

Max Graf

max.graf@live.at / [website](#) / [portfolio](#) / [GitHub](#)

Music AI researcher specialising in deep learning for music analysis, generation, and interactive music systems. Currently ML Engineer for the EU-funded CORPUS project. PhD in AI & Music from C4DM at Queen Mary University of London, with experience building generative models, music metadata pipelines, XR musical instruments, and AI-powered tools for sample exploration. Strong background across PyTorch, audio ML, real-time interaction, and creative music technology.

Core Skills

Music AI / Audio ML: music generation, MIR, metadata extraction; diffusion, language model (LM), and state-space (SSM) architectures; source separation, semantic search

ML Engineering: Python, PyTorch, Lightning, scikit-learn, NumPy, SciPy, pandas, TensorFlow, LibTorch

Creative Tech: Unity, C#, C++, XR/MR, real-time interaction, JUCE, Max/MSP, Pure Data

Software: backend APIs, full-stack web, JavaScript, Node.js, Svelte, Git

Experience

ML Engineer

March 2025 - present

CORPUS

Designed, implemented and tested a comprehensive music metadata extraction and analysis pipeline for large-scale music understanding and generation used in the CORPUS Contribution App.

Developed and evaluated real-time audio-domain music generation models: combined Google/DeepMind's SpectroStream neural audio codec with a MusicGen-style architecture to train custom models for real-time, high-quality instrumental music generation.

Trained and evaluated diffusion-based models for controlled, longer-form music generation, using Stable Audio as a baseline and applying inference-time optimisation for steering outputs via pitch, rhythm, and energy.

Built CORPUS Music Intelligence, an interactive music discovery and generation platform built using a combination of rich music metadata and CLAP-style models for discovery, and audio-domain diffusion models for music generation.

Full-stack integration of the above ML applications into production applications (backend, APIs and frontend workflows).

Researcher & Developer

September 2024 - January 2025

Netz XR Instrument, Queen Mary University of London

Secured Innovate UK grants to develop an XR musical instrument combining real-time gesture recognition and expressive sound synthesis (spun out from PhD research).

Drove prototype iterations, user surveys, and public demonstrations as part of grant-funded commercialisation efforts.

Researcher & Developer

May 2023 - February 2026

WavNav / Audio Maps, Queen Mary University of London

Developed WavNav, an AI-powered sample explorer using CLAP embeddings, audio feature extraction, semantic search, query-by-example retrieval, and visual sample mapping.

Built signal processing and feature extraction pipelines for sample analysis, search, and organisation.

Designed interfaces for fast exploration of large local music collections, focused on music-production workflows.

Teaching Assistant

October 2021 - February 2022

Queen Mary University of London

Supported the postgraduate module *Interactive Digital Multimedia Techniques*, delivering workshops on real-time audio interaction, gesture control, and XR prototyping.

Software Engineer

2016 - 2019

RSIT, Vienna

Part-time full-stack development and data visualisation on medium-to-large projects (JavaScript, Python, Java, C++).

Earlier experience: software engineering internships at ASFiNAG, Frequentis, and Roombonus (2012–2016).

Education

PhD, AI & Music — Queen Mary University of London, 2020–2026 Supervisors: Mathieu Barthet & Andrew McPherson

MSc, Sound and Music Computing (Distinction) — Queen Mary University of London, 2019–2020

BSc, Media Informatics & Visual Computing — TU Wien, 2015–2019

Selected Publications

Graf & Barthet. *Multimodal Hand Tracking for XR Musical Instruments Using Electromyography*. LNCS, 2025. [Paper](#)

Graf & Barthet. *When XR Meets AI: Integrating Interactive Machine Learning with an XR Musical Instrument*. AES International Symposium on AI and the Musician, 2024. [Paper](#)

Graf & Barthet. *Combining Vision and EMG-Based Hand Tracking for Extended Reality Musical Instruments*. CMMR, 2023. *Best Paper Nomination*. [Paper](#) · [Code](#)

Graf & Barthet. *Reducing Sensing Errors in a Mixed Reality Musical Instrument*. ACM VRST, 2023. [Paper](#)

Graf & Barthet. *Mixed Reality Musical Interface: Exploring Ergonomics and Adaptive Hand Pose Recognition*. NIME, 2022. [Paper](#) · [Code](#)

Graf, Opara & Barthet. *An Audio-Driven System for Real-Time Music Visualisation*. AES 150, 2021. [Paper](#) · [Code](#)

Grants & Awards

Innovate UK ICURe Explore, £35,000 (2024) — commercial validation of Netz XR instrument.

Innovate UK ICURe Discover, £3,500 (2024).

Impact Funding, £10,000 each for Netz (2024) and Audio Maps (2023).

MIDI Innovation Award for the Netz XR musical instrument (2023).

Austrian awards for excellent foreign postgraduate/doctoral students (2020, 2021).