

## PRESS RELEASE

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### **Audio technology — customized listening experiences in 3D: Fraunhofer IIS team wins Joseph von Fraunhofer Prize 2023**

**Whether streaming music and movies, watching TV or in the car: The MPEG-H Audio system makes it possible to fully immerse yourself in soundscapes and adjust them to your own preferences. Three researchers from the Fraunhofer Institute for Integrated Circuits IIS — representing a large team — are being awarded the Joseph von Fraunhofer Prize 2023 for this development. The prize is awarded to employees of the Fraunhofer-Gesellschaft for their outstanding scientific achievements in solving application-related problems.**

Turn up the volume on the TV movie dialogue, lower the background noise? Select your favorite sport commentator at the touch of a button? Or turn the drums down a bit while listening to music? The MPEG-H Audio system from the Fraunhofer IIS makes it easy to personalize 3D sound. For the development of the system, Harald Fuchs, Dr. Achim Kuntz and Adrian Murtaza — representing the team — will be awarded the Joseph von Fraunhofer Prize 2023.

#### **Metadata for individual sound experiences**

The MPEG-H Audio system brings the three-dimensional world of sound to more and more playback devices. The process used for this clearly distinguishes the technology from Fraunhofer IIS from other 3D sound systems: Instead of using only classic audio tracks, the format works with audio objects. Such an object, for example a singing bird, is assigned properties such as position and volume through metadata. They are used to determine what happens to the sound: The birdsong moves in three-dimensional space, becoming louder and softer. All this information is sent to the playback system, where it is combined with information about the playback environment. Only now are the loudspeaker signals created — in contrast to usual surround formats such as 5.1 or 7.1.

The new approach of describing audio objects through metadata also enables content to be personalized: choosing between different languages, making movie dialogues louder and thus more understandable, positioning the voice of the sports commentator freely in the room, and hearing more or less audience sound at live events.

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## **MPEG-H Audio: Innovative system from production to playback**

The Fraunhofer IIS team has developed a complete system that covers the entire chain from sound production to transmission and playback. And not just in the broadcast chain of television productions: “We want to make sure that every production, transmission, and playback situation is covered by MPEG-H Audio,” Kuntz explains. “The MPEG-H Audio system therefore goes far beyond a mere audio codec: It includes production tools, file and transmission formats, and innovative playback methods as well as software solutions for integrators.” Another example of one of the many developments around MPEG-H Audio is the immersive object-based music format 360 Reality Audio from the electronics company Sony. It can already be found on many streaming services — an album produced with this technology even won the Grammy for Best Immersive Album in 2023.

## **The end of the test phase**

Developing such a comprehensive audio system is only possible with a large team: At peak times, up to a hundred people were working simultaneously on the project, which started back in 2012 — currently there are still around 50 employees. In addition, international support was important. Industry and technology partners around the world helped make MPEG-H Audio fit for use in a wide variety of environments. Brazil, for example: After large-scale comparative tests, the country decided in December 2021 to use the new technology as the mandatory audio standard for its new TV infrastructure. MPEG-H Audio has also been tested a number of times in Europe. In short, the MPEG-H Audio system is the world's only open standardized system for transmitting the next generation of audio formats.

### **Joseph von Fraunhofer Prize**

Since 1978, the Fraunhofer-Gesellschaft has awarded annual prizes to its employees for outstanding scientific achievements that solve practical problems. This year, three prizes worth 50,000 euros each will be awarded to research groups from different institutes.

FRAUNHOFER INSTITUTE FOR INTEGRATED CIRCUITS IIS



**Fig. 1** The research team in the studio: Adrian Mur-taza, Harald Fuchs and Dr. Achim Kuntz from Fraunhofer IIS (from left to right)

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**Fig. 2** The MPEG-H Audio system from the Fraunhofer IIS makes it easy to personalize 3D sound.

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The Fraunhofer-Gesellschaft, headquartered in Germany, is the world's leading applied research organization. Its research activities are conducted by 76 institutes and research units at locations throughout Germany. The Fraunhofer-Gesellschaft employs a staff of more than 30,000, who work with an annual research budget totaling more than 2.9 billion euros.

The **Fraunhofer Institute for Integrated Circuits IIS**, headquartered in Erlangen, Germany, conducts world-class research on microelectronic and IT system solutions and services. Today, it is the largest institute of the Fraunhofer-Gesellschaft. Research at Fraunhofer IIS revolves around two guiding topics:

In the area of **"Audio and Media Technologies"**, the institute has been shaping the digitalization of media for more than 30 years now. Fraunhofer IIS was instrumental in the development of mp3 and AAC and played a significant role in the digitalization of the cinema. Current developments are opening up whole new sound worlds and are being used in virtual reality, automotive sound systems, mobile telephony, streaming and broadcasting.

In the context of **"cognitive sensor technologies"**, the institute researches technologies for sensor technology, data transmission technology, data analysis methods and the exploitation of data as part of data-driven services and their accompanying business models. This adds a cognitive component to the function of the conventional "smart" sensor.

More than 1170 employees conduct contract research for industry, the service sector and public authorities. Founded in 1985 in Erlangen, Fraunhofer IIS now has locations in 11 cities: Erlangen (headquarters), Nuremberg, Fürth and Dresden, as well as Bamberg, Deggendorf, Ilmenau, Munich, Passau, Waischenfeld and Würzburg. 72 percent of the budget of 189.7 million euros a year is financed by contract research projects. Institutional funding from the Fraunhofer-Gesellschaft covers 28 percent of the budget.

Detailed information on: [www.iis.fraunhofer.de/en](http://www.iis.fraunhofer.de/en)

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