

# Luca Comanducci

RESEARCH FELLOW

✉ [lucascomanducci@gmail.com](mailto:lucascomanducci@gmail.com) | 🏠 [lucacoma.github.io](https://lucacoma.github.io) | 📷 [lucacoma](https://www.instagram.com/lucacoma) | 📺 [lucacomanducci](https://www.youtube.com/channel/UCv33333333333333333333)

## Education

### Politecnico di Milano

#### PH. D. INFORMATION TECHNOLOGY

- Advisor: Prof. Augusto Sarti
- Thesis title: Intelligent networked Music PERforMANce Experiences (IMPERMANENCE)
- Final Grade: cum laude

Milan, Italy

Nov 2018 - March 2022

### Politecnico di Milano

#### M.Sc. IN COMPUTER SCIENCE AND ENGINEERING

- Advisor: Prof. Fabio Antonacci
- Thesis title: Convolutional neural networks applied to space-time audio processing applications
- Final Grade: 110/110

Milan, Italy

Oct. 2015 - April 2018

### Università degli Studi di Milano

#### B.Sc. IN MUSIC INFORMATION SCIENCE

- Advisor: Prof. Luca Andrea Ludovico
- Thesis title: Physical modeling audio synthesis using Max/Msp
- Final Grade: 102/110

Milan, Italy

Oct. 2011 - Oct. 2014

## Professional Experience

- July 2024- Ongoing    **Research Fellow (Ricercatore a Tempo Determinato di tipo A)**, at DEIB, Politecnico di Milano, Italy. **Main research topics: fake music detection and attribution [U1].**
- April 2022-July 2024    **Post Doctoral Researcher (Assegnista di Ricerca)**, at DEIB, Politecnico di Milano, Italy. **Main topics: Generative models applied to spatial audio [C3] and to text-to-audio [C5,C6]**

## Selected Publications

Full publication list available on [Google Scholar](#), [Scopus](#) and [Web of Science](#).

### INTERNATIONAL JOURNALS

- [J3] Miotello, F., Pezzoli, M., **Comanducci, L.**, Antonacci, & Sarti, A. (2023). **Deep Prior-based Audio Inpainting Using Multi-Resolution Harmonic Convolutional Neural Networks**, accepted, in publication at *IEEE/ACM Transactions on Audio, Speech, and Language Processing*
- [J2] **Comanducci, L.**, Gioiosa, D., Zanoni, et al. (2023) **Variational Autoencoders for Chord Sequence Generation Conditioned on Western Harmonic Music Complexity**, *EURASIP Journal on Audio, Speech, and Music Processing*
- [J1] **Comanducci, L.**, Bestagini, P., Tagliasacchi, M., Sarti, A., & Tubaro, S. (2021). **Reconstructing speech from cnn embeddings**, *IEEE Signal Processing Letters*, 28, 952-956.

### INTERNATIONAL CONFERENCES

- [C6] Colombo, M. F., Ronchini, F., **Comanducci, L.**, & Antonacci, F. (2024). **MambaFoley: Foley Sound Generation using Selective State-Space Models**, accepted to *2025 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*
- [C5] Ronchini, F., **Comanducci, L.**, & Antonacci, F. (2024). **Synthetic training set generation using text-to-audio models for environmental sound classification**, accepted to *2024 Detection and Classification of Acoustic Scenes and Events (DCASE) workshop, Tokyo, Japan*
- [C4] **Comanducci, L.**, Antonacci, F., & Sarti, A. (2024). **Interpreting End-to-End Deep Learning Models for Speech Source Localization Using Layer-wise Relevance Propagation**, *2024 32nd European Signal Processing Conference (EUSIPCO)*
- [C3] Miotello, F., **Comanducci, L.**, Pezzoli, M., Bernardini, A., Antonacci, F., & Sarti, A. (2024). **Reconstruction of Sound Field through Diffusion Models**. *IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP) 2024*
- [C2] **Comanducci, L.**, Antonacci, F. & Sarti, A. **Timbre transfer using image-to-image denoising diffusion implicit models**, accepted at *24th International Society for Music Information Retrieval (ISMIR 2023)*, 2023.
- [C1] **Comanducci, L.**, Cobos, M., Antonacci, F., & Sarti, A. **Time difference of arrival estimation from frequency-sliding generalized cross-correlations using convolutional neural networks**. In *ICASSP 2020-2020 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)* (pp. 4945-4949). IEEE.

## PREPRINTS/UNDER REVIEW

[U1] **Comanducci, L.**, Bestagini, P. & Tubaro, S. (2024). **FakeMusicCaps: a Dataset for Detection and Attribution of Synthetic Music Generated via Text-to-Music Models**, [arXiv preprint arXiv:2409.10684](#).

## Participation in International Research Projects

2018-2020	INTERMUSIC (INTERactive environment for MUSIC learning and practising), Erasmus +,	Politecnico di Milano
2022-2025	REPERTORIUM (Researching and Encouraging the Promulgation of European Repertory through Technologies Operating on Records Interrelated Utilising Machines ), Horizon,	Politecnico di Milano

## Collaborations with the industry

2024-2025	Undisclosed company, Topic: Engine-sound generation.
2023-2024	<a href="#">Samplesound</a> , Topic: text-to-music generative models.
2022	<a href="#">INVENTVM</a> , Topic: Piezoelectric loudspeakers modeling.
2021-2022	<a href="#">BdSound</a> , Topic: Speech source separation using deep learning.
2020-2021	<a href="#">Google Research Zurich</a> , Topic: Reconstruction of speech from CNN embeddings. [J1]

## Skills

**Programming Languages:** Python, MATLAB. **Libraries/Frameworks:** Tensorflow, PyTorch,  $\text{\LaTeX}$  **Languages:** Italian, English, Spanish

## Teaching Assistantships

2019 - now	Creative Programming and Computing - Module 2: Generative AI for art, (M.Sc)	Politecnico di Milano
2022 - now	Music and Acoustic Engineering Capstone, (M.Sc)	Politecnico di Milano
2019-2022	Musical Acoustics - Module 1: Modeling Of Musical Instruments, (M.Sc)	Politecnico di Milano

## Awards, Fellowships, & Grants

2022	Springer Award for the Ph.D. thesis, Politecnico di Milano IT PhD Board of professors
2020	Young Researcher Award, 1st International Workshop on the Internet of Sounds

## Supervision

Supervision of 7 M.Sc. theses and Co-supervision of 13 M.Sc. theses. Full list available [here](#).

## Organization of Events

5-9 Nov	24th International Society for Music Information Retrieval Conference (ISMIR),	Milan
2023	Organizing Committee, Virtual Technology, Social Media and Website	

## Reviewer

**International Journals:** Eurasip Journal on Audio, Speech, and Music Processing ; IEEE Signal Processing Letters; IEEE/ACM Transactions on Audio, Speech, and Language Processing **International Conferences:** IEEE International Conference on Acoustics, Speech, and Signal Processing, IEEE Workshop on Applications of Signal Processing to Audio and Acoustics, European Signal Processing Conference, Audio Mostly, DCASE workshop, Interspeech, NIME, International Society for Music Information Retrieval Conference.

## Professional Memberships

IEEE Member; IEEE Signal Processing Society.

**OTHER ACADEMIC SERVICES** Mentor, Women in Music Information Retrieval (WiMIR) mentoring program 2024, 2025