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Type: **Keynote**

# The SpiNNaker2 neuromorphic system for large-scale brain simulation and energy-efficient AI

*Tuesday 17 June 2025 15:30 (45 minutes)*

TU Dresden has recently completed the construction of the world's largest brain-inspired supercomputer „SpiNNcloud“, which will allow the real-time simulation of up to 5 billion neurons. It is based on the neuromorphic “SpiNNaker2” chip featuring 152 low-power ARM cores and digital accelerators to speed up the processing of spiking and deep neural networks. The overall system comprises a scalable communication infrastructure enabling the low-latency multi-cast routing of event packets such as spikes. All of this makes SpiNNaker2 a unique platform to explore large-scale brain simulation and neuro-inspired AI algorithms. This talk will introduce the SpiNNaker2 chip and system architecture and explain how spiking neural networks are simulated in real-time. Further, we will show examples of using SpiNNaker2 for efficient event-based AI processing. Finally, we will provide an overview of the software stack (including efforts on supporting NESTML) and give an outlook on the access options for SpiNNaker2.

## Acknowledgements

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## References

## Preferred form of presentation

Talk (& optional poster)

## Topic area

Simulator technology and performance

## Keywords

SpiNNaker2, Neuromorphic Hardware, Brain Simulation, Spiking Neural Networks

## Speaker time zone

UTC+2

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**Session Classification:** Keynote