4ᵗʰ International Symposium on the Internet of Sounds

26-27 October 2023, Congress Center "Le benedettine", Pisa, Italy

Organizers

Patronage

Sponsors

Programme

Day 1: October 26th 2023

	Registration, welcome & keynote
8:00 – 9:00	Registration
9:00 – 9:15	Welcome from organizers
9:15 – 10:00	Keynote of Rosa Maria Alsina Pagès: *Transforming Acoustic Environments: Real-time Sensor-Based Monitoring and Artificial Intelligence Applications.*
	Session "Internet of Musical Things" – *chair: Claudia Rinaldi*
10:00 – 10:15	Charles Martin, Alexander Hunter, Brent Schuetze and Yichen Wang. *Composing Interactions for a Networked Touchscreen Ensemble.*
10:15 – 10:30	Rômulo Vieira, Débora Muchaluat-Saade and Pablo César Garcia. *Towards an Internet of Multisensory, Multimedia and Musical Things (Io3MT) Environment.*
10:30 – 10:45	Davide Lionetti, Antonios Pappas, Luca Comanducci, Alberto Bernardini, Massimiliano Zanoni, Augusto Sarti, Matthew Yee-King and Mark d'Inverno. *HandMonizer: a case study for personalized digital musical instrument design.*
10:45 – 11:00	Luiz Naveda. *Exploring musical information through images: a method for leveraging musical iconography to the semantics of internet of things.*
	Coffee break
	Session "Audio & Web" – *chair: Benjamin Matuszewski*
11:30 – 11:45	Chrisoula Alexandraki, Demosthenes Akoumianakis, Dimitris Milios, Alexandros Nousias, Yannis Viglis, Michael Kalochristianakis, Konstantinos Velenis and Maximos Kaliakatsos-Papakostas. *Collaborative score transformations in online music lessons: the MusiCoLab Toolset.*
11:45 – 12:00	Antonio Servetti and Davide Pisanò. *Audio-aware applications at the edge using in-browser WebAssembly and fingerprinting.*
12:00 – 12:15	Chrisoula Alexandraki, Neoklis Mimidis, Yannis Viglis, Alexandros Nousias, Dimitris Milios and Konstantinos Tsioutas. *Collaborative playalong practices in online music lessons: the MusiCoLab Toolset.*
	Session "Internet of Audio Things" – *chair: Maximo Cobos*
12:15 – 12:30	Marcelo Moreno, Nils Peters, Pedro Almeida and Carlos Pernisa Jr.. *Towards a representation model and fog-based device orchestration for audio-centric pervasive storytelling.*
12:30 – 12:45	Marco Giordano, Claudia Rinaldi, Carlo Centofanti and Andrea Marotta. *On the perception of urgency in audition: sound design of an early warning alarm.*
12:45 – 13:00	Alexander Carôt, Thomas Fritz and Katja Englert. *Towards a System Supporting Music Feedback Exercise in Physical Tele-Rehabilitation.*
	Lunch
	Poster Session
14:00 – 15:00	• Matthew Peachey and Joseph Malloch. *FAUSTMapper: Facilitating Complex Mappings for Smart Musical Instruments.* • Matuszewski Benjamin and Golvet Aliénor. *Rapid Prototyping of Distributed Musical Things using Web Technologies.*

- Luca Turchet, Flavio Vella and Sandro Luigi Fiore. *The potential of high-performance computing for the Internet of Sounds.*
- Marco Tiraboschi, Stefano Papetti and Federico Avanzini. *Just a Sounding Object Notation: Sharing Objects for Sonic Interaction Design with JSON and OSC.*
- Luca Turchet and Paolo Casari. *Assessing a Private 5G SA and a Public 5G NSA Architecture for Networked Music Performances.*
- Marco Olivieri, Federico Simeon, Luca Comanducci, Fabio Antonacci and Augusto Sarti. *JumpApp: an online didactic game for music training and education.*
- Matteo Sacchetto, Maria Sangüesa, Piera Bagnus, Chiara Nicora and Cristina Rottondi. *Collection of Design Directions for the Realization of a Visual Interface with Haptic Feedback to Convey the Notion of Sonic Grain to DHH Students.*
- Domenico Stefani and Luca Turchet. *Real-Time Embedded Deep Learning on Elk Audio OS.*
- Luca Borgianni, Md Sabbir Ahmed, Davide Adami and Stefano Giordano. *Spectrogram Based Bee Sound Analysis with DNNs: a step toward Federated Learning approach.*
- Rosa Ma Alsina-Pagès, Marc Freixes, Daniel Bonet-Solà, Ester Vidaña-Vila, Carlos Guerrero and Xavier Sevillano. "*Sons al Balcó*": Empowering Citizens in Assessing Urban Soundscapes and Quiet Zones.*
- Diego Bert, Nicola Domini, Riccardo Peloso, Leonardo Severi, Matteo Sacchetto, Andrea Bianco and Cristina Rottondi. *FPGA-based Low-Latency Audio Coprocessor for Networked Music Performance.*
- Maria Mannone and Luca Turchet. *Theoretical Quantum Modeling of Improvisation in Networked Music Performances to Regulate the Behaviour of Artificial Musicians.*

