

# Auditorium Acoustics 2018



## THURSDAY 4 OCTOBER 2018

0930 Registration

1045 Welcome

1100 Assessing "quality of the acoustics" at large  
Jens Blauert, Ruhr University, Germany

1120 Influence of late directional reverberation on envelopment  
Winfried Lachenmayr, Muller-BBM, Germany

1140 Podium acoustics and the musician's adaptation  
Liisa Kilpillehto, Petri Lehto, Henrik Möller, Sakari Tervo, Akukon, Finland

1200 Characterisation of stage acoustics in two modern concert halls  
Jakob Wincentz, Cheol-Ho Jeong, Jonas Brunskog, Technical University of Denmark, Anders C Gade, Gade & Mortensen Akustik, Denmark

1220 Lunch

1320 A measurement database of US and European concert halls for realistic auralization and study of individual preference  
Matthew T Neal, Michelle C Vigeant, Pennsylvania State University, USA

1340 SIMOPERA – a research project on the sound level reduction in the orchestra pit of the Deutsche Oper Berlin  
Anton Schlesinger, Martin Ochmann, Beuth University of Applied Science, Jan-Michael Kimmich, Stefan Frank, HTW University of Applied Science, Germany

1400 Presenting opera in the 21<sup>st</sup> century. An approach combining multiple indoor/outdoor venues, historically inspired auditorium design, variable acoustics and immersive technology – The Stavros Niarchos Foundation Cultural Centre  
Alban Bassuet, PresenceLab, Rachid Abu Hasson, Ryan Biziorek, Anne Guthrie, Raj Patel, Arup, USA

1420 Staatsoper unter den Linden Berlin  
Martijn Vercammen, Magriet Lautenbach, Peutz, The Netherlands

1440 How a stripped-back opera house design produced acclaimed acoustics  
Raf Orłowski, Ramboll Acoustics

1500 Refreshments and Posters

1600 Kulturpalast Dresden- the other new concert hall alongside the Elbe  
Magriet Lautenbach, Martijn Vercammen, Peutz, The Netherlands

1620 Acoustical design of Elbphilharmonie  
Keiji Oguchi, Marc Quiquerez, Yasuhisa Toyota, Nagata Acoustics, Japan

1640 Acoustic test with 1:10 scale model: Elbphilharmonie case study  
Marc Quiquerez, Keiji Oguchi, Motoo Komoda, Daniel Beckmann, Yasuhisa Toyota, Nagata Acoustics, Japan

1700 Enhancement of bass frequency absorption in fabric-based absorbers  
Jonas Schira, Gerriets, Germany

1720 On the influence of the room shape on the reverberation time and the lateral efficiency – inspired by the Elbphilharmonie Hamburg  
Uwe M Stephenson, Hafencity University, Germany

1740 Considering the bass ratio in acoustically outstanding concert halls  
Helmut Fuchs, Casa Acustica, Germany

1800 Close

## FRIDAY 5 OCTOBER 2018

0930 Acoustical dimensions for productions of presence in music spaces  
Harold Marshall, Marshall Day Acoustics, New Zealand

0950 A consideration on harsh tone control with fine scale diffusive surface  
Hidaka Takayuki, Takenaka R&D Institute, Japan

1010 Assessment of wave-based methods for room acoustic simulations  
Boris Mondet, Jonas Brunskog, Cheol-Ho Jeong, Odeon, Scion-DTU, Denmark, Claus Lyng Christensen, Jens Holger Rindel, Technical University of Denmark,

1030 Wave-based room acoustics modelling: recent progress and outlooks on the future of room acoustics simulation  
Brian Hamilton, Stefan Bilbao, University of Edinburgh

1050 Refreshments and Posters

1150 Architectural patterning and its influence on sound  
Anne Minors, Sound Space Vision

1210 Halls without qualities –or the effect of acoustic diffusion  
Eckhard Kahle, Kahle Acoustics, Belgium

1230 Small concert halls for large orchestras on low budgets  
Eckard Mommertz, Muller-BBM, Germany, Eckard Kahle, Kahle Acoustics, Belgium

