

Christodoulos Benetatos

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 Google Scholar

Education

PhD	University of Rochester , Electrical and Computer Engineering • Deep Learning, Computer Audition, Interactive Systems	Sept 2018 – present
B.Sc/M.Sc	National Technical University of Athens , Electrical and Computer Engineering • Natural Language Processing, Signal Processing, Electronics Design	Sept 2011 – Dec 2017

Experience

University of Rochester, AIR Lab 🔗 , Research Assistant	Rochester, NY Sept 2018 – present
- Conducted research at the intersection of deep learning and human-machine interaction, focusing on sequence generation, latent modeling, and reinforcement learning. - Led multiple full-stack neural system prototypes, spanning from modeling frameworks (PyTorch) to real-time front-ends (Vue.js / JUCE / PyQt).	
ByteDance Inc. , Research Scientist Intern	Santa Clara, CA June 2022 – Aug 2022
- Developed generative sequence models (VAE and Transformer variants) to improve structured musical outputs. - Integrated models into an existing pipeline for symbolic music production.	
Kwai Inc. , Research Scientist Intern	Seattle, WA Aug 2020 – Nov 2020
- Conducted multimodal modeling of dance videos focusing on visual beat tracking, audio-video alignment and real-time body gesture recognition. - Delivered a real-time digital audio FX engine in C++ for iOS enabling real-time audio effects on user-generated content.	
Metis Cyberspace Technology , Software Engineer	Athens, Greece Jan 2018 – Aug 2018
Built real-time networked graph analytics to monitor vessels in operation, assisting fault detection and performance stats across distributed fleets.	

Research Projects

LLM Fine-Tuning for Playability-Aware Guitar Tablature Generation	2025 – present
- Built a dataset of 1M prompt-response pairs, capturing ergonomic and playability constraints for guitar tablature assignment. - Engineered prompt templates and ranking heuristics to guide LLMs toward generating human-playable tablature. - Fine-tuned LLaMA models using LoRA for constraint-aware symbolic music generation.	
HARP: Enabling DAWs to Access Remote Deep Learning Models 🔗	2023 – present
- Lead developer in a distributed team of 6 across 2 universities, coordinating architecture and engineering. - Developing a JUCE/C++ plugin enabling DAWs to integrate deep learning inference via hosted APIs (HuggingFace).	
Score Reduction as a Reinforcement Learning Problem 🔗	2023 – 2024
- Framed the task of score reduction as a combinatorial optimization problem and used Proximal Policy Optimization (PPO) to solve it. - Designed novel heuristic and learned reward functions to balance playability and musicality constraints.	

- Used a transformer-based RL agent that operates on a novel graph representation of musical scores.

Euterpe: Web Framework for Real-Time ML-Driven Music Agents [↗](#)

2021 – 2023

- Architected a framework enabling real-time deployment of ML-powered music agents in the browser, integrating Web Audio, MIDI streaming, and TensorFlow.js.
- Leveraged concurrency (Web Workers) and circular buffers for low-latency audio/MIDI communication.
- Lowered the barrier for researchers by providing pre-built pipelines and reusable components, allowing focus on core algorithm development.

Draw and listen! Sketch-Based Music Generation with Contour-Guided VAE [↗](#)

2020 – 2021

- Multimodal generative VAE where users sketch motion curves to shape the melodic contour of generated music output.
- Proposed a new melody disentanglement (contour, rhythm, context) and designed the VAE architecture to realize this structure.

BachDuet: LSTM-Based AI for Real-Time Human-Machine Counterpoint Improvisation [↗](#)

2019 – 2020

- Developed an LSTM-based AI improviser enabling real-time musical counterpoint in duet settings.
- Integrated frontend and model inference in a web-based app for interactive co-creation, engaging hundreds of participants.
- Conducted listening Turing tests showing BachDuet's duets were indistinguishable from those between music college students.

Publications/abstracts

Score Reduction for Guitar through Reinforcement Learning

2024

Christodoulos Benetatos, Zhiyao Duan

LBD at International Conference on Music Information Retrieval (ISMIR)

Euterpe: A Web Framework for Interactive Music Systems

2023

Yongyi Zang*, **Christodoulos Benetatos***, Zhiyao Duan, (* equal contribution)

Journal of the Audio Engineering Society (JAES)

HARP: Bringing Deep Learning to the DAW with Hosted, Asynchronous, Remote Processing

2023

Hugo Flores Garcia, **Christodoulos Benetatos**, et al.

NeurIPS workshop on Machine Learning for Creativity and Design

Draw and listen! A sketch-based system for music inpainting

2022

Christodoulos Benetatos, Zhiyao Duan

Transactions of the International Society for Music Information Retrieval (TISMIR)

Collagenet: Fusing arbitrary melody and accompaniment into a coherent song

2022

Abudukelimu Wuerkaixi, **Christodoulos Benetatos**, Zhiyao Duan

International Conference on Music Information Retrieval (ISMIR)

BachDuet: A deep learning system for human-machine counterpoint improvisation

2020

Christodoulos Benetatos, Joseph VanderStel, Zhiyao Duan

New Interfaces for Musical Expression (NIME)

Skills

Programming Languages: Python, C++, JavaScript, Java, MATLAB, Bash

ML & Dev Frameworks: PyTorch, scikit-learn JUCE, PyQt, OpenCV

Web Tools: Vue.js, FastAPI, REST APIs, WebAudio

Languages: English (fluent), Greek (native)

Music Skills: Classical Guitar, Flute, Mandolin, Piano, Cajon, Sample Library Programming