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How do you sound design? Articulating experiences and cultures via listening

Stefano Delle Monache
Delft University of Technology, Faculty of Industrial Design Engineering

Nicolas Misdariis
IRCAM STMS Lab, Sound Perception and Design Group, Paris

Elif Özcan
Delft University of Technology, Faculty of Industrial Design Engineering

Daniel Hug
Zurich University of the Arts, Institute for Computer Music and Sound Technology

Sara Lenzi
Delft University of Technology, Faculty of Industrial Design Engineering; Ikerbasque Basque Foundation for Science; Universidad de Deusto, Faculty of Engineering, Bilbao

See next page for additional authors

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Authors

Stefano Delle Monache, Nicolas Misdariis, Elif Özcan, Daniel Hug, Sara Lenzi, Sandra Pauletto, Davide Rocchesso, and Simone Spagnol

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Editorial: How do you sound design? Articulating experiences and cultures via listening

Stefano Delle Monache[a,b]*, Nicolas Misdariis[c], Elif Özcan[a], Daniel Hug[d], Sara Lenzi[a,e], Sandra Pauletto[b], Davide Rocchesso[f], Simone Spagnol[g]

[a] Critical Alarms Lab, Delft University of Technology
[b] KTH Royal Institute of Technology, Division of Media Technology and Interaction Design, Stockholm
[c] IRCAM STMS Lab, Sound Perception and Design Group, Paris
[d] Zurich University of the Arts, Institute for Computer Music and Sound Technology
[e] Ikerbasque Basque Foundation for Science; Universidad de Deusto, Faculty of Engineering, Bilbao
[f] University of Milano, Department of Computer Science
[g] Iuav University of Venice, Department of Architecture and Arts

*Corresponding author e-mail: s.dellemonache@tudelft.nl

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Abstract: The Sound-Driven Design track invites researchers and practitioners to delve into the multifaceted nature of sound, unravelling its physical, perceptual, emotional, and socio-technological dimensions, and contribute to the discovery and development of design methods and tools. In the sound-driven perspective, listening emerges as an element that adds depth and richness to the design space, adding to the role of the senses in the experience of the form quality of products, services, and systems. We introduce the papers accepted to the track, as they reflect the holistic and inclusive character of "sound-driven", combining the diverse sonic, experiential, technical, and cultural manifestations of sound with the creative, integrative, mitigative, and purposeful essence of designing.

Keywords: sound; design; listening; human-centred

1. Introduction

Sound-driven design is a dynamic and inclusive process that engages various stakeholders in the collaborative development of solutions tailored to address sound-related challenges and opportunities within a specific context. Central to sound-driven design are human-centred and collaborative approaches that prioritise the needs, preferences, and experiences of individuals who interact with the acoustic environment. By fostering open communication and collaboration, sound-driven design creates a shared foundation for creativity and dialogue, ensuring that diverse perspectives contribute to the development of effective solutions.

Furthermore, listening-centred methodologies play a crucial role in sound-driven design, recognizing the significance of attentive listening in understanding and shaping the acoustic landscape. Whether it is designing a public space, optimising workplace environments, or enhancing product experiences, prioritising listening fosters empathy and enables designers to create environments and products that resonate with users on a deeper level (Misdariis & Hug, 2020; Tarlao, Steele, Blanc, & Guastavino, 2023).

However, the effectiveness of designed sounds is not uniform across all listeners. Variations in functional roles within the environment and differing levels of listening attention required for specific tasks can result in varying perceptions and responses to the acoustic environment (Özcan et Al., 2022). Moreover, even among experts experienced in sound-driven design projects, there exists a spectrum of interpretations regarding the concept of "sound" and its implications for design. While some may focus on the technical aspects of acoustics, others may prioritise the emotional and psychological impact of sound on human well-being. This diversity of perspectives enriches the design process but also highlights the complexity of navigating design decisions for the listening experience (Delle Monache, Misdariis, & Özcan, 2022; Hug, 2020).

Therefore, achieving optimal outcomes in sound-driven design necessitates a holistic approach that integrates the insights and contributions of all involved stakeholders. By actively involving users, designers, architects, engineers, and other relevant parties throughout the design process, a more comprehensive understanding of the diverse needs and preferences related to sound can be attained. This collaborative approach not only enhances the quality of design solutions but also fosters a sense of ownership and satisfaction among stakeholders, ultimately leading to more inclusive and impactful outcomes (e.g., Zanella et al., 2022; Misdariis et al., 2022).

Starting from these considerations, the initial call for papers sought works that could offer insights and actionable knowledge on the sound-driven approach to design. Ten papers were accepted, all responding to the call in different ways and showing a clear distinction between the foundations of sound-driven design in theory and methods and how sound-driven design is applied in practice. We arranged the ten papers in two series, based on their more prominent foundational or applied contribution to the design research field, as can be seen below:

1.1 Sound-driven design: Foundations

In the first series, authors explored listening as a central activity and aimed to propose new methods and processes to further advance the field of sound-driven design.

In *Designing [The, With, Against] Sound [For]: Towards A Semantic-oriented Coding Scheme For Protocol Studies In Sound-driven Design*, Delle Monache, Misdariis and Özcan propose a semantic-oriented methodology and coding system for protocol analysis in sound-driven de-

sign. They show how the proposed methodology captures the diversity of sound-driven concepts that support the design process, in a protocol study of a multidisciplinary design team engaged in improving the listening experience in the healthcare context.