1250 Overview of the acoustic design of the new concert hall at the Royal Birmingham Conservatoire  
Michael Whitcroft, Hoare Lea Acoustics

1310 Lunch

1410	St Cecilia's Concert Hall, Edinburgh Anne L Budd, Emily M J Tilbury, New Acoustics
1435	Circular concert halls and possible ways to improve their acoustics Nikolay Kanev, Anatoly Livshits, Acoustics Group, Russia
1455	The problem of well-balanced dynamics between various orchestral instruments in concert halls of different shape Jürgen Meyer, Meyer, Germany
1515	Acoustic simulations and subjective rating of acoustic conditions in a symphony orchestra. A case study Magne Skålevik, AKUTEK and Brekke & Strand, Norway
1535	Refreshments
1600	Dynamic spatial responsiveness in concert halls Evan Green, Eckhard Kahle, Kahle Acoustics, Belgium
1620	Dynamic responsiveness in concert halls as source of emotional impact Jukka Pätynen, Tapio Lokki, Aalto University, Finland
1640	Discussion of the relation between initial time delay gap (ITDG) and acoustical intimacy: documentation of Leo Beranek's final thoughts on the subject Jerald R Hyde, Consultant, USA
1700	Leo Beranek: from his letters John S Bradley, NRC-CNRC, Canada
1720	Developments in concert hall acoustics in the 1960s: theory and practice Mike Barron, Fleming and Barron
1740	A study of the just noticeable difference of early decay time (EDT) Fernando del Solar Dorrego, Michelle C Vigeant, Pennsylvania State University, USA
1800	Concert hall acoustics – 2008: Leo Beranek identifies EDT as metric best correlated with subjective preference Richard Talaske, TALASKE  Sound Thinking, USA
1820	Close
1930	Drinks Reception
2000	Conference Dinner The Ehemaliges Hauptzollamt (Former Main Customs Office Hamburg)  <i>The spacious Former Main Customs Office is located directly beside the Zollkanal (customs canal). The impressive building in which tea, spices, coffee and tobacco from all four corners of the world were once inspected affords a unique location: it lies at the very heart of the historic warehouse district yet is also just a stone's throw from the city centre.</i>

## SATURDAY 6 OCTOBER 2018

0930	Please ensure that you arrive promptly, you will not be able to enter the auditorium once the rehearsal has started.
1000	Attendance at the final rehearsal for the 2nd Philharmonic Concert: Elbphilharmonie Grosser Saal  <i>Maestro Kent Nagano, Violinist Viktoria Mullova and the Hamburg Philharmonic State Orchestra rehearse Symphony No. 4 by Charles Ives and the Violin Concerto op. 61 by Ludwig van Beethoven.</i>
1130	Refreshments
1200	Localisation, loudness and proximity David Griesinger, Consultant, USA
1220	Authentic auralization of acoustic spaces based on spherical microphone array recordings Jens Ahrens, Hannes Helmholtz, Carl Andersson, Chalmers University of Technology, Sweden
1240	The importance and influence of detail in room acoustic calculations – a comparison between Grosser Musikverein Saal and the new concert hall in Malmo Jan-Inge Gustafsson, Emma Gjers, Mats Lundgren, Akustikon, Norconsult, Sweden
1300	Wave field analysis in concert halls using large scale arrays Ingo Witew, Michael Vorländer, RWTH Aachen University, Germany
1320	Impulse response comparison metrics Robert Essert, Fabrizio D'Amelio, Sound Space Vision
1350	Lunch
1420	Attack the attack Tor Halmrast, Statsbygg & University of Oslo, Norway
1440	The behaviour of singers to adapt to various room acoustics Paul Luizard, Stefan Weinzierl, TU Berlin, Germany
1500	Variable control of the room response in performance halls by natural or electronic means Tobias Behrens, Wolfgang Ahnert, ADA-AMC, Germany
1520	Advantages and disadvantages of surround type concert halls Rob Harris, Theatre Projects
1540	The role of the resonant 'hardcap' in contemporary concert hall design Paul H Scarbrough, Christopher Blair, Akustiks, USA, José A Nepomuceno, Acustica Et Sonica, Brazil
1600	Refreshments

