IEEE ELECTRON DEVICES SOCIETY

imw 2025

17th International Memory Workshop

May 18th – 21st 2025

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Advisory Committee:

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Thomas Mikolajick, *Namlab&TU,* Germany

Summary of Events

Sunday, May 18th

Breakfast (Provided)	7:30AM – 8:30AM
Tutorial #1 – HBM	8:30AM – 11:30AM
Lunch (Provided)	11:30AM – 1:15PM
Tutorial #2 – Emerging Memory	1:15 PM – 4:15PM

Monday, May 19th

Breakfast (Provided)	7:30AM – 8:30AM
Opening remarks	8:30AM – 8:50AM
Session #1 – Keynotes	8:50AM – 10:20AM
Session #2 – DRAM	10:50AM – 12:05PM
Lunch (Provided)/Committee Luncheon	12:05PM – 2:05PM
Session #3 – NAND I	2:05PM – 3:45PM
Poster Session + Reception	5:30PM – 8:30PM

Tuesday, May 20th

Breakfast (Provided)	7:30AM – 8:30AM
Session #4 – In-Memory Computing	8:30AM – 10:10AM
Session #5 – NAND II	10:40AM – 12:20PM
Lunch (Provided)	12:20PM – 2:15PM
Session #6 – Emerging Memory	2:15PM – 3:55PM
Panel Discussion	4:20PM – 5:30PM
Banquet	7:00PM – 9:00PM

Wednesday, May 21st

Breakfast (Provided)	7:30AM – 8:30AM
Session #7 – NAND III	8:30AM – 10:10AM
Session #8 – Ferro	10:40AM – 11:55AM
Closing Remarks – Best papers awards	11:55AM – 12:15PM

Sunday, May 18th

07:30AM *Breakfast (Provided)*

Tutorial #1 8:30AM – 11:30AM Advanced DRAMs and HBM

Chair: **Motoyuki Sato**, *TEL*
Katherine Chiang, *TSMC*

08:30AM **Gaurav Thareja**, *Applied Materials*, "Materials, Processes and Systems Co-optimization for advanced HBMs"

09:20AM **Han Suk Ko & Younsoo Kim**, *SK hynix*, "HBM & Memory Opportunity/Challenge for AI"

10:10AM—10:40AM *Coffee Break*

10:40AM **Gautam Bhatia**, *NVIDIA*, "GPU Memory for AI"

11:30AM—1:15PM *Lunch (Provided)*

Tutorial #2: 1:15PM – 4:15PM Emerging Memory

Chair: **Ludovic Goux**, *imec*
Stephan Menzel, *Forschungszentrum Jülich*

1:15PM **Kai Ni**, *University of Notre Dame*, "Rethinking Vertical NAND: How Ferroelectrics Can Potentially Change the Game"

2:05PM **Mattia Boniardi**, *ST Microelectronics*, "Embedded Phase Change Memory: From Device Physics to AI-oriented Applications"

2:55PM—3:25PM *Coffee Break*

3:25PM **Enrico Piccinini**, *Applied Materials*, "Simulation-driven material engineering for memory devices"

Monday, May 19th

Poster Session 6:00PM – 8:30PM

[P1] Teng-Hao Yeh, *Macronix International (MXIC)*, "Utilizing 2T SONOS Cell Characteristics for L2/Euclidean Distance Computing – From Unit Cell to Array Operations"

[P2] Anurag Swarnkar, *imec,* "Design Technology Co-Optiomzation of 3D SRAM Macro in Nanosheet Technology for High-Bandwidth Applications"

[P3S] Tarcisius Januel, *CEA-Leti, Univ. Grenoble Alpes*, "Dual-Mode 16kb Memory: Transforming a Ferroelectric Capacitor Bitcell into Resistive Filamentary Memory"

[P4] Po-Hao Tseng, *Macronix International (MXIC)*, "Monolithic 3D Macro Integrating CMOS with Ambipolar SONOS Tunnel FET for High Performance Edge-AI Computing Applications"

[P5] David Lehninger, *Fraunhofer IPMS*, "Al-Doped HZO: A BEoL compatible Ferroelectric Material for Automotive-Grade Memory"

[P6] Wooseok Choi, *IBM*, "Hardware Implementation of Ring Oscillator Networks Coupled by BEOL Integrated ReRAM for Associative Memory Tasks"

[P7] Enrico Piccinini, *Applied Materials*, "Simulation of Ge-rich PCM Device Material Evolution from Post-Deposition Anneal to Programming Operations"

[P8S] Junnosuke Furukawa, *University of Tokyo*, "Bayesian Neural Network Realization by Random Telegraph Noise in 40nm TaOX ReRAM CiM"