Session "Wireless Acoustic Sensor Networks & Auditory Scene Analysis" – *chair: Nils Peters*	
15:00 – 15:15	Jesus Lopez-Ballester, Jaume Segura, Santiago Felici and Maximo Cobos. *An AI-IoT Platform for Psycho-Acoustic Annoyance Assessment on the Edge.*
15:15 – 15:30	Luca Serafini, Valeria Bruschi, Stefano Nobili, Emanuele Principi, Stefania Cecchi and Stefano Squartini. *Joint Detection and Active Cancellation of Snoring Signals in Real-Time.*
15:30 – 15:45	Amir Latifi Bidarouni and Jakob Abeßer. *Unsupervised Feature-Space Domain Adaptation applied for Audio Classification.*
15:45 – 16:00	Lam Pham, Dat Ngo, Tin Nguyen, Alexander Schindler, Anahid Jalali and Phat Lam. *Light-Weight Deep Learning Models for Acoustic Scene Classification Using Teacher-Student Scheme and Multiple Spectrograms.*
Session "Packet Loss Concealment Methods" – *chair: Sacha Krstulovic*	
16:00 – 16:15	Luca Vignati, Stefano Dallona and Luca Turchet. *PLC Testbench: a modular tool for the study and comparison of audio Packet Loss Concealment algorithms.*
16:15 – 16:30	Carlo Aironi, Samuele Cornell, Leonardo Gabrielli and Stefano Squartini. *A Score-aware Generative Approach for Music Signals Inpainting.*
Coffee break	
Demo session	
17:00 – 19:00	- Leonardo Severi, Matteo Sacchetto, Andrea Bianco, Cristina Rottondi, Aleksandra Knapińska and Piotr Lechowicz. *Demonstration of a Networked Music Performance Experience with MEVO.* - Michel Buffa, Quentin Plet and Antoine Vidal Mazuy. *Web Audio Modules: Swiss knife for audio plugin developments on the Web Platform.* - Nishal Silva. *Demo of a smart musical instrument-based real time pattern detection system.* - Domenico Stefani. *A Guide to Real-Time Embedded Deep Learning Deployment for Elk Audio OS.*

	• Luca Vignati. *PLC Testbench: a modular tool for the study and comparison of audio Packet Loss Concealment algorithms.* • Mauro Galbiati, Nicola Gualandris and Federico Laini. *New evolution (excerpt from "Allegro non troppo" by Bruno Bozzetto).* • Serkan Sevilgen. *Gendy Cloud.* • Alberto Boem. *Web-Browser based prototypes for exploring Musical Metaverse Experiences.* • Matteo Tomasetti. *Demo of Nautilus-shaped VR Auditorium: Navigation in Virtual Reality as an approach to interactive and immersive music composition.* • Gabriel Zalles Ballivian. *Bits: a Permanent Virtual Installation.* • Sophia Ppali and Alexandra Covaci. *Crafting melodies in Virtual Spaces: A VR prototype for encouraging creative musical practice.*
Social Dinner	
20:00 –	Restaurant "Ristorante Quore" - Via del Cuore, 1, 56100 Pisa PI.

