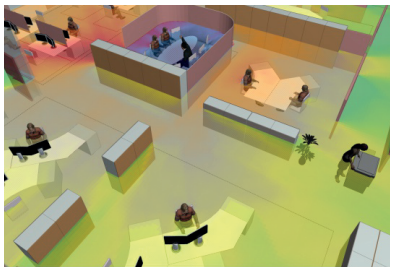

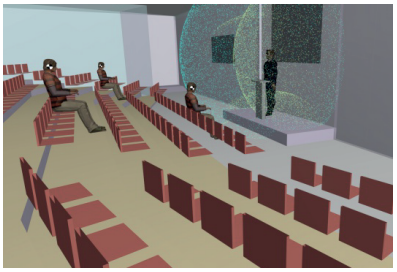

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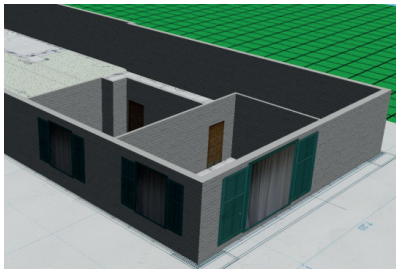

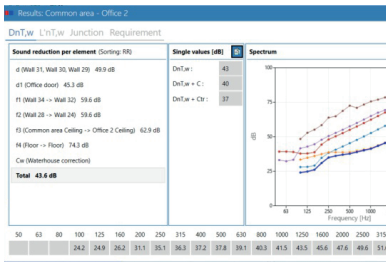

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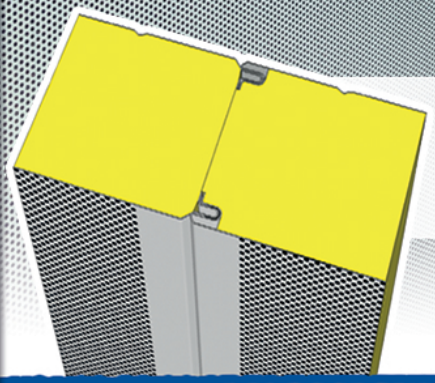

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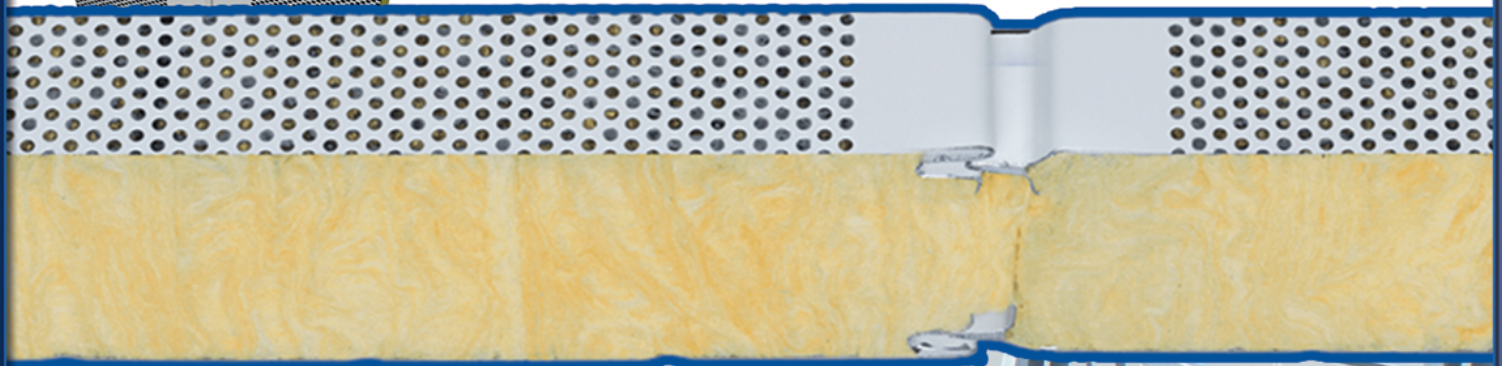

