XENOFON KARAKONSTANTIS

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SUMMARY

- PhD student, budding researcher and engineer in acoustics, signal processing and sensor array processing
- Involved in development, algorithms and acoustics research of high end consumer audio products
- Engaged in projects regarding data engineering for measurement and inference of room acoustics, sound source localisation and sound field analysis
- Detailed knowledge of deep learning, Bayesian inference and state of the art machine learning models for inverse problems
- Long term musician with experience in touring and performing and trained in acoustics and psychoacoustics

TECHNICAL SKILLS

- **Signal Processing:** Beamforming algorithms (MVDR, MUSIC, etc.), adaptive filtering (LMS, RLS, etc.) for noise/echo cancellation
- **Machine Learning:** Neural networks (discriminative/generative models), Bayesian models (VAEs, HMC, analytic methods, Gaussian Processes), kernel methods
- **Acoustics:** Room acoustics, architectural acoustics, structure-borne sound, array signal processing, electro-acoustics
- **Audio:** Time-frequency signal analysis, speech, music, compressive sensing, signal enhancement, noise reduction, dereverberation and psychoacoustics
- **Acoustic measurements:** Microphone-loudspeaker-interface signal chains, amplifiers/preamplifiers, sampling, signal generation (sweep and noise signals), transducers
- **Computational:** Programming languages (R, Python, C, Matlab, Shell script) machine Learning API's (Tensorflow, Pytorch, JAX), probabilistic programming (Numpyro, Pyro, Tensorflow probability, PySTAN)

RESEARCH EXPERIENCE

Acoustic Technology Group — **Technical University of Denmark**
Research Assistant — *November 2020 to December 2020*

- Investigating generative models for bandwidth extension of aliased/corrupted room impulse responses
- Examined methods of reconstructing room impulse responses with physical models (plane wave/point source regression)
- Examined Generative Adversarial networks and Variational Auto-encoders in the context of compressive sensing for audio signals
- A publication on the topic is on way

Acoustic Technology Group — **Technical University of Denmark**
PhD — *December 2020 to Present*

- Investigating neural generative models for sound field reconstruction
- Validated methods by comparing real and simulated data of sound fields with classic regression methods
- Investigating graph neural networks and inductive (spatial) biases for sound source localisation

EDUCATION

- PhD, Data Driven Acoustic Holography, Techical University of Denmark, Present
- MSc, Engineering Acoustics, Techical University of Denmark, 2020
- MEng, Electrical and Computer Engineering, National Technical University of Athens, 2018

INDUSTRY EXPERIENCE

Student Researcher — **GN - Jabra (Denmark)**
Audio Research — *September 2019 to July 2020*

- Python DSP applications for audio related tasks (sensor array processing, room acoustics)
- Deep learning framework (Tensorflow-Pytorch-ONNX) migration tasks for audio product-related applications
- Higher order ambisonics recording-processing, sensor calibration and beamforming

Student Assistant — **Sennheiser Communications (Denmark)**
Gaming Audio — *March 2019 to September 2019*

- Processing of Head-Related Transfer Functions (SOFA format) for mapping out acoustic data.
- Troubleshooting for gaming headsets, audio processors and software products and provision of statistical feedback on common issues.

TEACHING AND MENTORING EXPERIENCE

- 2019 - Teaching Assistant for problem solving in the class of "Advanced Acoustics"
- Present - Lab exercise responsible for classes "Advanced Acoustics" and "Acoustic Signal Processing"

CONFERENCE PRESENTATIONS

- Time lapse video sonification; watching and listening to events unfolding - 15th Sound and Music Computing Conference (SMC2018) | Limassol, Cyprus
- Sound field reconstruction in rooms with deep generative models - InterNoise 2021 1-5 August 2021 | Washington, DC

- Invertible neural networks for reconstructing acoustic fields - 182nd Meeting of the Acoustical Society of America 23-27 May 2022 | Denver, Colorado
- Localising acoustic sources with a spherical graph neural network - 24th International Congress on Acoustics 24-28 Oct 2022 | Gyeongju, S. Korea

PUBLICATIONS

- **Karakonstantis, X.**, & Fernandez Grande, E. (2021, August). Sound field reconstruction in rooms with deep generative models. In *INTER-NOISE and NOISE-CON Congress and Conference Proceedings* (Vol. 263, No. 5, pp. 1527-1538). Institute of Noise Control Engineering.
- Grande, E. F., Nozal, D. C., Hahmann, M., **Karakonstantis, X.**, & Riezu, S. A. V. (2021). Reconstruction of room impulse responses over extended domains for navigable sound field reproduction. In *International Conference on Immersive and 3D Audio*.
- **Karakonstantis, X.**, Fernandez Grande E. & Hahmann, M., (2021, August). Localising acoustic sources with a spherical graph neural network. In *24th International Congress on Acoustics. 2022*.

OTHER SKILLS

Music Multi-instrumentalist, trained in classical modern and jazz guitar, traditional balkan music (oud), toured with bands, semi-professional experience

Music Electronics Part-time electronics enthusiast, occasionally collaborate with colleagues to make guitar pedals and synthesisers

Languages English: Native. Greek: Native. Danish: Professional proficiency.