

International Conference on Spatial and Immersive Audio

Huddersfield, United Kingdom
23-25 August 2023

ISBN: 978-1-7138-8462-0

Printed from e-media with permission by:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571



Some format issues inherent in the e-media version may also appear in this print version.

Copyright© (2023) by the Audio Engineering Society
All rights reserved.

Printed with permission by Curran Associates, Inc. (2024)

For permission requests, please contact the Audio Engineering Society
at the address below.

Audio Engineering Society
International Headquarters
551 Fifth Ave., Suite 1225
New York, NY 10176
USA

Phone: +1 212 661 8528

www.aes.org

Additional copies of this publication are available from:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: 845-758-0400
Fax: 845-758-2633
Email: curran@proceedings.com
Web: www.proceedings.com

TABLE OF CONTENTS

Noise-Resistant Correlation-based Alignment of Head-Related Transfer Functions for High-fidelity Spherical Harmonics Representation.....	1
<i>Jonas Reijnders, Bart Partoens, Herbert Peremans</i>	
Room Impulse Response Estimation in a Multiple Source Environment.....	12
<i>Kyungyun Lee, Jeonghun Seo, Keunwoo Choi, Ben Sangbae Chon, Sangmoon Lee</i>	
Case Studies in Music Production for 3D Audio Reproduction with Bottom Channels.....	23
<i>Will Howie, Toru Kamekawa, Miki Morinaga</i>	
Exploring the Influence of Multichannel Soundtracks on Film Immersion	32
<i>Joseph Williams, Jon Francombe, Damian Murphy</i>	
Torso Effects in HRTF.....	46
<i>Jaan Johansson, Aki Mäkivirta, Matti Malinen</i>	
Recreating a Multi-Loudspeaker Experiment in Virtual Reality	55
<i>Matthias Frank, Djordje Perinovic</i>	
Employing the Processing Capability of Mixing Consoles and Audio Interfaces to Spatialize Sound	64
<i>Richard Foss</i>	
Liminal Spaces: Composing for a New Layered Immersive Spatial Audio System.....	74
<i>Eric Lyon, R. Benjamin Knapp, Tanner Upthegrove, Brandon Hale</i>	
Objective Comparison of 3D Audio Reproduction with and Without Bottom Channels	84
<i>Will Howie, Atsushi Marui, Toru Kamekawa, Florian Grond, Akira Omoto</i>	
Designing Immersive Audio for a Location-Based Augmented Reality Experience in a Museum Setting.....	93
<i>Frank Duchêne, Jukka Holm</i>	
Robust Binaural Measurements in the Ear Canal Using a Two-Microphone Array	101
<i>Viktor Gunnarsson, Sead Smailagic</i>	
Near-Field Binaural Rendering: Evaluating the Natural Channel Separation of Loudspeakers Mounted in a Headrest.....	111
<i>Ethan Stanhope, Laurence J. Hobden, Stephen G. Oxnard</i>	
Perceptual Comparison of Parametric Spatial Audio Codings for Binaural Rendering	119
<i>Benjamin Stahl, Stefan Riedel</i>	
A Commonly-Accessible Toolchain for Live Streaming Music Events with Higher-order Ambisonic Audio and 4k 360 Vision	128
<i>Bartłomiej Mróz, Piotr Ody, Przemysław Danowski, Marek Kabacinski</i>	
Blind Estimation of Ensemble Width in Binaural Music Recordings Using ‘spatiograms’ Under Simulated Anechoic Conditions	139
<i>Paweł Antoniuk, Sławomir Krzysztof Zielinski</i>	
Spatial Upsampling of Sparse Head Related Transfer Functions - A VQ-VAE & Transformer Based Approach	149
<i>Devansh Zurale, Shlomo Dubnov</i>	

