

Job role: Algorithm Engineer Intern

We live and breathe audio. We are driven by the passion to create audio solutions that make a difference. Building the future of audio and bringing remarkable sound experiences to our customers – this is what the Sennheiser brand has represented for more than 80 years. Sennheiser Mobility is the automotive-focused Sennheiser innovation venture. Our R&D center in Zürich is the home of a multi-national group of audio engineers, algorithm and software developers, and project managers who are passionate about developing exceptional and one-of-a-kind audio experiences for in-car entertainment and communication.

Sounds good? Join us as

Algorithm Engineer Intern

Background

The reproduction of virtual sound sources around a listener is well explored in controlled studio environments and in setups where loudspeakers can be positioned uniformly, i.e. at the same distance from a given listening position. When space is limited though, loudspeakers can be mounted in fixed, non-uniform locations with varying frequency responses. Traditional panning techniques, such as amplitude panning, often yield suboptimal results under these constraints, both in terms of sound quality and localization accuracy.

You will work on the implementation and improvement of such panning algorithms and benchmark the found solution against existing techniques.

Project Objective

This project focuses on enhancing classic panning algorithms and comparing various approaches for non-uniform loudspeaker layouts against Sennheiser Mobility's state-of-the-art panning method. With "non-uniform" we specifically refer to loudspeakers located at various distances from a given listening position.

You will conduct an in-depth literature review of existing techniques—such as Vector Base Amplitude Panning (VBAP)—and evaluate them through objective measurements as well as subjective listening tests, benchmarking the results against our current panning solution. Findings from these evaluations will highlight the strengths and limitations of each method and provide insights into potential pre- or post-processing strategies that could improve sound quality and localization accuracy.

Application

Prototype algorithms will be developed in MATLAB when needed and subsequently migrated into reusable C/C++ libraries. The final tool will be implemented within the C++-based JUCE audio framework, enabling real-time signal processing.

A graphical user interface (GUI) will also be created to allow users to enter the parameters required for the panning process and to access various adjustable settings.

Learnings

The candidate will get a deep understanding of:

- Literature research
- MATLAB prototype development
- Implementation of prototype in a C++ based framework
- Development of a basic user interface to give the user access to the most important parameters.
- Objective and subjective tests to compare the implemented approaches against our current panning solution.

Project duration

3 months with possible extension to 6 months on site in Zuerich, Switzerland. The first time (around 3 months) could also be remote.

What you can expect from us:

- **Environment:** A wide range of tasks and projects in our international family business.
- **State-of-the-art:** With us you work with and on "high-end" technologies
- **Team:** You work in a passionate team of specialists with many exciting ideas

The audio world is diverse — from concerts and lecture halls to streaming platforms, meeting spaces, and studio recordings. So are we at Sennheiser. We welcome applicants from all backgrounds, regardless of gender identity, national origin, sexual orientation, ethnicity, religion, disability, or age.

If you are interested in this internship, please reach out to our Local HR Manager Esther Zobrist esther.zobrist@sennheiser.com with your resume.