

Christodoulos Benetatos

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Education

- University of Rochester**, PhD in Electrical and Computer Engineering Sept 2018 – Feb 2025
- Focus Areas: Deep Learning, Music and Audio Signal Processing
 - Supervised by Prof. Zhiyao Duan [↗](#)
- National Technical University of Athens**, B.Sc/M.Sc in Electrical and Computer Engineering Sept 2011 – Dec 2017
- Thesis: A Brain Computer Interface (BCI), using Steady State Visual Evoked Potentials (SSVEP), for the task of maze navigation.
 - Supervised by Prof. A. G. Stafylopatis and Dr G. Siolas [↗](#)

Experience

- Research Scientist Intern**, ByteDance Inc. – Santa Clara, CA June 2022 – Aug 2022
- Developed generative models (VAE and Transformers) enhancing the melodic quality in a full-song music generation pipeline.
- Research Scientist Intern**, Kwai Inc. – Seattle, WA Aug 2020 – Nov 2020
- Conducted multimodal modeling of dance videos, including visual beat tracking and real-time body gesture recognition
- Research Assistant**, University of Rochester, AIR Lab [↗](#) – Rochester, NY Sept 2018 – Feb 2025
- Developing novel AI tools (algorithms and prototypes) to assist in the music making process using generative models.
- Software Engineer**, Metis Cyberspace Technology – Athens, Greece Jan 2018 – Aug 2018
- Designed and deployed graph algorithms for real-time remote monitoring and performance assessment of equipment onboard vessels.

Projects

- Score Reduction** Through Deep Reinforcement Learning [↗](#) 2023 – present
- Framed the task of guitar score reduction as a combinatorial optimization problem and used Proximal Policy Optimization (PPO) to solve it.
 - Designed novel rule-based and data-driven rewards to guide the learning process.
 - Used a transformer-based RL agent that operates on scores represented as graphs.
- HARP: Bringing Deep Learning to the DAW** [↗](#) 2023 – present
- A C++/Juce app that lets users of Digital Audio Workstations (DAWs) access state-of-the-art deep learning models deployed on cloud-based services without breaking the within-DAW workflow.
- Euterpe: A Web Framework for Interactive Music Systems** [↗](#) 2021 – 2023
- Enables researchers without JavaScript expertise to easily deploy musical agents, including those powered by neural networks, on the web.
 - A Vue.js-based client-side app with real-time audio/MIDI synchronization, data visualization, and use of concurrency and parallelism techniques.

- Draw and listen!:** Draw-based melody inpainting [↗](#) 2020 – 2021
- A sketch-based multimodal VAE model for music inpainting, enabling users to draw a curve to guide the melodic contour of the generated melody.
 - A new melody disentanglement scheme -> ‘melody = contour + rhythm + context’.
 - Designed a frontend in Vue to support the user interaction with the model.
- Score Following** for Event Augmented Live Performances [↗](#) 2021 – 2022
- Implemented a modified online DTW algorithm for real-time audio-score alignment.
 - Developed a PyQt UI to visualize the alignment and facilitate event activation.
 - Deployed the system in a mini-concert in the Eastman School of Music.
- BachDuet:** Real-time human-machine improvisation [↗](#) 2019 – 2020
- Designed a system for real-time human-AI musical improvisation.
 - Developed a web-deployed prototype system, engaging hundreds of users and showcasing live demonstrations across various venues.
- EEG BCI:** An exploratory study on SSVEPs using Emotiv Epoc [↗](#) 2017 – 2018
- Designed and conducted an SSVEP experiment utilizing the Emotiv Epoc EEG headset.
 - Designed and built custom hardware and driving circuits for the visual LED cues.
 - Created a real-time data collection pipeline in Python.
 - Implemented a processing algorithm using Canonical Correlation Analysis (CCA) to decode user intentions from their EEG for navigating a virtual maze.

Publications and Abstracts

- **Benetatos**, Z. Duan. "Score Reduction for Guitar through Reinforcement Learning." *LBD ISMIR*, 2024.
- **Benetatos**, et al. "HARP 2.0: Expanding Hosted, Asynchronous, Remote Processing for Deep Learning in the DAW." *LBD ISMIR*, 2024.
- Y. Zang*, **Benetatos***, Z. Duan. "Euterpe: A Web Framework for Interactive Music Systems." *Journal of the Audio Engineering Society (JAES)*, 2023. (* equal contribution)
- H. F. Garcia, **Benetatos**, et al. "HARP: Bringing Deep Learning to the DAW with Hosted, Asynchronous, Remote Processing." *NeurIPS Workshop*, 2023.
- **Benetatos**, Z. Duan. "Draw and listen! A sketch-based system for music inpainting." *Transactions of the International Society for Music Information Retrieval (TISMIR)*, 2022.
- A. Wuerkaixi, **Benetatos**, Z. Duan. "Collagenet: Fusing arbitrary melody and accompaniment into a coherent song." *International Society for Music Information Retrieval Conference (ISMIR)*, 2022.
- **Benetatos**, J. VanderStel, Z. Duan. "BachDuet: A deep learning system for human-machine counterpoint improvisation." *New Interfaces for Musical Expression (NIME)*, 2020.

Skills

Programming Languages: Python, C++, JavaScript, Java, Matlab

Frameworks: Pytorch, JUCE, Vue.js, PyQt, Spring

Languages: English (fluent), Greek (native)

Music:

- *Classical Guitar & Flute:* Professional proficiency; recipient of prizes international competitions and performed solo and with orchestras.
- *Mandolin & Cajon:* Advanced proficiency.
- *Teaching Experience:* 6 years experience in instructing students in classical guitar and music theory.