1620 Concert hall should primarily please the ear, not the eye

Tapio Lokki, Jukka Pätynen, Aalto University, Finland

1640 Two new – and very different – theatres in Denmark

Anders Chr. Gade, Hallur Johannessen, Jens Niros, Gade & Mortensen Akustik, Denmark

1700 If drones had ears: designing auditoriums for interactive, remote and dynamic recordings

Fabiana Pion, thedsolae, UK

1720 Concert hall acoustics auralized: subjective evaluation of differences in hall shape

Andrzej Klosak, Cracow University of Technology, K T Piotrowski, Academy of Music, Cracow, A C Gade, Gade & Mortensen Akustik, Denmark, A Magda, K Staryszak, Cracow University of Technology, Poland

1740 Spectral preferences of reverberation time in halls that present pop and rock music

Niels W Adelman-Larsen, Flex Acoustics, Denmark

1800 Closing comments

1830

## THURSDAY 4 OCTOBER 2018 - POSTERS

New, variable acoustic panel technology:  $1s < RT < 2s$

Niels W Adelman-Larsen, Flex Acoustics, Denmark

Non-exponential decay curves in auditoriums

Jamilla Balint, Graz University of Technology, Austria, Fabio Kaiser, Rohde Acoustics, Austria

The use of machine learning algorithms in the generation of emotional response to sound and space

Paul Bavister, Flanagan Lawrence Architects & Bartlett School of Architecture UCL, UK

An active loudspeaker point source for the measurement of high quality wide band room impulse responses

Gottfried Behler, RWTH Aachen University, Germany

How architectural design of stages influences stage acoustic parameter values

Ilaria Fishera, Luigi Marletta, Remy Wenmaekers, University of Catania, Italy & Eindhoven University of Technology, Netherlands

An experimental and numerical approach to the acoustical design of the Convento São Francisco auditorium in Coimbra, Portugal

Octavio Inacio, Inacoustics, Portugal

Naturally ventilated and hybrid-ventilated performance spaces

Vangelis Koufoudakis, Charcoalblue, UK

Acoustic considerations in the refurbishment of a 1960's Brutalist Concert Hall

Perttu Laukkanen, Raf Orłowski, Ramboll Acoustics, UK

Acoustical renovation of the Jyväskylän Sinfonia rehearsal hall

Henry Niemi, Mikko Kylliäinen, Jesse Lietzén, AINS Group, Finland

The acoustician who has to wear hearing aids

John O'Keefe, O'Keefe Acoustics, Canada

Identifying the initial time delay gap (IDTG): Truth or fake?

Jean-Dominique Polack, Sorbonne Université, France

Accurate localisation of early reflections using a modified tetrahedral microphone array

Sven Rechenberger, Consultant

Sound absorption of slat structures for practical applications: measurements and comparisons with results from mathematical models

Janne Riionheimo, Nella Näveri, Henrik Möller, Akukon, Finland

Analysis of reverberation time measurements of a multi-functional theatre under construction located in Guarapuava, Brazil

Rodrigo Scoczynski Ribeiro, Márcio Henrique de Avelar Gomes, Rosemara Santos Deniz Amarilla, Adalberto Matoski, Rodrigo Eduardo Catai, Federal University of Technology, Brazil

Auralization use in acoustical design: preliminary results of a survey study

David Thery, Vincent Boccard, Brian F G Katz, LIMSI, France

The new Teatro "Amintore Galli" in Rimini: acoustic design and measurements of diffusing panels

Lamberto Tronchin, Pietro Fiumana, University of Bologna, Italy, Angelo Farina, Simone Campanini, University of Parma, Italy

The acoustic design of a multi-purpose hall: comparing acoustic model and final measurement results