On the Perception of Musical Groove in Large-Scale Events with Immersive Sound	160
<i>Thomas Mouterde, Nicolas Epain, Samuel Moulin, Etienne Corteel</i>	
Impact of Standing Waves on Human Auditory Perception of Low-Frequency Direction.....	170
<i>Madalina Anamaria Nastasa, Ville Pulkki, Aki Mäkivirta</i>	
RoomZ: Spatial Panning Plugin for Dynamic Auralisations Based on RIR Convolution	179
<i>Poirier-Quinot David, Peter Stitt, Brian Katz</i>	
Relative Distance Perception of a Position-Dynamic Nearby Virtual Sound Source	186
<i>Yuqing Li, Stephan Preihs, Jürgen Peissig</i>	
Parametric Architecture for the Transmission and Binaural Reproduction of Microphone Array Recordings.....	198
<i>Leo McCormack, Christoph Hold, Archontis Politis</i>	
Cross-Correlation-Based Time-Aligned Interpolation of Head-Related Impulse Responses	208
<i>Christoph Pörschmann, Tim Lübeck, Johannes M. Arend</i>	
The Hartufo Toolkit for Machine Learning with HRTF Data	218
<i>Johan Pauwels</i>	
The Effect of Head Tilt on the Perception of the Top Layer of Three-Dimensional Audio.....	230
<i>Toru Kamekawa, Atsushi Marui, Will Howie</i>	
The Role of Source Signal Similarity in Distinguishing Between Different Positions in a Room	238
<i>Thomas McKenzie, Nils Meyer-Kahlen, Sebastian J. Schlecht</i>	
Immersive Audio Test Signals for Musical Applications.....	247
<i>Arthur Moelants</i>	
Adapting Live Loudspeaker Array Spatialisation Methods for a Site-Specific Live Electronic Music Performance in Physical, Virtual and Hybrid Contexts	260
<i>Matt Barnard, Mark Slater, Adam Martin</i>	
Using Personal HRTF and Binauralized Headphone Monitoring in Immersive Soundtrack Post Production	268
<i>Henri Takala, Aki Mäkivirta, Petteri Rajanti</i>	
ORTF-2plus2: A Stereophonic Spot Microphone Technique for 3D Audio	269
<i>Helmut Wittek</i>	
Do-It-yourself Headphones and Development Platform for Augmented-reality Audio	274
<i>Alexander Mülleder, Michael Romanov, Nils Myer-Kahlen, Franz Zotter</i>	
Object-Based Workflows in Live Sports Broadcasting Using AI-Based Mixing	282
<i>Aimée Moulson, Max Walley, Yannik Grewe, Rob Oldfield, Ben Shirley, Ulli Scuda</i>	
A DAW-Based Approach to Immersive Audio System Evaluation in Network Music Performance Contexts.....	290
<i>Patrick Cairns, Helena Daffern, Gavin Kearney</i>	
Requirements for 6DoF Audio Service and 6DoF Audio Metadata	298
<i>Takehiro Sugimoto, Tomomi Hasegawa, Taishi Iwasaki, Hiroki Kubo, Satoshi Oode, Hiroyuki Okubo</i>	

Six Degrees-Of-freedom Room Impulse Response Dataset Measured Over a Dense Loudspeaker Grid (6DRIR-DL).....	305
<i>Jung-Woo Choi, Franz Zotter</i>	
Avatar Representation in Extended Reality for Immersive Networked Music Performance.....	313
<i>Anthony Hunt, Helena Daffern, Gavin Kearney</i>	
Evaluating the Interaural Thresholded Level Distribution as a Psychophysically-Motivated Metric of Auditory Source Width.....	320
<i>Christian S. E. Cotton, James Blake, Ethan Stanhope, Stephen G. Oxnard, Laurence J. Hobden</i>	
Projecting Source Directivity Variations onto an Existing Binaural Room Impulse Response	329
<i>Pablo Abehsera Morell, David Poirier-Quinot, Brian F. G. Katz</i>	
Perceptual Thresholds for Angular Decomposition of Direct and Reverberant Sound in Spatial Room Impulse Responses.....	337
<i>Jacob Cooper, Helena Daffern, Gavin Kearney</i>	
Spatio-Sonic Site Survey Using Ambisonics Recordings and VR Rendering – Designing Soundscapes in the Early Planning Process.....	346
<i>Kristin Nedlich, Arne Nykänen, Björn Hellström</i>	
A Listening Test Evaluation of Spatial Sound Technologies in Music Production: Dolby Atmos and Ambisonics.....	354
<i>Pawel Malecki, Joanna Stefanska, Maja Szydłowska, Malgorzata Teczynska Keska</i>	
Localisation in Virtual Choirs: Outcomes of Simplified Binaural Rendering	363
<i>Kajornsak Kittimathaveenan, Sten Ternström</i>	
Pros and Cons of Artificial Head and Ambisonics Recordings and Reproductions Used in Design Processes	367
<i>Arne Nykänen, Kristin Nedlich</i>	
Frequency Dependency of Loudness Perception for Immersive Audio Formats	373
<i>Samuel Dickinson, Hyunkook Lee</i>	
Immersive Audio as a Tool for the Preservation and Transference of Musical Heritage: Music and Spaces in 19th-Century Colombian Music	381
<i>Marco Antonio Juan De Dios Cuartas, Jorge Mario Valencia Upegui</i>	
Sound Environment Control Using an Immersive Audio System – Advancing Sound Experiences for Creators and Listeners Using Active Field Control –	390
<i>Dai Hashimoto, Hideo Miyazaki, Ron Bakker, Sungyoung Kim</i>	
Virtual 3D Microphone Arrays by Virtual Sound Sources Detected from an FOA Response.	398
<i>Masataka Nakahara, Yasuhiko Nagatomo, Akira Omoto</i>	
User Preference Evaluation of Direct-To-Reverberant Ratio of Virtual Ambisonic Listening Spaces.....	406
<i>Tomasz Rudzki, Damian Murphy, Gavin Kearney</i>	
Audibility of Binaural Beats Depending on Frequency and Modulation Rate	415
<i>Lasse Nipkow, Hyunkook Lee</i>	
Creating Navigable Auralisations Using RIR Convolution: Impact of Grid Density and Panning Method on Perceived Source Stability	419
<i>Julien De Mynke, David Poirier-Quinot, Brian F. G. Katz</i>	