Day 2: October 27ᵗʰ 2023

Registration & keynote	
8:00 – 9:00	Registration
9:00 – 9:45	Keynote of Cristina Rottondi: *Inclusiveness in Remote Music Teaching and Networked Music Performances: Vision, Technological Requirements and Open Challenges.*
International Workshop on Networked Immersive Audio – *chair: Michel Buffa*	
9:45 – 10:00	Kurt Mikolajczyk, Sam Trolland, Alon Ilsar, Sam Ferguson, Jon McCormack and Oliver Bown. *Gestural Interactions with Object-Based Audio in an Internet of Sounds Ecosystem.*
10:00 – 10:15	Federico Martusciello, Carlo Centofanti, Claudia Rinaldi and Andrea Marotta. *Edge-Enabled Spatial Audio Service: Implementation and Performance Analysis on a MEC 5G Infrastructure.*
10:15 – 10:30	Alberto Boem and Luca Turchet. *Musical Metaverse Playgrounds: exploring the design of shared virtual sonic experiences on web browsers.*
10:30 – 10:45	Francesco Zumerle, Luca Comanducci, Massimiliano Zanoni, Alberto Bernardini, Fabio Antonacci and Augusto Sarti. *Procedural music generation for videogames conditioned through video emotion recognition.*
10:45 – 11:00	Damian Dziwis, Henrik von Coler and Christoph Pörschmann. *Live Coding in the Metaverse.*
Coffee break	
Poster Session	
11:30 – 12:15	• Cárthach Ó Nuanáin, Kevin O'Mahony, Kevin Maye, Andrew de Juan, Joseph Clarke, Hugh McCarthy, Sara Morrissey Tucker and Mike Griew. *Réaltacht: Creating Immersive and Accessible Experiences of Irish Traditional Music in Virtual Reality.* • Rory Hoy and Doug Van Nort. *Towards Accessible and Embodied Control of Telematic Sonic Space Through Browser-Based Facial Tracking.* • Mattia Mazzocchio. *Design and Implementation of an immersive, cooperative Net Art installation using Web Csound.* • Jingjing Tang, Geraint Wiggins and Gyorgy Fazekas. *Pianist Identification Using Convolutional Neural Networks.* • Michele Rossi, Giovanni Iacca and Luca Turchet. *Explainability and Real-Time in Music Information Retrieval: Motivations and Possible Scenarios.*

	• William Wilson, Niccolò Granieri and Islah Ali-MacLachlan. *Ubiquitous Multimodality as a Tool in Violin Performance Classification.* • Matthew Peachey, Joseph Malloch and Sageev Oore. *Creating Latent Representations of Synthesizer Patches using Variational Autoencoders.* • Ève Poudrier, Bryan Jacob Bell, Jason Yin Hei Lee and Craig Stuart Sapp. *Listeners' Perceived Emotions in Ordered vs. Randomized Musical Excerpts.*

Panel – *chair: Luca Turchet*	
12:15 – 13:00	Panel on *Networked Immersive Audio: opportunities and challenges*

Lunch	

Tutorial	
14:00 – 15:00	Tutorial "Immersive Social Audio in the Web" by Atmoky

International Workshop on Multilayer Music Representation and Processing – *chair: Marco Tiraboschi*	
15:00 – 15:15	Adriano Baratè, Goffredo Haus, Luca Andrea Ludovico and Davide Andrea Mauro. *Towards the Future of Multi-Layer Music Encoding: The IEEE 1599 V2.0 Draft.*
15:15 – 15:30	Nicole Cosme-Clifford, James Symons, Kavi Kapoor and Christopher Wm. White. *Musicological Interpretability in Generative Transformers.*
15:30 – 15:45	Oliver Hödl, Dennis Gubbels, Oleksandr Shabelnyk and Peter Reichl. *Improving a real-time music alignment algorithm for opera performances.*
15:45 – 16:00	Hendrik Vincent Koops, Gianluca Micchi, Ilaria Manco and Elio Quinton. *SERENADE: A Model for Human-in-the-Loop Automatic Chord Estimation.*
16:00 – 16:15	Joséphine Calandra, Jean-Marc Chouvel, Myriam Desainte-Catherine and Erwan Michel. *Visualisation of Multi-scaled Formal Diagrams for Music Analysis.*
16:15 – 15:30	Matěj Ištvánek, Štěpán Miklánek, Klára H. Mühlová, Lubomír Spurný and Zdeněk Smékal. *How to Utilize Computational Methods for Comparative Music Analysis.*

Coffee break	

Closing Ceremony	
17:00 – 17:30	• Awards • Announcements • Acknowledgements

Keynote speakers

Rosa Maria Alsina Pagès - Department of Engineering Human-Environment Research, La Salle Campus Barcelona - Ramon Llull University

