

## Seminar Description

### “Future Computing”

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Language: English, but written reports in German will be accepted.

The seminar will be offered in every semester (i.e., in both WiSe and SoSe).

**Abstract:** Technology scaling is approaching its end in which breakthroughs become inevitable. This holds even more after starting the massive production of commercial processors at 7nm technology nodes. At such an extreme scale, obtaining further improvements in the efficiency of processors become profoundly difficult.

In this seminar, the students will learn and explore the new trends in future computer architecture such as in-memory computing, near-memory computing, and neuromorphic computing, which promise a significant improvement in computing efficiency as they go beyond the traditional von Neumann architecture that has been employed for decades. Students will also explore how emerging technologies beyond traditional CMOS will reshape the future of computing.

State-of-the-art scientific publications from the following fields will be covered:

- In-Memory and Near-Memory Computing.
- Brain-Inspired Computing and Neuromorphic Computing.
- Emerging Non-volatile Memories.
- Emerging Technologies for Future Low-Power Processors.

#### **The following requirements are planned for the seminar:**

- A 30-minute oral presentation in English.
- One set of presentation slides (PowerPoint, Latex, PDF, Open Office, etc.).
- A written report on the topic in Latex or Word. The report must be between 8 to 10 pages summarizing the research papers that the student studied. The report can be in German or English (student's choice).
- Attendance at the presentations of other participants, attendance at the regular meetings during the semester, and active participation in the discussions.

A detailed seminar description will be distributed in the first meeting (preliminary discussion), which contains the exact requirements for the presentation and the written report. This description will also contain a list of topics and list of research papers, which the students are requested to read. The deadlines will also be discussed and decided in the first meeting.