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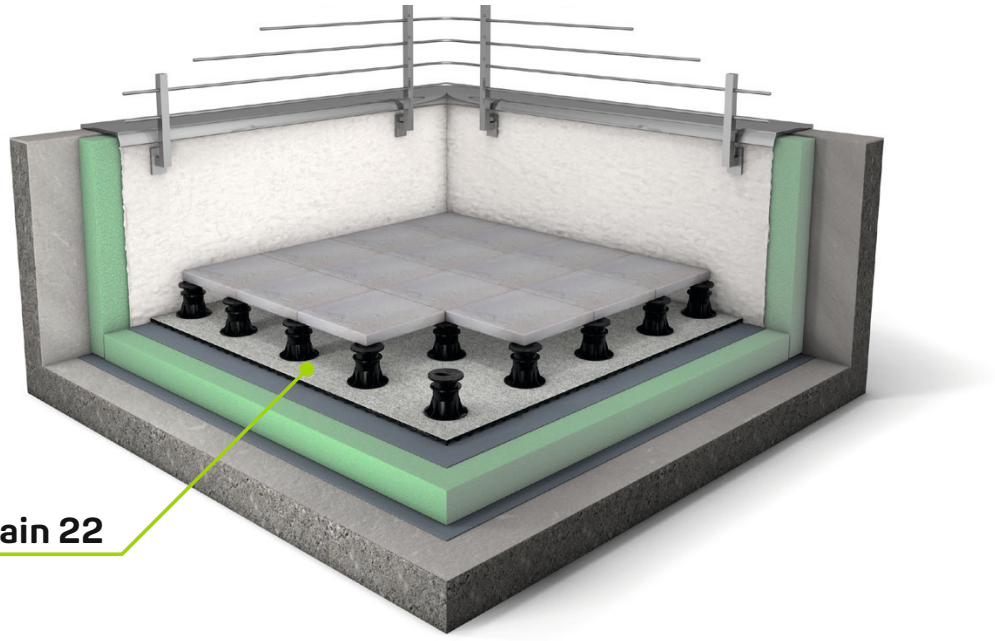

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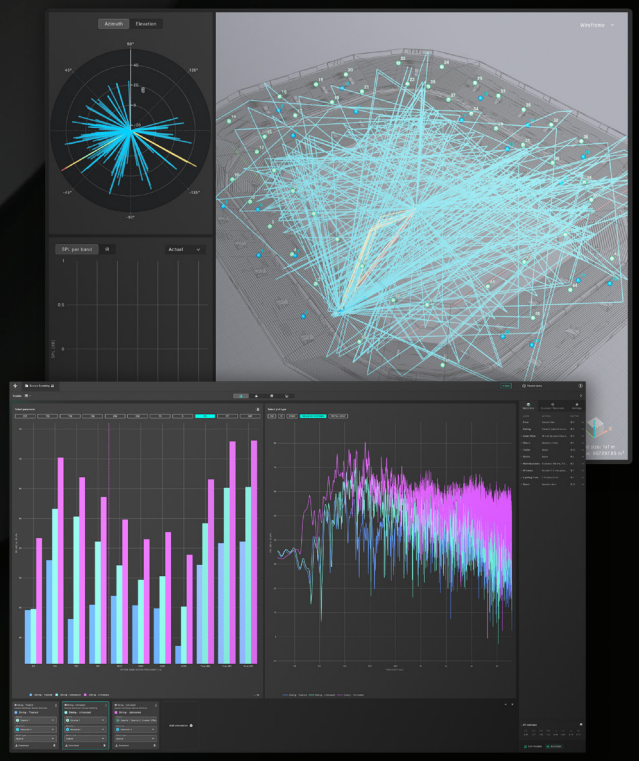

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