Sara Vehviläinen, Henrik Moller, Nella Naveri, Akukon, Finland

The audience microphone – using smartphones as receivers for occupied room acoustic measurements

Andreas Wagner, Impulse Audio Lab, Germany

Acoustic design of the opera house at the Shanghai Conservatory of Music, China

Albert Xu, Mario Philippe, XU Acoustique, France

The correlation of sound wave diffusion and loudness perception in concert halls

Yingzi Ying, Gunilla Sundin, Akustikon Norconsult, Sweden

## FRIDAY 5 OCTOBER 2018 - POSTERS

Refurbishment of the "Palace of Music" in Barcelona, Catalonia, Spain

Higini Arau-Puchades, Arau Acustica,

On the prediction of sound diffusion coefficient

Hassan Azad, University of Florida, USA

A tribute to E-L Boullée: a visual and aural virtual reality experience into the "Basilica"

Eric Ballestero, Antony Gasnier, Thibault Guillaume, London South Bank University

Speech intelligibility and reverberation time at higher education teaching spaces

Peter Beke, BP-Vibroakusztika, Hungary

Assessment of perceptual attributes of classroom acoustics: real versus simulated room

Matthias Blau, Armin Budnik, Steven van de Par, Jade Hochschule Wilhelmshaven, Germany

Acoustic simulation parameters for theatre flytowers: case study

Victoria Chavez, Simon Perigot, Theatre Projects

Design goal of acoustic coefficients in concert hall related to reverberation and loudness

Jin Yong Jeon, Kee Hyun Kwak, Hyun In Jo, Jung In Woo, Hanyang University, Korea

Conception of a performing arts centre in South Korea and cultural differences

Sebastien Jouan, Ando Ranrianoelina, Theatre Projects,

Optimal reverberation in jazz venues; experimental investigation

John Karagiannis, Marina-Anna Chounti, Alexandra Sotiropoulou, Technical University of Athens, Greece

The acoustic design of a multi-purpose horseshoe hall and a drama hall at Druskininkai Culture Centre

Gerda Kaasik, Henrik Möller, Nella Näveri, Edmundas Žižys, Akukon, Finland

Microphone array method for in-situ measurement of incident and reflection sound intensities on room surfaces

Shinichiro Koyanagi, Noriko Nishihara, Takenaka Corporation, Japan

Modern sound systems in concert halls

Julien Lavel, Etienne Corteel, L-Acoustics, France

Background noise measurements with audience in a concert hall

Maarten Luyck, Peutz, The Netherlands

Perceptual evaluation of loudspeaker auralisations from a phased geometrical room acoustic model

Gerd Marbjerg, Jonas Brunskog, Cheol-Ho Jeong, Technical University of Denmark

On the architectural implications of "diffusing surfaces"

Harold Marshall, Marshall Day Acoustics, New Zealand

Stage machinery noise – what limits are appropriate

Anton Melnikov, SBS Bühnentechnik, Technical University of Munich, Germany, Ingo Witew, RWTH Aachen University, Germany, Marcus Maeder, Steffen Marburg, Technical University of Munich, Germany

Theatres inside countryside railway stations

Emmanuel Merida, EM Acoustic & GRECCAU, Fabian Garry, Emeric Boussely, EM Acoustic, France, Catherine Semidor, GRECCAU, France

Optimization of a diffuser geometry using parametric modelling tools and finite-difference time-domain simulations

Julie Meyer, Tapio Lokki, Aalto University, Finland

Learning about hall acoustics from multi-directional audio recordings

Jonah Sacks, Kelsey Hochgraf, Acentech

Expected sound levels at concert venues for amplified music

Bård Støfringsdal, COWI, Norway

3D Modelling through photogrammetry to support acoustic measurements and derive geometries for simulations

Josep Llorca, Universitat Politècnica de Catalunya, Spain, Ingo Witew, RWTH Aachen University, Germany, Ernest Redondo, Universitat Politècnica de Catalunya, Spain, Michael Vorländer, RWTH Aachen University, Germany