Website address:
https://www.gesundheitsindustrie-bw.de/en/article/press-release/ai-chip-design-heilbronn

AI Chip Design From Heilbronn

AI plays a huge role in the semiconductor industry, both by facilitating more efficient development processes and as a target application in development work. This is why the Fraunhofer Heilbronn Research and Innovation Centers HNFIZ are adding the Chip AI research and innovation center for AI chip design to their service range. The center is funded via the Dieter Schwarz Foundation. The Chip AI research and innovation center relies on close cooperation with stakeholders of the Innovation Park Artificial Intelligence (IPAI).

The global artificial intelligence (AI) boom has led to competitive innovation activity concerning both soft and hardware. More and more powerful AI chips are needed for increasingly complex AI applications. Aiming to boost Germany's innovative strength in this cutting-edge technology in Heilbronn, the Fraunhofer Institute for Applied Solid State Physics IAF and the Fraunhofer Institute for Integrated Circuits IIS are starting to establish the Chip AI research and innovation center as part of the Fraunhofer HNFIZ in Heilbronn in 2026. The focus of the center will be on developing innovative chip designs for and with AI.

Chip AI center to strengthen local innovative capacity in AI chip design

"Artificial intelligence is a key driver of future value creation. In addition to powerful software and innovative applications, the development of cutting-edge hardware is of decisive importance with regard to Germany's role as a high-tech hub. In cooperation with the Dieter Schwarz Foundation, we are deliberately addressing this area," says Holger Hanselka, President of the Fraunhofer-Gesellschaft. "By establishing the Chip AI research and innovation center in Heilbronn, we are pooling the proven chip design expertise of Fraunhofer IAF and IIS as well as strengthening the comprehensive Fraunhofer microelectronics portfolio. In this way, we are creating a high-performance platform for AI hardware made in Germany and are sending an important signal of Germany's competitive strength."

"Establishing the Chip AI center sends a strong message. In close cooperation with Fraunhofer IIS, we want to get involved in shaping future developments in AI chip design and take on a leading role in Europe. Heilbronn is the perfect base for this, as our researchers will be working next door to internationally leading AI experts at IPAI," explains Patricie Merkert, who manages Fraunhofer IAF together with Rüdiger Quay.

Rüdiger Quay stresses that "the Fraunhofer-Gesellschaft's work on chiplets is already among the best to be found in the world. Thanks to the generous support of the Dieter Schwarz Foundation, we will be able to establish a high-performance research and innovation center over the next nine years, aiming to exploit the full potential of AI in the field of chip design and to keep developing better chips for AI applications. We are extremely grateful for that."

"In an era in which neuromorphic computing and edge AI are steadily gaining importance, our long-standing IC design expertise at Fraunhofer IIS remains a key driver for innovation. Together with Fraunhofer IAF, we are excited to be cooperating in Heilbronn to expand our AI-driven chip design portfolio as well as our work dedicated to developing innovative chips for AI applications," says Fraunhofer IIS Institute Director Giovanni Del Galdo. "This is a decisive step toward using technologies such as spiking neural networks for advancing energy-efficient processing of local data. In this way we are making a vital contribution to improving Europe's technological sovereignty in the AI sector."

Fraunhofer IAF to develop AI chip design to enhance efficiency and security

In Heilbronn, researchers from Fraunhofer IAF will be developing high-performance semiconductor chips for use in modern AI systems on the one hand and be working on innovative methods for aiding the chip design process with AI on the other. The aim is to make chip design processes more efficient by using AI to automate numerous individual design steps. Smart strategies for protecting intellectual property (IP) are to be drawn up to ensure licensing of the resulting designs. Furthermore, solutions are to be found for verifying and certifying designs in order to protect safety-critical applications, such as in the areas of transportation, robotics and aerospace technology.

The focus in this context will be on CMOS (complementary metal-oxide-semiconductor) circuits. These are particularly efficient, resilient and durable and therefore used in a wide range of electronic devices. CMOS circuits combine two complementary transistors on the same substrate, which take turns in allowing and blocking current. Thanks to their superior characteristics, they also serve as key components in AI chips, and they require a large number of manual interventions in the design process that can be reduced with the help of AI.

Fraunhofer IIS to work on neuromorphic hardware architectures for edge AI applications

At the Chip AI center, Fraunhofer IIS will be working on new scalable, configurable neuromorphic processor units in analog and mixed-signal CMOS design in conjunction with the related software tool chain for AI training. The focus will be on so-called spiking neural networks (SNNs). These are a new type of artificial neural network that mimic the human brain even more closely: Rather than exchanging signals continuously, they process only relevant information in the shape of brief, timed pulses. In a similar way as their biological counterparts, the artificial neurons are only activated when defined thresholds are exceeded. SNNs are thus able to combine a high level of energy efficiency with real-time capability, making them particularly well suited for using AI applications directly on terminal devices, for example in the areas of robotics, mobile communication and satellites.

In addition, Fraunhofer IIS will also interlink the activities of the Chip AI center with the wide range of Fraunhofer microelectronics offerings that are available beyond Baden-Württemberg. The aim is to draw on further links of the semiconductor value chain, in addition to chip design, to promote the development of innovative AI hardware, such as capacities in the areas of characterization, packaging and (sub-)system technology.

Fraunhofer Heilbronn Research and Innovation Centers HNFIZ

The Chip AI center will be the ninth research and innovation center to complement the Fraunhofer activities in Heilbronn. The Dieter Schwarz Foundation has been funding the centers since 2019. The first eight centers were established in 2025 following an expansion of the cooperation. Six Fraunhofer institutes—the Fraunhofer Institute for Industrial Engineering IAO, the Fraunhofer Institute for Systems and Innovation Research ISI, the Fraunhofer Institute for Intelligent Analysis and Information Systems IAIS, the Fraunhofer Institute for Manufacturing Engineering and Automation IPA, the Fraunhofer Institute for Secure Information Technology SIT and the Fraunhofer Information Center for Planning and Building IRB—contributed their expertise in the first step, aiming to advance relevant future-oriented issues related to AI. The two institutes Fraunhofer IAF and IIS have now also taken up their activities in Heilbronn.

The research portfolio of the nine Fraunhofer research and innovation centers is aimed specifically at addressing urgent present-day challenges and demands of industry and society. The concept is based on a close cooperation with companies, universities and public institutions. In-depth dialogue with innovators in Heilbronn gives rise to an unparalleled scientific ecosystem that allows for rapid technology transfer and economic utilization of research results. Plans call for the solutions and technologies developed in Heilbronn to be used across Europe and beyond, thereby strengthening Germany and the entire region in a lasting fashion.

Press release

03-Mar-2026
Source: Fraunhofer-Gesellschaft zur Förderung der angewandten Forschung e.V.

Further information

- Fraunhofer-Gesellschaft zur Förderung der angewandten Forschung e.V.