7th IEEE Electron Devices Technology and Manufacturing (EDTM) Conference 2023



Program Book

Strengthen the global semiconductor research collaboration after the covid-19 pandemic

2023

March 7th - 10th, 2023 Coex, Seoul, Korea

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Sponsored	by												
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IEEE EDTM 2023

7th IEEE Electron Devices Technology and Manufacturing (EDTM) Conference 2023



On behalf of the Organizing Committee of IEEE EDTM 2023, it is my pleasure to invite you to the 7th Electron Devices Technology and Manufacturing Conference (IEEE EDTM 2023), which will be held during March 7-10, 2023 at Coex, Seoul, Korea.

IEEE EDTM is a premier conference, providing a unique forum where device, process, material, and tool communities gather and discuss their novel ideas for technological breakthrough. The conference rotates among Asian countries where hot-hubs of semiconductor manufacturing are located; and this year, it will take place for the first time in Seoul, Korea.

IEEE EDTM 2023 will include prestigious plenary talks, keynote/invited talks, tutorials & short courses, and technical sessions (oral and poster presentations) on device/manufacturing-related topics, including but not limited to, materials, processes, devices, packaging, modeling, reliability, manufacturing and yield, tools, testing, and any emerging device technologies, as well as workforce training.

I sincerely hope that all of our participants will take this unique opportunity to present your recent research and development highlights, interact with your colleagues and peers, and have deep and profound discussions. And I believe that with the diverse academic programs and social activities we have prepared, IEEE EDTM 2023 will be a memorable and rewarding experience for all of our participants.

Again, on behalf of the Organizing Committee, I would like to sincerely invite you to the IEEE EDTM 2023.

Let's make the Conference fruitful and plentiful together.

Changrock Song

Byoung Hun Lee Lee Byoung Hun

IEEE EDTM 2023 General Co-Chair Professor

IEEE EDTM 2023 General Chair EVP, Head of CIS Development SK hynix

Pohang University of Science and Technology





• Steering Committee

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IEEE EDTM 2018 General Chair	Hitoshi Wakabayashi (Tokyo Institute of Technology)
IEEE EDTM 2019 General Chair	Geok Ing Ng (Nanyang Technological University)
IEEE EDTM 2021 General Chair	Albert Wang (University of California, Riverside)

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Executive Committee

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1. Materials

Chair	C. J. Su (National Yang Ming Chiao Tung University)
Co-Chair	Kiyoung Lee (Hongik University)
Member	Soon-Yong Kwon (Ulsan National Institute of Science and Technology)
	Young Duck Kim (Kyung Hee University)
	Young Joon Hong (Sejong University)
	Jinseong Heo (Samsung Advanced Institute of Technology)
	Donghyun Im (Samsung Electronics Semiconductor R&D Center)
	Lain-Jong (Lance) Li (The University of Hong Kong)
	Francesca Iacopi (University of Technology Sydney)
	Martin M. Frank (IBM T.J. Watson)
	Milan Pesic (Applied Materials)
	Mengwei Si (Shanghai Jiao Tong University)

2. Process, Tools, Yield, and Manufacturing

Chair	Tomasz Brozek (PDF Solutions)
Co-Chair	Min Hyuk Park (Seoul National University)
Member	Sang-Joon Cho (Park Systems Corp.)
	Ki Soo Chang (Korea Basic Science Institute)
	Woo-Hee Kim (Hanyang University)
	Woongkyu Lee (Soongsil University)
	Hanwool Yeon (Gwangju Institute of Science and Technology)
	Seung Wook Ryu (SK hynix)
	Jong Hyun Lee (Samsung Electronics Co., Ltd.)
	Makoto Miura (Hitachi High-Tech)
	Angelo Pinto (Intel)
	Ming Li (Peking University)
	Anupam Mitra (Kioxia Corporation)
	Shinichi Yoshida (Sony Semiconductor Solutions Co.)
	Shawn Thomas (Applied Materials)
	Yoshiki Yamamoto (Renesas)
	Huimei Zhou (IBM)
	Shimpei Tsujikawa (Tokyo Electron Ltd.)

