MOCAST

INTERNATIONAL CONFERENCE ON MODERN CIRCUITS AND SYSTEMS TECHNOLOGIES

- **11-13 June 2025**
- **Dresden University of Technology (TUD), Dresden, Germany**
- **https://tud.de/ing/mocast2025**

Special Session Announcement: EMERGING MEMORY DEVICES FOR IN-MEMORY AI: FROM MATERIALS TO SYSTEM INTEGRATION

The 14th International Conference on Modern Circuits and Systems Technologies (MOCAST) aims to bring together leading academic and industrial scientists and researchers to exchange and share their knowledge and experiences about all aspects of Circuits and Systems.

Session Description:
Scaling AI requires rethinking computing architectures beyond von Neumann constraints. **Emerging memory devices** enable **in-memory computing (IMC)**, reducing power and latency by performing computation within the memory itself.

At the **device level**, advances in **materials, switching mechanisms, and fabrication techniques** allow for highly dense, low-power computation. At the **circuit level**, crossbar arrays and mixed-signal processing enable efficient **matrix-vector multiplications (MVM)** for AI acceleration. At the **system level**, hardware-software co-design optimizes precision, reliability, and real-world deployment.

This session will explore how **device physics, circuit design, and AI architectures** come together to enable the next generation of **memory-centric AI computing**.

Special Session Organizers:
Alptekin Vardar, Fraunhofer IPMS, Germany
Maximilian Lederer, Fraunhofer IPMS, Germany
Thomas Kämpfe, Fraunhofer IPMS, Germany

List of Topics (but not limited to):

- **Device-Level Innovations for In-Memory Computing**
Advances in memristive, ferroelectric, and magnetic devices for AI, focusing on switching mechanisms, material challenges, and strategies to improve variability, endurance, and reliability.
- **In-Memory Computing Architectures and Circuits**
Crossbar-based accelerators for matrix-vector multiplication, mixed-signal and analog computing for deep learning, and circuit designs optimized for low-power AI workloads.
- **Hardware-Software Co-Design**
Precision-aware AI models, hardware-aware training, and compiler frameworks to co-optimize performance, power, and accuracy in memory-centric systems.
- **Use Cases and Applications**
Energy-efficient machine learning inference, secure and private AI execution on-chip to reduce attack surfaces, and ultra-low-power AI solutions for real-time processing in edge devices.
- **Security, Reliability, and Future Directions**
Error correction and noise compensation for stable operations, resilient architectures for fault tolerance, and emerging trends in AI models optimized for in-memory computing and hybrid memory systems.

MOCAST is Technically Sponsored by IEEE. All accepted papers are expected to be included in IEEE Xplore and will be indexed by EI.
Authors of selected accepted papers will be invited to submit extended version of their paper to the MOCAST Special Issue at **Advanced Electronic Materials**.

Important Dates:

17.03.2025 Deadline for Regular Paper Submission	**17.03.2025** **Deadline for Special Session Paper Submission**	**17.04.2025** Acceptance Notification for Papers	**24.04.2025** Camera-ready Submission for all Papers	**24.04.2025** Early Bird Registration deadline	**11.-13.06.2025** MOCAST 2025 conference in Dresden