David Valdivia

2nd year PhD student, Audio signal processing and optimal transport, Univ. of Toulouse
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Education

PhD in Audio Signal Processing, IRIT / Univ. Toulouse, France (2024/27 expected)
- Research: applications of optimal transport for audio
- **MESRI-funded doctoral fellowship** (French Ministry of Higher Education and Research), obtained via competitive selection
- Supervisors: Cédric Févotte, Elsa Cazelles

MSc in Artificial Intelligence, PSL University, Paris, France (2023/24)

Diplôme d'ingénieur (equiv. MEng), ISAE-Supaéro, Toulouse, France (2018/22)

Work experience

Data analyst (apprentice), Qobuz - Paris (Oct 2023 - Sep 2024)
- Implemented z-score–based anomaly detection to flag abnormal coupon usage patterns
- Built Looker dashboards on Snowflake (SQL + Python) regarding music streaming usage
- Documented the Snowflake database to support non-technical users

Natural language understanding, SoundHound Inc. - Paris (May 2022 - Mar 2023)
- Implemented C++ NLU interface based on ASR string outputs.
- Built and maintained multilingual commands (English/French/Spanish).
- Developed an internal website enabling spoken input to be routed to the C++ NLU component.

Test software developer (intern), Ableton AG - Berlin (Sep 2020 - Feb 2021)
- Developed hardware test software for a music controller's pad using C and Python.
- Implemented test cases and automation scripts to validate the pad's behavior.
- Wrote documentation describing each test.

Publications

D. Valdivia, M. Renaud, E. Cazelles, C. Févotte, *"Audio signal interpolation using optimal transportation of spectrograms"*, 2025 IEEE Statistical Signal Processing Workshop (SSP), Edinburgh, United Kingdom, 2025, https://arxiv.org/abs/2502.15430

- Proposed unsupervised audio morphing method based on optimal transport barycenters of time-frequency energy distributions.
- Introduced a cost matrix that forbids large temporal displacements, leading to a sparse representation that scales to high-sample-rate and multi-second signals.
- **Best student paper award** (finalist): https://2025.ieeessp.org/best-paper-awards/
- **Code**: https://github.com/davidvaldiviad/audio-signal-interpolation-ot
- **Demo with sounds**: https://davidvaldiviad.github.io/audio-signal-interpolation-ot/
- **Poster** presented at IEEE SSP 2025, Edinburgh, United Kingdom
- **Talk** given at GDR-IASIS day on Optimal Transport, 2025, Lyon, France

Skills

Computer stack: Python (NumPy, SciPy, Matplotlib, Librosa), C, C++, CMake, Git, Bash, Linux/macOS, MATLAB, SQL
Languages: English - 990/990 TOEIC (April 2024), Spanish - bilingual, French - bilingual
Audio practice: musician, familiarity with timbre, pitch and harmonics, good listening skills

Teaching experience

Algorithms and data structures in C, ISAE-Supaéro, Toulouse, France
Statistics, ENSEEIHT, National Polytechnic Institute of Toulouse, Toulouse, France
Introduction to Matlab, ENSEEIHT, National Polytechnic Institute of Toulouse, Toulouse, France