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3. Process, Tools, Yield, and Manufacturing

Chair	Gong Xiao (National University of Singapore)
Co-Chair	Sanghyeon Kim (Korea Advanced Institute of Science and Technology)
Member	Woo Young Choi (Seoul National University)
	YeonJoo Jeong (Korea Institute of Science and Technology)
	Hyuk-Jun Kwon (Daegu Gyeongbuk Institute of Science and Technology)
	Byung Chul Jang (Kyungpook National University)
	Kyung Chul Jang (SK hynix)
	Masaharu Kobayashi (The University of Tokyo)
	Yuichiro Mitani (Tokyo City University)
	Kimihiko Kato (National Institute of Advanced Industrial Science and Technology)
	Kuniyuki Kakushima (Tokyo Institute of Technology)
	Bin Gao (Tsinghua University)
	Naoto Horiguchi (imec)
	Roger Booth (Qualcomm)
	Wei Cao (Intel)
	Han Wang (TSMC)
	Jixuan Wu (Shandong University)
	Avirup Dasgupta (Indian Institute of Technology Roorkee)
	Runsheng Wang (Peking University)

4. Memory Technologies

Chair	Tuo-Hung Hou (National Yang Ming Chiao Tung University)
Co-Chair	Seung Jae Baik (Samsung Electronics Co., Ltd.)
Member	Myounggon Kang (Korea National University of Transportation)
	Si Joon Kim (Kangwon National University)
	Yongwoo Kwon (Hongik University)
	Tae-Sik Yoon (Ulsan National Institute of Science and Technology)
	Kyung Min Kim (Korea Advanced Institute of Science and Technology)
	Jiyong Woo (Kyungpook National University)
	Matthew Marinella (Arizona State University)
	Qiangfei Xia (University of Massachusetts at Amherst)
	Kai Ni (Rochester Institute of Technology)
	Wilman Tsai (Stanford University)
	Jianshi Tang (Tsinghua University)
	Bing Chen (Zhejiang University)
	Gabriele Navarro (CEA-Leti)



5. Photonics, Imaging and Display

Chair	Kai Wang (Sun Yat-Sen University)
Co-Chair	Sung Hun Jin (Incheon National University)
Member	Hyeongjin Kim (Inha University)
	Jeongkyun Roh (Pusan National University)
	Junyoung Song (Incheon National University)
	Ki Jun Yu (Yonsei University)
	Sang Min Won (Sungkyunkwan University)
	Gang Li (Hong Kong Polytechnic University)
	Hang Zhou (Peking University)
	Shang-Hua Yang (National Tsing Hua University)

6. Power and Energy Devices

Chair	Wai Tung Ng (University of Toronto)
Co-Chair	Jungwoo Oh (Yonsei University)
Member	Ho-Young Cha (Hongik University)
	Donghyun Kim (Korea Advanced Nano Fab Center)
	Hyung-Seok Lee (Electronics and Telecommunications Research Institute)
	You Seung Rim (Sejong University)
	Hyemin Kang (Korea Institute of Energy Technology)
	Carol Zhan (ON Semiconductor)
	Man Hoi Wong (The Hong Kong University of Science and Technology)
	Qian Sun (Suzhou Institute of Nano-Tech and Nano-Bionics)
	Shu Yang (Zhejiang University)
	Hyun-Seop Kim (Bristol University)
	Wataru Saito (Kyushu University)
	Hiroshi Yano (University of Tsukuba)
	Ray Hueting (University of Twente)
	Jae-Hyun Ryou (University of Houston)

7. Modeling and Simulation

Chair	Guofu Niu (Auburn University)
Co-Chair	Rock-Hyun Baek (Pohang University of Science and Technology)
Member	Jiwon Chang (Yonsei University)
	Daewoong Kwon (Hanyang University)
	Sung-Min Hong (Gwangju Institute of Science and Technology)
	Jaewoo Lee (Korea University)
	Paul Zhou (ADI)
	Chika Tanaka (Kioxia Corporation)
	Lan Wei (University of Waterloo)
	Darsen Lu (National Cheng Kung University)
	Victor Moroz (Synopsys)
	Slobodan Mijalkovic (Silvaco)
	Elena Gnani (University of Bologna)
	Mansun Chan (The Hong Kong University of Science and Technology)
	Junsik Yoon (Synopsys)

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8. Reliability

Chair	Stanislav Tyaginov (imec)		
Co-Chair	Minsoo Yoo (SK hynix)		
Member	Hyun-Yong Yu (Korea University)		
	Jin-Woo Han (Samsung Electronics Co., Ltd.)		
	Sangwan Kim (Sogang University)		
	Heungsik Park (SK hynix)		
Rino Choi (Inha University)			
Fransesco Maria Puglisi (University of Modena)			
	Raghavan Nagarajan (Singapore University of Technology and Design)		
	Pragya Shrestha (National Institute of Standards and Technology)		
	Charles Larow (Intel)		
Gerhard Rzepa (GTS)			
Susanna Regianni (University of Bologna)			
	Koji Eriguchi (Kyoto University)		
	Yasuo Cho (Tohoku University)		