In *Augmenting soundscapes of ICUs: a Collaborative approach*, Louwers, Pont, Van der Heide, Gommers, and Özcan investigate design strategies for designing soundscape augmentations within Intensive Care Units (ICUs), based on soundscape perception and fundamental needs. They analysed the conceptual designs produced in a co-design workshop with diverse ICU stakeholders, and found five characteristics for designing effective soundscape augmentation systems for ICUs (personalised, user-friendly, integrated, humanised, and familiar), essential for reshaping the listening experience of the ICU soundscape.

In *Guiding design students to sound-driven design from the base camp of semiotics*, Sanz-Segura and Manchado-Pérez present their perspective on sound-driven design education in the context of the bachelor studies (BSc) in Industrial Design and Product Development Engineering at the University of Zaragoza, Spain. They build on their Design Framework for Audible Alarms, develop several design cases and show how the framework can be effectively used as a conceptual tool in semiotics for design.

In *It sounds sustainable: practices in designing sound for sustainability*, Marentakis and Dal Palù, critically discuss the role of sound and listening in current approaches to designing for sustainability. They provide an overview of successful cases, stressing emerging relations and possible opportunities for research and design amongst the two fields.

In *Towards a Definition of Autographic Sonifications: Listening as an Act of Knowledge*, Lenzi, Ciuccarelli, and Offenhuber tackle the field of data sonification design as a device increasingly used to support and engage experts, researchers and the general public. Building on the analysis of a subset of cases from the Data Sonification Archive, the authors propose a definition of autographic sonification, which foregrounds listening as a central act to making sense of complex phenomena.

1.2 Sound-driven design in action

In the second series, we observe a more practical approach to sound-driven design addressing sound-induced issues and ultimately aiming at societal, industrial or psychological impact for better relationship with sounds encountered in professional, public, artistic and ecological settings, even tackling more than human-approaches.

In *ICU alarm management reimagined: Sound-driven design and the role of acoustic biotope*, Bostan, van Egmond, Gommers, and Özcan investigate the alarm load in an adult ICU, with an emphasis on alarm durations and their impact on actionability on the nursing staff. They devise and assess a design strategy to effectively mitigate false alarms, based on the introduction of alarm delays across various vital parameters, and provide key considerations to implementing alarm delays in alarm management practice.

In *Designing tools for designers: The Data Sonification Canvas*, Lenzi presents and evaluates the Data Sonification Canvas, a design tool intended to support the creation of sonification

designs. A user experience evaluation with 20 participants shows the value and practicality of the tool in meeting the users needs. Areas for further improvement, such as accessibility, terminology, multi-media augmentation, and dynamic templates are discussed.

In *Designing Sound for Public Spaces Through a Research-Creation Collaboration Framework*, Fraisse, Wanderley, Misdariis, and Guastavino tackle the methodological problem of designing and evaluating new sound installations in public spaces. They develop three case studies involving sound artists and soundscape researchers and propose a research-creation collaboration framework that can be used to anticipate the impact of the sound installation on user experience.

In *Designing through ecological soundscape to foster human-nature interaction*, Valsecchi, Chen, and Zhang reflect on the role of listening as a more-than-human approach to observe, map and explore places. They discuss two design projects and exemplify how soundscape can be used not only as a research tool, but also as communication media to stimulate exploration and empathy in human-nature interaction.

In *Acoustic patterns for urban attractors*, Salamanca explores the use of acoustic entrainment as interaction design principle to promote collaborative action. The author explores its application in the context of slow mobility. A system that uses visual cues and rhythmic patterns to gather riders with similar routes around mobile GPS signals is presented and evaluated with eight participants.

All the papers accepted in the theme track highlight the fervour of approaches and perspectives on how listening can be used to inform design decisions in complex projects, and, taken together, reflect the holistic and purposeful nature of design approaches driven by sound.

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About the Authors:

Stefano Delle Monache works on practices, methods and representations for sound-driven design, especially in collaborative, multi-stakeholder settings. He investigates appropriate sound-driven research methodology instrumental to contribute to the understanding of the embodied and multisensory nature of designing.

Nicolas Misdariis investigates the design process at the intersection of environmental sound and soundscape perception, auditory display, human-machine interfaces and interactive sonification. The research collaboration with industrial stakeholders provides the ground for a systematic inquiry of the real-world sound design practice through action research projects.

Elif Özcan works on sound-driven design and research in the fields of mobility, space operations and healthcare. She explores how to shape the sounds and soundscapes of complex environments with multiple listeners and multiple sound sources. Her connections to industry and expertise in sound-driven research makes her approach both fundamental and applied.

Daniel Hug is exploring sound and interaction design through art and design projects, theoretical inquiry and applied research. As an expert in interaction and game sound design, Daniel has a focus on innovation and technology in sound and music education.

Sara Lenzi is a sound designer who enjoys incursions in sound art, and an activist on the importance of sound in communication. She investigates data sonification design and the use of sound to gather insights on datasets and complex phenomena.

Sandra Pauletto works at the intersection of sound and music computing, media production, sound design, sonic interaction design and sonification. She explores sonic augmentation possibilities often with a focus in sustainability and health, and investigates the transfer of established sound production practices to develop novel sound design tools.

Davide Rocchesso is interested in sound modelling, interaction design, and multisensory perception and action. His focus on research-through-design practices in continuous multisensory interaction is aimed at developing sound synthesis models that are perceptually coherent, efficient, and controllable. He has led international research projects on sound modelling, sonic interaction design, and sonic sketching.

Simone Spagnol works on sound processing and representation, binaural technologies, sonic interaction design, and assistive technologies. He is currently exploring design possibilities in the context of acoustic signal recognition in socio-technological environments.