

# **4th International Conference on Acoustics & Sound Reinforcement (ASR 2024)**

Le Mans, France  
22 - 26 January 2024

ISBN: 978-1-7138-8920-5

**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© (2024) 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](http://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](mailto:curran@proceedings.com)  
Web: [www.proceedings.com](http://www.proceedings.com)

## TABLE OF CONTENTS

Matching Early Reflections of Simulated and Measured RIRs by Applying Sound-Source Directivity Filters .....	1
<i>A. Gallien, K. Prawda, S.J. Schlecht</i>	
Optimizing Speech Intelligibility in Practical Applications Using State-Of-The-Art Acoustic Simulation Tools.....	11
<i>S. Feistel, D. Ponteggia</i>	
Exploring Perceptual Annoyance and Colouration Assessment in Active Acoustic Environments.....	23
<i>P. Coleman, N. Epain, S. Venkatesh, F. Roskam</i>	
A Case Study on Practical Live Event Sound Exposure Monitoring.....	33
<i>A. Hill, K. Liston, I. Wiggins, G. Naylor</i>	
Dual-Target Design for Large-Scale Sound Reinforcement: Simulation and Evaluation.....	44
<i>L. Golles, F. Zotter</i>	
A Study on Loudspeaker SPL Decays for Envelopment and Engulfment Across an Extended Audience.....	53
<i>S. Riedel, M. Frank, F. Zotter; R. Sazdov</i>	
On the Factors Influencing Groove Fidelity in Immersive Live Music Events.....	63
<i>T. Mouterde, N. Epain, S. Moulin, E. Corteel</i>	
On the Perception of Time-Alignment Between Full-Range Speakers and Subwoofers for Sound Reinforcement .....	73
<i>T. Mouterde, S. Moulin, N. Epain, E. Corteel</i>	
On the Application and Dependency of Directivity Ratings for Sound Reinforcement Systems at Low Frequencies .....	83
<i>T. Goldmann, M. Kok, T. Mouterde, E. Corteel</i>	
Efficiency Assessment and Comparative Analysis of Various Designs and Acoustic Loads for Low-Frequency Reproduction .....	94
<i>S. Bouchet, C. Richard</i>	
The Loudspeaker as a Sustainable and Aesthetic Product Using Additive Manufacturing .....	101
<i>M. Isenegger, E. Schedler, V. Hutter, C. Zumbuhl, O. Schalli, A. Taghipour</i>	
Signal Decorrelation for Sound Reinforcement System Crossovers .....	111
<i>A. Hill</i>	
Sound Level Measurement, Monitoring and Management in Small Music Venues: Leq Averaging Time Interval .....	117
<i>J. Mulder, A. Hill</i>	
Comparative Evaluation of Public Address Feedback Controllers: A Preliminary Assessment Methodology .....	127
<i>S. Dupont, C. Lambourg, P. Leroy, P. Herzog</i>	
Perceptual Validation of the Extended Energy Vector Model for Audio Objects Localization in Large Audience Areas.....	137
<i>D. Jacquet, J. Dominguez, J.F. Petiot</i>	

Design and Evaluation of a Sound Insulation Curtain Filled with Sand.....	147
<i>L. Euler, K. Neuwerk, J. Dreher, J. Schira, M. Haupt</i>	
Industrial Applications of Hybrid Room Acoustic Simulations Using a Combination of Discontinuous Galerkin Method and Geometrical Acoustic Methods - Benchmark Case Study .....	155
<i>G. Oskarsdottir, F. Pind, J. Pedersen</i>	
Requirements and Solutions for Audio Networking in Sound Reinforcement Systems.....	163
<i>H. Kaltheuner, G. Kronauer, M. Lave, E. Corteel</i>	
Basics of Sound Propagation in the Atmospheric Boundary Layer.....	173
<i>P. Libianchi</i>	
Assessing the Acoustic Load on a Loudspeaker Driver Through Electrical Impedance Measurements.....	182
<i>R. Magalotti, K. Bugaj, A. Said</i>	
Deployment of Two-Dimensional Loudspeaker Arrays in Worship Spaces - New Application Concepts and a Real-World Case Study .....	191
<i>E. El-Saghier</i>	
Function Group Approach to Immersive Audio System Design for Stage-Based Applications .....	204
<i>J. Frutos-Bonilla</i>	
Loudspeaker Matrix Arrays: Challenging the Way We Create and Control Sound .....	211
<i>E. Start</i>	

## **Author Index**