

Riccardo Simionato, PhD

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NATIONALITY: Italian

Researcher specializing in machine learning for time-dependent data, combining deep learning and signal processing with expertise in temporal modeling, differentiable signal processing, generative modeling, physics-informed modeling, and discrete representation learning. My work focuses on audio signals and symbolic representations, and spans international collaborations, academic leadership, and 8+ publications in high-impact journals (JAES, EURASIP) and conferences (DAFx, AES).

Employment

- 01/2026 – 01/2027** **Post-Doc**, at University of Bordeaux (Scrimex), *Bordeaux, France*
- Automatic Audio to Tablature Transcription
- Tablature to Guitar Synthesis
- 09/2024 – 09/2025** **Research Grant** at University of Oslo, *Oslo, Norway*
- Advanced research in machine learning for audio applications
- Teaching responsibilities in audio technology and research methods
- 02/2019 – 08/2021** **Associate Consultant** at Siemens, *Milan, Italy*
- Developed enterprise software solutions using C, Java, and PL/SQL
- Enhanced project management and cross-functional collaboration skills
- 05/2018 – 08/2018** **Junior Consultant** at Dacomat Srl, *Treviso, Italy*
- Full-stack development and project management experience
- Programming in Java and PL/SQL for enterprise applications

Education

- 09/2021 – 09/2024** **PhD**, at University of Oslo, *Oslo, Norway*
Dissertation: *Neural Modeling of Musical Devices*
- 10/2015 – 09/2018** **M.Sc.** in Computer Science Engineering, at University of Padova, *Padova, Italy*
Dissertation: *Numerical Simulation of a Tube-Delay Audio Effect*
- 10/2011 – 07/2015** **B.Sc.** in Information Engineering, at University of Padova, *Padova, Italy*
Dissertation: *Auditory Display to Mobility Aid for Visually Impaired*

Other Experience

- 05/2025 – 06/2025** **Researcher Visitor** at Universitat Pompeu Fabra, *Barcelona, Spain*
- Generative modeling techniques for audio processing and synthesis
- Conditioning techniques for machine learning models
- 08/2017 – 01/2018** **Researcher Visitor** at Aalto University, *Helsinki, Finland*
- Research project on modeling of audio delay effect
- Acoustic measurements and DSP algorithm design
- 08/2017 – 01/2018** **Erasmus Student** at Universitat Politècnica de Catalunya, *Barcelona, Spain*
MSc in Innovation and Research in Informatics and AI

Technical Contributions

- 8+ DATASETS DESIGN, collection, and curation involving acoustic and electronic measurements
- Public software for automatic dataset collection from audio sources and processors
- OPEN-SOURCE CODE of specialized approaches for nonlinear and time-dependent systems (novel architectures, training procedures, and dataset management)

- NOVEL physics-informed-based machine learning modeling
- PUBLIC REAL-TIME SOFTWARE (VST) emulating various audio processing

Research achievements

- Developed a novel neural network architecture achieving state-of-the-art performance in modeling dynamic range compression effects, demonstrating improved accuracy and real-time capability compared to existing approaches [1, 6].
- Conceived and implemented a hybrid modeling framework combining physics-based constraints with neural network architectures for acoustic instrument synthesis. This novel approach enables high-fidelity instrument emulation with reduced data requirements by integrating signal processing principles and physics knowledge [3, 4].
- Co-designed and developed an open-source Max patch application for systematic collection of paired audio datasets, including audio effects transformations. This tool facilitates dataset creation for machine learning research in audio processing [8].
- Pioneered a novel neural approach for creating hybrid audio effects by learning and interpolating across multiple audio processing behaviors in a continuous latent space. This methodology expands creative possibilities in sound design through intuitive control of effect morphing [7].