[P9S] Marcelo Correa Cueto, *Weebit Nano Ltd*, "Relaxation-Aware Programming in RRAM: Evaluating and Optimizing Write Termination"

[P10S] Mufeng Chen, *Purdue University*, "Analog Multilevel eDRAM-RRAM CIM for Zeroth-Order Fine-tuning of LLMs"

[P11S] Pufan Xu, *Tsinghua University*, "A Precision-Adaptive ECC Strategy with Computing Fusion Decoding for Near/In-Memory Computing"

[P12] Koji Sakui, *Unisantis*, "Dynamic Flash Memory Operation Experimentally Validated with 65nm SOI Technology"

[P13S] Djihad Nacereddine Bouakaz, *KU Leuven*, "1kb IGZO TFT based Static Random Access Memory for IoT applications"

[P14] John Hoang, *Lam Research Corporation*, "Enabling Merged 3D NAND Memory Hole and Interlayer Dielectric (ILD) Contact Etches with Deposition and Etch Co-Optimization (DECO)"

[P15] Joshua Collins, *Lam Research Corporation*, "Deposition of ALD-Molybdenum for Flash Memory Wordline Metallization"

Monday May 19th

07:30AM *Breakfast (Provided)*
08:30AM **Haitao Liu**, **Opening Remarks**

Session #1 8:50AM – 10:20AM Keynotes
Chairs: **Haitao Liu,** *Micron Technology*
Sangbum Kim, *Seoul National Univ.*

8:50AM **[1.1] Krishnan Subramanian**, *Micron Technology*, "NAND flash innovation in the AI Era" ***--Invited***
9:20AM **[1.2] Su Jin Ahn**, *Samsung Electronics*, "Future Technology Outlook on DRAM/Flash Memories for More Moore and More Than Moore" ***--Invited***
9:50AM **[1.3] Dmitri Strukov**, *UCSB*, "Controlling ReRAM's Switching Characteristics with Shadow Memory for Continual Learning" ***--Invited***
10:20AM *Break*

Session #2 10:50AM – 12:05PM DRAM
Chairs: **Motoyuki Sato**, *TEL*
Frederick Chen, *Winbond*

10:50AM **[2.1] Daisuke Matsubayashi**, *imec*, "Accurate off-current evaluation by parasitic capacitance extraction in capacitor-less DRAM cells"
11:15AM **[2.2S] Po-Kai Hsu**, *Georgia Institute of Technology*, "Monolithic 3D Stackable DRAM Design with BEOL-Compatible Oxide Channel Access Transistor"
11:40AM **[2.3] Onur Mutlu**, *ETH Zurich*, "Memory-Centric Computing: Solving Computing's Memory Problem" ***--Invited***
12:05PM *Lunch (Provided) / Committee Luncheon*

Session #3 2:05PM – 3:45PM NAND I
Chairs: **Ravi Kumar**, *Infineon*
Henry Chin, *Sandisk*

2:05PM **[3.1] Hiroshi Maejima**, *Kioxia*, "Crossed Bit Line Architecture (CBL) in 3D Flash memory CMOS Directly Bonded to Array (CBA) Structure"
2:30PM **[3.2] Chanyang Park**, *Samsung Electronics*, "First Demonstration of Threshold Voltage Modeling in Multi-Hole V-NAND Flash Architecture with Noncircular Channel Hole Profiles"
2:55PM **[3.3] Sana Rachidi**, *imec*, "Hole-Side Airgap Integration as Enabler for 3D NAND Flash Z-Pitch Scaling"
3:20PM **[3.4] Masaaki Higuchi**, *Micron Technology*, "Modeling of the impact of elliptical shapes on main Read Window Budget mechanisms in 3D NAND"

Reception 5:30PM – 8:30PM
Sponsored by Applied Materials

Poster Session 6:00PM – 8:30PM
Chair: Arun Karamcheti, *Applied Materials*

Tuesday May 20th

07:30AM *Breakfast (Provided)*

Session #4 8:30AM – 10:10AM In-Memory Computing
Chairs: **Mattia Boniardi,** *ST Microelectronics*
Takumi Mikawa, *Screen*

8:30AM **[4.1] Steven Lemke**, *SST*, "Reliability and Accuracy of a Qualified Split-Gate Flash In-Memory Compute Technology" ***--Invited***
8:55AM **[4.2S] Hechen Ji**, *Beijing University of Posts and Telecommunications*, "High-parallel In-memory Data Sorting based on 40nm Analog RRAM Chip"
9:20AM **[4.3S] Eknath Sarkar**, *Georgia Institute of Technology*, "Analog In-Memory-Compute with Multi-bit Silicon Ferro FinFET Array for Improved Energy and Area Efficiency"
9:45AM **[4.4] Sidney Tsai**, *IBM*, "Analog AI Accelerators for Transformer-based Language Models: Hardware, Workload, and Power Performance" ***--Invited***
10:10AM *Break*

