

Bernardo Torres

<https://bernardotorres.net> | github.com/bernardo-torres | [linkedin](https://www.linkedin.com/in/bernardotorres) | [Google Scholar](https://scholar.google.com/citations?user=...)

Researcher in Machine Learning with expertise in audio applications. I have conducted research in the intersection between signal processing, deep learning, unsupervised and self-supervised learning with published works in music information retrieval, audio source separation and generative modeling.

Education

Telecom Paris, Institut Polytechnique de Paris

Paris, France

Ph.D. in Machine Learning and Signal Processing for Audio and Music

2023 – Jul. 2026 (expected)

- Thesis: *Structure-Guided Learning for Audio Analysis under Low Supervision*
- Research in unsupervised and self-supervised learning for audio analysis, music source separation, and music information retrieval.
- Advisors: [Prof. Geoffroy Peeters](#), [Prof. Gaël Richard](#)

École Normale Supérieure Paris-Saclay

Gif-sur-Yvette, France

M.S. in Computer Science and Applied Mathematics (MVA). **Highest honors.**

2021–2022

- MVA (Mathematics, Vision and Learning) — top AI research master in France.
- Coursework: Deep Learning, Time Series, Audio & Speech Processing, Computer Vision.

Telecom Paris, Institut Polytechnique de Paris

Paris, France

Engineering Diploma & B.S. in Computer Science. **GPA: 4.0/4.0.**

2020–2021

- Majors: Machine Learning, Signal Processing, and Embedded Systems.

Federal University of Minas Gerais (UFMG)

Belo Horizonte, Brazil

B.S. in Electrical Engineering

2016–2022

- Electrical, Electronics, and Computer Engineering.

Work Experience

Deezer

Paris, France

Research Scientist Intern

Apr. 2025 – Jul. 2025

- Investigated diffusion model objectives for audio compression
- Designed a training strategy to induce linear geometric structure in the latent space, enabling latent arithmetic for audio manipulation; published at ICASSP 2026.
- Advisor: [Gabriel Meseguer-Brocal](#)

Sony Computer Science Laboratories

Paris, France

Research Scientist Intern

Apr. 2022 – Sep. 2022

- Developed and benchmarked self-supervised foundation models for singing voice representation learning, exploring contrastive, VICReg, and uniformity-alignment objectives; published at ISMIR 2023.
- Advisor: [Stefan Lattner](#)

Radix Engineering and Software

Belo Horizonte, Brazil

Data Science Intern

Jul. 2019 – May 2020

- Developed and deployed LSTM networks for multivariate time series analysis and anomaly detection in industrial sensor data.

Publications

Journal Articles

- **Torres, B.**, Peeters, G. and Richard, G., The Inverse Drum Machine: Source Separation Through Joint Transcription and Analysis-by-Synthesis. *IEEE/ACM Transactions on Audio, Speech, and Language Processing (TASLP)*, 2025.
- Riou, A., **Torres, B. (co-first author)**, Hayes, B., Lattner, S., Hadjeres, G., Richard, G., and Peeters, G., PESTO: Real-Time Pitch Estimation with Self-supervised Transposition-equivariant Objective. *Transactions of the International Society for Music Information Retrieval (TISMIR)*, 2025.

Conference Papers

- **Torres, B.**, Moussallam, M., and Meseguer-Brocal, G., Learning Linearity in Audio Consistency Autoencoders via Implicit Regularization. *IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, 2026.

- **Torres, B.**, Peeters, G. and Richard, G., Unsupervised Harmonic Parameter Estimation Using Differentiable DSP and Spectral Optimal Transport. *IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, 2024.
- Richard, G., Chouteau, P. and **Torres, B.**, A Fully Differentiable Model for Unsupervised Singing Voice Separation. *IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, 2024.
- **Torres, B.**, Lattner, S. and Richard, G., Singer Identity Representation Learning using Self-Supervised Techniques. *International Society for Music Information Retrieval Conference (ISMIR)*, 2023.

Teaching Experience

Telecom Paris, Institut Polytechnique de Paris

Paris, France

Teaching Assistant

2023–Present

Deep Learning I — IP Paris Data Science M.S. program

TSIA 201 Signal Processing

TSIA 206 Speech and Audio Processing

TSIA 203 Introduction to Deep Learning

Awards & Scholarships

CAPES Foundation (Brazil)

BRAFITEC Excellence Double-Degree Scholarship

2020–2022

Skills

Deep Learning: PyTorch, TensorFlow, self-supervised learning, generative models

Audio & Signal Processing: torchaudio, librosa, SciPy, differentiable DSP, spectral analysis, music source separation, music information retrieval (MIR)

Programming Languages: Python, C, C++

Research/ML Infrastructure: Git, Docker, Slurm, Hydra, Weights & Biases, Linux

Spoken Languages: Portuguese (native), English (fluent, C2), French (fluent), Spanish (B2)

Interests: Music, sound synthesis, bioacoustics, electronic music production and mixing