

Christodoulos Benetatos

San Francisco, CA | c.benetatos@rochester.edu | (585) 406-8092 | [linkedin.com/in/christodoulos-benetatos](https://www.linkedin.com/in/christodoulos-benetatos)
github.com/xribene



Education

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|---|----------------------|
| University of Rochester , PhD in Electrical and Computer Engineering | Sept 2018 – Dec 2024 |
| <ul style="list-style-type: none">• 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 |
| <ul style="list-style-type: none">• 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

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| Research Scientist Intern , ByteDance Inc. – Santa Clara, CA | June 2022 – Aug 2022 |
| <ul style="list-style-type: none">• Developed generative models (VAE and Transformers) to improve various automatic music generation pipelines. | |
| Research Scientist Intern , Kwai Inc. – Seattle, WA | Aug 2020 – Nov 2020 |
| <ul style="list-style-type: none">• Multimodal modeling of dance videos. Visual beat tracking and audio synchronization• Developed a real time digital audio effects suite in C++ for iOS | |
| Research Assistant , University of Rochester, AIR Lab – Rochester, NY | Sept 2018 – Dec 2024 |
| <ul style="list-style-type: none">• Developing AI tools (algorithms and prototypes) to assist musicians in music making, using generative models, graph neural networks, and reinforcement learning.• Supervised by Prof. Zhiyao Duan | |
| Software Engineer , Metis Cyberspace Technology – Athens, Greece | Jan 2018 – Aug 2018 |
| <ul style="list-style-type: none">• Designed algorithms for real-time remote monitoring and performance assessment of equipment onboard vessels. | |

Projects

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|---|----------------|
| Guitar Score Reduction as a Reinforcement Learning Problem | 2023 – present |
| <ul style="list-style-type: none">• 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 reward functions to guide the learning process.• Used a transformer-based RL agent that operates on scores represented as graphs. | |
| HARP  | 2023 – present |
| <ul style="list-style-type: none">• Lead Developer• HARP lets users of Digital Audio Workstations (DAWs) access large state-of-the-art deep learning models using cloud-based services, without breaking the within-DAW workflow. | |
| Euterpe: A Web Framework for Interactive Music Systems  | 2021 – 2023 |
| <ul style="list-style-type: none">• Enabled researchers without JavaScript expertise to easily deploy musical agents on the web.• Supported real-time audio/MIDI synchronization and data visualization.• Re-Implemented various deep-learning musical agents using Euterpe | |

and gave a tutorial in ISMIR 2023.

Draw and listen!

2020 – 2021

- Built a sketch-based system for music inpainting enabling users to draw a melodic contour and hear them realized instantly.
- Derived a new melody disentanglement scheme -> ‘melody = contour + rhythm + context’.
- Designed a VAE architecture that realizes the above disentanglement.

Score Following for Event Augmented Live Performances

2021 – 2022

- Implemented a modified ODTW algorithm for real-time audio-score alignment.
- Developed a UI to visualize the alignment and activate events.
- Used OSC to send events in real-time to a TouchDesigner instance for triggering sound and video effects.
- Deployed the system in a mini-concert with the TableTopOpera.

BachDuet

2019 – 2020

- Designed a RNN model for real-time musical counterpoint improvisation.
- Trained on duets extracted from Bach Chorales.
- Implemented a prototype system and demoed it live at various venues.

Publications

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)

Talks and Demos

Guitar Score Reduction as a Reinforcement Learning Problem – San Francisco, CA

Dec 2024

- Work In Progress (under submission)
- Demo at the International Symposium on Music Information Retrieval (ISMIR)

Euterpe: A Web Framework for Interactive Music Systems – Madrid, Spain

June 2024

- Oral presentation at the AES International Conference

Computer-Assisted Music-Making Systems: Taxonomy, Review, and Coding – Milan, Italy

Nov 2023

- Tutorial and Live Coding at the International Symposium on Music Information Retrieval (ISMIR)

Automatic Rendering of Augmented Effects in Immersive Concerts – Rochester, NY

Nov 2022

- Demo at the 7th Annual Frameless XR Symposium

BachDuet: A deep learning system for human-machine counterpoint improvisation – Delft, Netherlands

Nov 2019

- Demo at the International Symposium on Music Information Retrieval (ISMIR)

Skills

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

Frameworks: Pytorch, JUCE, Vue.js, Spring

Languages: Greek (native), English (fluent)

Music Skills

Instruments: Classical Guitar, Flute, Mandolin, Cajon

Music Production: Reaper, Sample Library Programming