9. Packaging and Heterogeneous Integration

Chair	Akihiro Horibe (IBM Research Tokyo)	
Co-Chair	Hak-Sung Kim (Hanyang University)	
Member	Changhwan Choi (Hanyang University)	
	Min Hyung Lee (Korea Institute of Industrial Technology)	
	Jin Kyu Kim (DUKSAN Hi-Metal Co., Ltd.)	
	Gu-sung Kim (Kangnam University)	
	Taek-Soo Kim (Korea Advanced Institute of Science and Technology)	
	Ki-II Moon (SK hynix)	
	Bongyoung Yoo (Hanyang University)	
	Caroline Sunyong Lee (Hanyang University)	
	Tanja Braun (Fraunhofer IZM)	
	Bioh Kim (Yield Engineering System Inc.)	
	Chang-Chun Lee (National Tsing Hua University)	



10. Sensor, MEMS, Bio-Electronics

Chair	Hongyu Yu (The Hong Kong University of Science and Technology)	
Co-Chair	Hyunjoo Jenny Lee (Korea Advanced Institute of Science and Technology)	
Member	Hyunwoo Kim (Hanyang University)	
	Donghyun Kim (Yonsei University)	
	Sung Jae Kim (Seoul National University)	
	Sungjoon Park (Korea Advanced Institute of Science and Technology)	
	Jae-Hyuk Ahn (Chungnam National University)	
	Shuji Tanaka (Tohoku University)	
	Beomjoon Kim (The University of Tokyo)	
	Xiaoyi Wang (Beijing Institute of Technology)	
	Wei Wang (Peking University)	

11. Flexible and Wearable Electronics

Chair	Feng Yan (Hong Kong Polytechnic University)	
Co-Chair	Yong-Young Noh (Pohang University of Science and Technology)	
Member	Do Hwan Kim (Hanyang University)	
	Kibum Kang (Korea Advanced Institute of Science and Technology)	
	Keehoon Kang (Seoul National University)	
	Jimin Kwon (Ulsan National Institute of Science and Technology)	
	Sungjun Park (Ajou University)	
	Kenjiro Fukuda (RIKEN)	
	Vincenzo Pecunia (Simon Fraser University)	
	Gerardo Hernandez-Sosa (Karlsruhe Institute of Technology)	
	Ji Tae Kim (Hong Kong University)	
	Xiaojun Guo (Shanghai Jiao Tong University)	

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12. Nanotechnologies

Chair	Xinran Wang (Nanjing University)	
Co-Chair	Gwan-Hyoung Lee (Seoul National University)	
Member Jang-Yeop Son (Korea Institute of Science and Technology)		
	Hyobin Yoo (Sogang University)	
	Joonki Suh (Ulsan National Institute of Science and Technology)	
	Jae Sung Son (Ulsan National Institute of Science and Technology)	
	Felix Sunjoo Kim (Chung-Ang University)	
	Qing Tu (Texas A&M University)	
	Yoshitaka Okada (University of Tokyo)	
	Huamin Li (University at Buffalo, The State University of New York)	

13. Disruptive Technologies - IoT, AI/ML, Neuromorphic & Quantum Computing

Chair	Gina Adam (George Washington University)	
Co-Chair	Jin-Hong Park (Sungkyunkwan University)	
Member	Kyung Rok Kim (Ulsan National Institute of Science and Technology)	
	Geun Huh (Jeonbuk National University)	
	Saeroonter Oh (Hanyang University)	
	Myungsoo Kim (Ulsan National Institute of Science and Technology)	
	Bongjun Kim (Sookmyung Women's University)	
	Donghee Son (Sungkyunkwan University)	
	Xiaojian Zhu (Chinese Academy of Sciences)	
	Bonan Yan (Peking University)	
	Ying-Chen (Daphne) Chen (Northern Arizona University)	
	Matthew W. Daniels (National Institute of Standards and Technology)	
	Changjin Wan (Nanjing University)	





Materials

• Chair: C. J. Su (National Yang Ming Chiao Tung University)

• Co-Chair: Kiyoung Lee (Hongik University) All device-related materials, including semiconductors, magnetics, ferroelectrics, insulators, metals, liquid crystals, photoresist, organic films, precursors, EUV photoresist, etching gas, filaments, and phase-changing materials. Materials engineering for reducing costs, and improving reliability/ yield/manufacturability. Smart materials enabling intelligent devices are highly welcome.

