Nils Werner, Ph.D.

Personal Information

Email:	nils@hey.com
Web:	https://nils-werner.github.io/
Phone:	+49 178 683 0197

Work Experience

2020–2022 **International Audio Laboratories** — Postdoctoral Research Scientist
- Research in psychacoustically weighted reconstruction of compressive sensing signals
- Research in audio event classification in non-cooperating sensor networks
- Research and development of a toolkit to simulate acoustic sensor networks
- Mentoring in the use of modern MLOps, DevOps and HPC architectures and toolkits for research in signal processing and machine learning

2020 **Fraunhofer IIS** — Research Scientist
- Development of infrastructure and DevOps workflows for a cloud based speech assistant
- Mentoring in the design and deployment of speech assistant components

2014–2020 **International Audio Laboratories** — Research and Teaching Assistant
- Research of a psychoacoustically optimized filterbank for audio compression algorithms
- Design and maintenance of laboratory's IT infrastructure and software services
- Mentoring in the use of modern sofware development tooling for signal processing research
- Teaching in audio signal analysis, statistical analysis methods, and reproducible research
- Supervision of 2 master students, 2 interns, and numerous student assitants
- Contributions to open source software projects

2012–2013 **Fraunhofer IIS** — Research Intern
- Development of a library and GUI for spatial audio experiments

2005–2014 **Entrepreneurship** — Co-Founder
- Development of full stack websites
- Contributions to open source software projects

2003/2005 **Schaeffler AG** — Student Assistant
- Development of industrial machine control software in C
- Development of predictive maintenance software in Java and MySQL

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 Architectures, Mentoring, Python, Git, UNIX/macOS/Linux Administration and Development, Software Tooling, DevOps
Intermediate	Machine Learning, Deep Learning, PyTorch, C, C++, CUDA, MATLAB, R
Fundamentals	Rust, Kubernetes, Tensorflow

Other Contributions

Open Source	Top 1% 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.