Session #5 10:40AM – 12:20PM NAND II
Chairs: **Antonio Arreghini**, *imec*
Fumie Kikushima, *Kioxia*

10:40AM **[5.1] Kana Kudo**, *Kioxia*, "Energy-Efficient In-Memory Computing using 3D Flash Memory with Sequential Multi-Block Activation and Current Control Cell (CC cell)"
11:05AM **[5.2] Junyoung Lee**, *Samsung Electronics*, "Development of Innovative Self-Aligned SSL Mold (SASM) Scheme with Remarkable Reduction of Chip Size"
11:30AM **[5.3] Teng-Hao Yeh**, *Macronix International (MXIC)*, "A Novel 3D Stacked Vertical-Channel High-Voltage Peripheral Transistor for Largely Scaled the WL Driver Circuit of 1000-layer 3D NAND Flash"
11:55AM **[5.4] Albert Chen**, *Sandisk*, "On the Challenges of Open-Block Reads in 3D NAND"
12:20PM *Lunch (Provided)*

Session #6 2:15PM – 3:55PM Emerging Memory
Chairs: **Michiel van Duuren**, *NXP*
Stephan Menzel, *Forschungszentrum Jülich*

2:15PM **[6.1] John Sung**, *MXIC*, "Enhancing 3D XPT/SOM Reliability: Strategies for Mitigating Spike Current and Improving Read Endurance" ***--Invited***
2:40PM **[6.2S] Song-hyeon Kuk**, *KAIST*, "Proposal of Block Erase and Verify Schemes for Ferroelectric NAND: Overcoming Critical Challenges from Threshold Voltage Polarity"
3:05PM **[6.3] Thi Van Anh Nguyen**, *Tohoku Univ.*, "Low write power and Field-free sub-ns write speed SOT-MRAM cell with Design Technology of Canted SOT structure and Magnetic Anisotropy for NVM"
3:30PM **[6.4] Syed M. Alam**, *Everspin*, "STT-MRAM Antifuse Macro for Memory, SoC, and FPGA Chips" ***--Invited***
3:55PM *Break*

Panel Discussion 4:20PM – 5:50PM
Topic: "Memories for AI"
Moderator: **Jian Chen**, *Micron Technology*
Panellists: **Insoo Yoon**, *Sandisk*
Seho Lee, *SK hynix*
Sidney Tsai, *IBM*
Anand Joshi, *TechInsight*

Banquet 7:00PM – 9:00PM

Wednesday May 21st

07:30AM *Breakfast (Provided)*

Session #7 8:30AM – 10:10AM NAND III
Chairs: **Yong Kyu Lee**, *Samsung Electronics*
Prashant Majhi, *Intel*

8:30AM **[7.1] Tae-Gon Lee**, *Samsung Electronics Co.*, "On-Chip Capacitors with Wall-Type Structure in 9th Generation 3D VNAND Flash Memory"
8:55AM **[7.2] Abhijith Prakash**, *Sandisk*, "Low Cost 'On Pitch Select Gate' (OPS) Technology for 3D Flash Memory"
9:20AM **[7.3] Jeongyoon Yeo**, *Samsung Electronics*, "Innovative V-NAND Flash Structure with Dual Trap Layer for Future Generations of Multi-Bit Device"
9:45AM **[7.4] Hao-Ling Tang**, *Applied Materials*, "Demonstration of Conformal MoS2 on High-Aspect-Ratio Structures up to 40:1 and Exploration of Manufacturability in a 300mm Fab for 3D NAND applications"
10:10AM *Break*

Session #8 10:40AM – 12:15PM Ferro
Chair: **Prashant Majhi**, *Intel*
Jun Okuno, *SONY*

10:40AM **[8.1S] Mor Dahan**, *Technion – Israel Institute of Technology*, "Novel Ultrafast Non-Destructive Readout of FeRAM by Low-Voltage Transient Current"
11:05AM **[8.2S] Lance Fernandes**, *Georgia Tech*, "Comparative Study of Channel Materials for Ferroelectric NAND Applications"
11:30AM **[8.3] Asif Khan**, *Georgia Tech*, "Ferroelectrics for Vertical NAND Flash Applications" ***--Invited***

11:55AM **Haitao Liu**, **Closing Remarks**
12:05PM **Sangbum Kim**, **Best Paper Award Announcement**