Technical Expertise

Audio & Signal Processing

- Digital Signal Processing
- Audio analysis & synthesis
- Music Information Retrieval
- Virtual analog and physical modeling
- Acoustic measurements & Farina method

Software Development

- Python, C/C++, Java, MATLAB
- Audio Development (JUCE, VST, ONNX)
- Database (PL/SQL)

Machine Learning & AI

- PyTorch, TensorFlow
- Diffusion, VAEs, DDSP, RQVAE
- State-space, Transformers, U-Net
- Pruning, Distillation Knowledge

Music

- Audio production, mixing, mastering
- Music Theory

Research Interests

- Machine and deep learning for temporal data
- Sound synthesis and analog audio modeling
- Physics-based sound synthesis and acoustics
- Audio-symbolic representation learning

Selected Publications

Journal Articles (Peer-Reviewed):

- [1] MODELING TIME-VARIANT RESPONSES OF OPTICAL COMPRESSORS WITH SELECTIVE STATE SPACE MODELS. **Simionato Riccardo** & Fasciani Stefano. In: *Journal of Audio Engineering Society*, vol. 73, no. 3, 2025. <https://aes2.org/publications/elibrary-page/?id=22808>
- [2] COMPARATIVE STUDY OF STATE-BASED NEURAL NETWORKS FOR VIRTUAL ANALOG AUDIO EFFECTS MODELING. **Simionato Riccardo** & Fasciani Stefano. In: *EURASIP Journal on Audio, Speech, and Music Processing*, 2025, doi: [10.1186/s13636-025-00416-3](https://doi.org/10.1186/s13636-025-00416-3).
- [3] PHYSICS-INFORMED DIFFERENTIABLE METHOD FOR PIANO MODELING. **Simionato Riccardo**, Fasciani Stefano & Holm Sverre. In: *Frontiers in Signal Processing*, volume 3, 2024, doi: [10.3389/frsip.2023.1276748](https://doi.org/10.3389/frsip.2023.1276748).
- [4] SINE, TRANSIENT, NOISE NEURAL MODELING OF PIANO NOTES. **Simionato Riccardo** & Fasciani Stefano. In: *Frontiers in Signal Processing*, vol. 3, 2025, [10.3389/frsip.2024.1494864](https://doi.org/10.3389/frsip.2024.1494864).

Conference Proceedings (Peer-Reviewed):

- [5] COMPRESSING NEURAL NETWORK MODELS OF AUDIO DISTORTION EFFECTS USING KNOWLEDGE DISTILLATION TECHNIQUES. **Simionato Riccardo** & Aleksander Tidemann. In: *Proc. of the AES International Conference on Artificial Intelligence and Machine Learning for Audio, London, UK*.
- [6] FULLY CONDITIONED AND LOW-LATENCY BLACK-BOX MODELING OF ANALOG COMPRESSION. **Simionato Riccardo** & Fasciani Stefano. In: *Proceedings of the 26th International Conference on Digital Audio Effects (DAFx20in23)*, Copenhagen, Denmark, https://www.dafx.de/paper-archive/2023/DAFx23_paper_10.pdf
- [7] HYBRID NEURAL AUDIO EFFECTS. **Simionato Riccardo** & Fasciani Stefano. In: *Proc. of the 19th Sound and Music Computing Conference (SMC24)*, Porto, Portugal, doi: [10.5281/zenodo.14361818](https://doi.org/10.5281/zenodo.14361818).
- [8] A UNIVERSAL TOOL FOR GENERATING DATASETS FROM AUDIO EFFECTS. Fasciani Stefano, **Simionato Riccardo** & Tidemann Aleksander. In: *Proc. of the 19th Sound and Music Computing Conference (SMC24)*, Porto, Portugal, doi: [10.5281/zenodo.14362474](https://doi.org/10.5281/zenodo.14362474).

Academic Service & Leadership

Editorial & Review Activities

- Reviewer for *Frontiers in Signal Processing* (2024)
- Program Committee Member of DAFx (2019 - 2025)
- Program Committee Member of AIMC (2022 - 2025)
- Program Committee Member of AES (2025)
- Reviewer for ICASSP (2026)

Conference Organization

- Workshop Convenor:
“Embodied Perspectives on Musical AI (EmAI)”
University of Oslo, 21-22 November 2022

Teaching & Mentorship

- Supervision of Master’s Students (2022-2023)*
Teaching at University of Oslo, Department of Musicology:
- “Sensing Sound and Music” (Music technology),
 - “Master’s thesis in musicology” (Research Methods)

Invited Presentations

- “AI in System Modelling” *Norwegian Toll gathering* (26-06-2022)
- “Black Box Model of Audio Compressors” *Italian Music Tech Meetup* (27-06-2023)
- “Neural Modeling of Musical Devices” *University of Milan* (23-09-2025)

Language Skills

Italian (Native), English (Full professional), Spanish (Basic), German (Basic)