Nils Werner, Ph.D.

Personal Information

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Work Experience

2020–Present	**International Audio Laboratories** — Postdoctoral Research Scientist Audio Signal Processing, Machine Learning, and Compressive Sensing in the Internet of Things.
2020	**Fraunhofer IIS** — Research Scientist Consulted Engineers in the Development of Cloud Based Audio Processing and Natural Language Processing Applications.
2014–2020	**International Audio Laboratories** — Research and Teaching Assistant **Researched:** Audio Signal Processing, Audio Signal Analysis, Transform Coding, Lapped Transforms, Machine Learning, Human Auditory Perception **Taught:** Laboratory Course: Audio Signal Analysis, Statistical Analysis Methods in R. Seminar: Reproducible Research, Audio Signal Analysis. Supervised 2 Master Students, 2 Interns, Numerous Student Assitants.
2012–2013	**Fraunhofer IIS** — Research Intern Developed Tools for Spatial Audio Reproduction Experiments
2005–2014	**Entrepreneurship** — Co-Founder IT Consulting, Full Stack Website Development

Education

PhD/Dr.-Ing.	**Fraunhofer IIS** and **University of Erlangen-Nürnberg** — *Summa Cum Laude* **PhD Thesis:** "Lapped Nonuniform Orthogonal Transforms with Compact Support". Supervisor: Prof. Dr.-Ing. Bernd Edler.
MSc/Dipl.-Ing.	**University of Erlangen-Nürnberg** **MSc Thesis:** "Parameter Estimation for Time-Varying Harmonic Audio Signals". Supervisor: Dr.-Ing. Fabian-Robert Stöter. **BSc Thesis:** "A Recursive Algorithm for Sound Synthesis on GPU Hardware". Supervisor: Prof. Dr.-Ing. Rudolf Rabenstein.

Skills

Advanced	Audio Signal Processing, Statistical Analysis, Software Engineering, Python, Git, macOS, Linux
Intermediate	C, C++, CUDA, MATLAB, R, Deep Learning, PyTorch
Fundamentals	Kubernetes, Tensorflow

Other Contributions

Open Source	Top 2% StackOverflow Contributor, 30+ Open Source Repositories, 170+ Open Source Contributions
Reviewer	IEEE, Journal of Open Source Software, and Web Audio Conference

Tutorials/Invited Talks/Interviews

Invited Talk	"An Introduction to Audio Signal Compression", INRIA, Montpellier 2019
Interview	"Data Transmission on the Internet", YouTube Channel "Physics Girl" (2M+ subscribers)
Tutorial	"Multimedia Signal Processing in Python", Fraunhofer Student Summer Camp 2015, 2016, 2017

Languages

Fluent	German, English
Fundamentals	French

Selected Publications

Papers

F.-R. Stöter, N. Werner, S. Bayer, and B. Edler, "Refining fundamental frequency estimates using time warping," in *Proceedings of the 2015 23rd European Signal Processing Conference*, Aug. 2015, pp. 6–10.

N. Werner and B. Edler, "Nonuniform orthogonal filterbanks based on mdct analysis/synthesis and time-domain aliasing reduction," *IEEE Signal Processing Letters*, vol. 24, no. 5, pp. 589–593, May 2017.

——, "Computational complexity of a nonuniform orthogonal lapped filterbank based on mdct and time domain aliasing reduction," in *Proceedings of the Audio Engineering Society Convention 146*, Mar. 2019.

——, "Experimenting with lapped transforms in numerical computation libraries using polyphase matrices and strided memory views," in *Proceedings of the Audio Engineering Society Convention 146*, Mar. 2019.

——, "Perceptual audio coding with adaptive non-uniform time/frequency tilings using subband merging and time domain aliasing reduction," in *Proceedings of the IEEE 2019 International Conference on Acoustics, Speech and Signal Processing*, 2019.

——, "Time-varying time-frequency tilings using non-uniform orthogonal filterbanks based on mdct analysis/synthesis and time domain aliasing reduction," *IEEE Signal Processing Letters*, vol. 26, no. 12, pp. 1783–1787, Dec. 2019.

N. Werner, S. Balke, F.-R. Stöter, M. Müller, and B. Edler, "trackswitch.js: A versatile web-based audio player for presenting scientific results," in *Proceedings of 3rd Web Audio Conference*, London, Aug. 2017, p. 6.

Patents

N. Werner and B. Edler, "Time domain aliasing reduction for non-uniform filterbanks which use spectral analysis followed by partial synthesis," WO Patent WO2 018 019 909A1, Feb., 2018.

——, "Time-varying time-frequency tilings using non-uniform orthogonal filterbanks based on mdct analysis/synthesis and tdar," EU Patent Request, Aug., 2019.

N. Werner, B. Edler, and S. Disch, "Perceptual audio coding with adaptive non-uniform time/frequency tiling using subband merging and the time domain aliasing reduction," WO Patent WO2 020 083 727A1, Apr., 2020.

Software

F.-R. Stöter and N. Werner, "Sisec 2016 website," International AudioLaboratories Erlangen, Nov. 2016.

N. Werner, "Room impulse response generator," Zenodo, Oct. 2020.

October 13, 2021