A Systematic Review of Reverberation and Accessibility for B/blind Users in Virtual Environments	427
<i>Luke Child, Natanya Ford, Tom Mitchell</i>	
Towards the Neurophysiological Characterization of Immersive Attributes in Auditory Events	435
<i>Norberto E. Naal-Ruiz, Hyunkook Lee, Andrea González, Rodrigo Gonzalez, Mathilde Marie Duville, Luz M. Alonso-Valerdi, David I. Ibarra-Zarate</i>	
Creating In-Air 3D Sound Objects for Immersive Sound Applications and Electroacoustic Music	444
<i>Paul Geluso, Lars Graugaard, Donald Martin</i>	
Use of Immersive Audio as an Assistive Technology for the Visually Impaired – A Systematic Review	452
<i>Cameron Jones, Steven Fenton</i>	
Exploring Experience and Expertise in the Context of Preference for Spatial Sound Treatment in Immersive Environments.....	461
<i>Angela McArthur, Andrew Johnston, Mark Sandler, Sam Ferguson, Rebecca" Stewart</i>	
Latency Detection Threshold of Head-Tracking with and Without Individualized HRTFs in Binaural Rendering.....	469
<i>Clément Rappin, Julian Palacino, Pascal Rueff, Laurent Feichter, Mathieu Paquier</i>	
SoniCross: Evaluating Annoyance in Sonifications for Electric Vehicles Using Audio-Visual Simulation	475
<i>Iason Svoronos-Kanavas, Hyunkook Lee</i>	
Perceptual Dimensions of Listener Envelopment (LEV) in a Positional and Directional-Varying Context	484
<i>Bogdan Bacila, Hyunkook Lee</i>	
An Investigation into Immersive Contemporary Popular Music Mixing Practice	492
<i>Andrew Bourbon, Matthew Watson, Dawid Stelmach, Michael Champion, Ansh Chomal, Steven Fenton, Hyunkook Lee</i>	
Investigating the Impact of Room Divergence Effect on the Film Watching Experience in Multi-Channel Binauralized Content.....	500
<i>Tudor Petrea, Hyunkook Lee</i>	
Hearing from Within a Sound: A Series of Techniques for Deconstructing and Spatialising Timbre	508
<i>Lewis Wolstanholme, Cyrus Vahidi, Andrew McPherson</i>	
A Novel Algorithm for Volumetric Amplitude Panning and Diffusion in Spatial Audio Production	517
<i>Saarish Kareer, Kaushik Sunder</i>	
Miniature Line Array for Immersive Sound Reinforcement.....	525
<i>Lukas Gölles, Franz Zotter, Leon Merkel</i>	

Author Index