Keynote title: *"Transforming Acoustic Environments: Real-time Sensor-Based Monitoring and Artificial Intelligence Applications"*

Abstract: The implementation of real-time, in-situ acoustic event detection through sensor technology has the potential to significantly impact our understanding of acoustic environments across diverse settings, ranging from the solitude of an elderly individual's home to a bustling cow farm or a noisy intersection in Barcelona. Leveraging artificial intelligence, spanning from cutting-edge Convolutional Neural Networks (CNNs) to traditional Gaussian Mixture Models (GMMs), thoughtfully trained on meticulously curated and analyzed datasets, offers wide range of capabilities of monitoring. This technology can serve multiple purposes, including assisting farmers in assessing the well-being and, consequently, milk production levels of their livestock, or to facilitate unobtrusive daily behavior monitoring at home. Furthermore, it can aid in monitoring traffic and recreational noise, thus informing urban

planning decisions in dynamic urban settings like Barcelona. The affordability and computational capacity of prototypable, low-cost acoustic sensors, though not yet widely commercialized, bridge the gap between laboratory research and practical implementation, ushering us closer to integrating noise reduction into everyday life while prioritizing sound quality.

Bio: Dr. Rosa Ma Alsina-Pagès is nowadays Director of Research and Innovation and Associate Professor in La Salle - URL. The executive area she leads has the vocation of improving the research and the technology transfer and the innovation of the university adding the value of real-world challenges and knowledge to teaching and students. Dr. Alsina-Pagès is a Engineer in Electronics and Telecommunications (2002 and 2004 respectively), from La Salle-URL, Graduate in Humanities from the UOC (2012), Master in Project Management from La Salle - URL (2003). She is also a Doctor in ICT and its management by the URL, with Cum Laude, in 2012. Her track in research belongs nowadays to acoustic event detection and the impact on sound on people and animals, and its implementation in real-time, and is leading 4 public and private funded projects on that topic. She has published more than 54 JCR and Scopus indexed journals. She is member of the organizing committee of Urban Sound Symposium, and has lead Special Sessions about AI and Acoustics and Environment in several conferences, as Internoise or Forum Acusticum.

Cristina Rottondi - Department of Electronics and Telecommunications, Politecnico di Torino

Keynote title: *Inclusiveness in Remote Music Teaching and Networked Music Performances: Vision, Technological Requirements and Open Challenges*

Abstract: The talk will provide an overview on inclusiveness in remote music education and networked music performances, highlighting issues and difficulties encountered by users with visual, auditory or motor disabilities when approaching such practices. It will also review currently available technological solutions that can be leveraged to enhance the accessibility of web-based platforms for online music teaching and remote performances. The talk will then discuss the integration of such technological solutions in a networked music performance framework and their potential benefits for various categories of disabled users.

Bio: Cristina Rottondi is Associate Professor with the Department of Electronics and Telecommunications of Politecnico di Torino (Italy). Her research interests include optical networks planning and networked music performance. She received both Bachelor and Master Degrees "cum laude" in Telecommunications Engineering and a PhD in Information Engineering from Politecnico di Milano (Italy) in 2008, 2010 and 2014 respectively. From 2015 to 2018 she had a research appointment at the Dalle Molle Institute for Artificial Intelligence (IDSIA) in Lugano, Switzerland. She is co-author of more than 100 scientific publications in international journals and conferences. She served as Associate Editor for IEEE Access from 2016 to 2020 and is currently Associate Editor of the IEEE/OSA Journal of Optical Communications and Networking. She is co-recipient of the 2020 IEEE Charles Kao award, of the 2022 Journal of the Audio Engineering Society best paper award, of three conference best paper awards (FRUCT-IWIS 2020, DRCN 2017, GreenCom 2014), and of one excellent conference paper award (ICUFN2017).

Organizing Committee

- Stefano Giordano (University of Pisa)
- Gregorio Procissi (University of Pisa)
- Nils Peters (University of Erlangen-Nürnberg and Fraunhofer IIS)
- Sacha Krstulovic (Independent AI consultant)
- Claudia Rinaldi (CNIT – National Inter-University Consortium for Telecommunications)
- Benjamin Matuszewski (IRCAM)
- Chrisoula Alexandraki (Hellenic Mediterranean University)
- Luca Borgianni (University of Pisa)
- Luca Turchet (University of Trento)

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