

Darius Pétermann

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<http://www.dariuspetermann.com>

Researcher in the field of applied machine learning and signal processing for audio

1. Education

PhD Student in Intelligent Systems Engineering Jan. 2021 - Present

- Luddy School of Informatics, Computing, and Engineering - Indiana University Bloomington, IN
- Courses: Machine Learning for Signal Processing, Deep Learning, Computer Vision
- Research Group: Signals and AI Group in Engineering ([SAIGE](#))
- Advised by Prof. [Minje Kim](#)

M.Sc. in Information and Communication Engineering - GPA: 9.48/10.0 Sept. 2020

- Dept. of Information and Communication Technologies - Universitat Pompeu-Fabra, Spain
- Courses: Music Information Retrieval, System Design, Audio Signal Processing, ML for Audio, Research Methods, Reinforcement Learning
- Thesis: “[SATB Voice Segregation for Monaural Recordings](#)”, Advised by [British Chandna](#)

BM in Electronic Production & Design - GPA: 3.79/4.0 May. 2016

- Electronic Production & Design Dept. - Berklee College of Music
- Courses: Digital Signal Processing, Physical Computing, Audio Programming in C, Principles of Audio Electronics, Music Acoustics, Logic & Programming
- Thesis: “[A Deep Look at Spectral Synthesis Techniques Through csConvolve](#)”, Advised by [Dr. Richard Boulanger](#)

2. Positions Held

Research Intern, Mitsubishi Electric Research Labs (MERL) May. 2021 - Present

- Hosted by Dr. Gordon Wichern and Dr. Jonathan Le Roux

- Derive and implement new models and optimization methods for audio analysis with applications to source separation in challenging multi-source environments and using advanced machine learning techniques.

Technical Lab Assistant, Massachusetts Institute of Technology Oct. 2020 - Apr. 2021

- Contractor for [Senseable Intelligence Group](#), McGovern Institute for Brain Research
- Assisting in the research and development of new machine learning and signal processing technologies targeting speech and clinical applications

Content Engineer - Audio/Music Apps, Apple Inc. Jun. 2016 - Jul. 2019

- Software engineer for Apple's pro Audio/Music Apps
- Designed real-time MIDI processing systems in C++

Programming Tutor, Berklee College of Music Sep. 2015 - May 2016

- Electronic Production & Design Dept.
- Tutored and mentored EPD students for technical classes: "Audio Programming in C", "Digital Signal Processing", "Csound", "Max/MSP"

3. Publications

Darius Petermann, Gordon Wichern, Zhong-Qiu Wang, Jonathan Le Roux (October 2021), "[The Cocktail Fork Problem: Three-Stem Audio Separation for Real-World Soundtracks](#)", Submitted for review to the 2022 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP) 2022

Darius Petermann, Seungkwon Beack, Minje Kim (October 2021), "[HARP-Net: Hyper-Autoencoded Reconstruction Propagation for Scalable Neural Audio Coding](#)", The IEEE Workshop on Applications of Signal Processing to Audio and Acoustics (WASPAA) 2021

- [Code repository](#)
- [Experiment results page](#)

Darius Petermann, Pritish Chandna, Helena Cuesta, Jordi Bonada, and Emilia Gomez, "[Deep learning based source separation applied to choir ensembles](#)" in Proceedings of the 21st International Society for Music Information Retrieval Conference (ISMIR) 2020,

- [Code repository](#)
- [Experiment results page](#)

4. Honors & Awards

- “Excellent” Grade with Honor, Music Cognition & Perception, UPF** Sep 2020
Magna Cum Laude Honor, Berklee College of Music May 2016
Dean’s List, Berklee College of Music May 2013 - May 2016
- Appeared on Berklee Dean’s List for 7 semesters out of 8
- BT Production Award & Scholarship, Berklee College of Music** Apr. 2015
- Award and scholarship from the Electronic Production & Design Dept.

5. Certifications

- Machine Learning, Stanford - Coursera** Jul. 2019 - Oct. 2019
Audio Signal Processing for Music Applications, UPF - Coursera Apr. 2018 - Jul. 2018

6. Skills

Deep Learning (over 3 years of experience):

- PyTorch, Tensorflow
- auto-encoders (audio source separation), RNN/LSTM (time-series prediction), CNN (audio/music information retrieval)

Machine Learning (over 4 years of experience):

- scikit-learn, Weka, Panda, NumPy
- regression, classification, clustering
- data mining, feature analysis and selection

Audio Signal Processing (over 6 years of experience):

- JUCE, MATLAB, Csound
- audio coding and audio quality assessment
- high and low level audio feature extraction
- real-time audio synthesis

7. Referees

- **Dr. Minje Kim**, Principal Investigator of the Signals and AI Group in Engineering (SAIGE) at Indiana University, Assistant Professor in the Dept. of Intelligent Systems Engineering. Email: minje@indiana.edu

- **Dr. Xavier Serra**, Director of the Music Technology Group at Universitat Pompeu-Fabra, Professor in the Dept. of Information and Communication Technologies.
Email: xavier.serra@upf.edu
- **Dr. Richard Boulanger**, Professor in the Electronic Production & Design Dept. at Berklee College of Music. Email: rboulanger@berklee.edu