Process, Tools, Yield, and Manufacturing

- Chair: Tomasz Brozek (PDF Solutions)
- Co-Chair: Min Hyuk Park (Seoul National University) Semiconductor processes and equipment, including process modules (deposition, dry/wet etch, cleaning, planarization, isolation, dielectrics, metals, silicides, lithography), process integration, process control, equipment impact on devices, reliability and yield, self-assembly techniques, process sensing, process enhancement by Al/ML, etc.

③ Semiconductor Devices

- Chair: Gong Xiao (National University of Singapore)
- Co-Chair: Sanghyeon Kim (Korea Advanced Institute of Science and Technology) All semiconductor devices including Si/Ge CMOS, interconnects, compound semiconductors, oxide semiconductors, low-dimensional nanomaterials (van der Waals heterostructures, nanowires, nanotubes, nanosheets, quantum dots), ferroelectric, spintronics, 3D devices, RF/THz devices, etc. Emerging device concepts for future computing are encouraged, such as tunnel FET, negative capacitance FET, topological insulators, phase transitions, Qubit devices, etc.

④ Memory Technologies

- Chair: Tuo-Hung Hou (National Yang Ming Chiao Tung)
- Co-Chair: Seung Jae Baik (Samsung Electronics Co., Ltd.) All memories, including embedded and standalone memories, volatile and nonvolatile memories, in-memory and neuromorphic computing. Topics on charge-based memories, RRAM, MRAM, PCM, FeRAM, cross-point and selectors, bio-inspired memory, scaling, processing, characterization, reliability, modeling, 3D integration, read/write/erase, novel hierarchies and architectures for memory-centric computing.

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5 Photonics, Imaging and Display

- Chair: Kai Wang (Sun Yat-Sen University)
- Co-Chair: Sung Hun Jin (Incheon National University) Topics on photonics, photonics for energy, optoelectronics, microwave photonics, nanophotonics, optical sensors incluing emerging materials, perovskites, etc, optical communications/networking, optical switch, bio-photonics, lasers, optical systems, bio-imagng, imagers, display technology including QLEDs, OLEDs, VR, AR, and others, and other emerging technologies in photonics, imaging and display.

6 Power and Energy Devices

- Chair: Wai Tung Ng (University of Toronto)
- Co-Chair: Jungwoo Oh (Yonsei University)

Device technologies related to high-voltage devices, power/RF devices, energy harvesting devices, photovoltaics, energy storage devices, discrete/integrated power devices, power modules/ systems. Power device structures such as diodes, BJTs, FETs, IGBTs. Power device materials such as wide bandgap and ultra-wide bandgap materials (SiC, GaN, AIN, GaO, etc.). Power device fabrication processes, modeling and simulation.

Modeling and Simulation

- Chair: Guofu Niu (Auburn University)
- Co-Chair: Rock-Hyun Baek (Pohang University of Science and Technology) Advanced in modeling/simulation of electron devices, packages, and processes. Numerical, analytical, and statistical modeling/simulation of electronic, optical or hybrid devices, interconnects, technology CAD, benchmarking, monolithic integration, heterogeneous integration, design-technology co-optimization (DTCO), system-technology co-optimization (STCO), parasitic elements, fabrication processes, physical phenomena, mechanical systems, electro-thermal effects, test structures, and methodologies.

8 Reliability

- Chair: Stanislav Tyaginov (imec)
- Co-Chair: Minsoo Yoo (SK hynix)

Advances in reliability of materials, processes, devices, modules and systems including interconnects, ESD, latch-up, soft errors, radiation, noises and mismatch behavior, hot-carrier effects, self-heating, biasing and thermal instabilities, dielectric wear-out and breakdown, process charging damage, elctromigration, reliability test structures and methodologies, defect monitoring and control, electromagnetic robustness, and design-for-reliability. Also, topics on reliability of emerging memories, more-than-Moore application, biomedical devices, automotive, and aerospace application.



Packaging and Heterogeneous Integration

- Chair: Akihiro Horibe (IBM Research Tokyo)
- Co-Chair: Hak-Sung Kim (Hanyang University)
 - Advances in packaging and heterogeneous integration technologies, including 2.1D, 2.5D and 3D integrations. Topics on advanced packaging and manufacturing technologies, such as waferlevel packaging, chiplets, ultra-fine-pitch interconnection, sub-micron package-level wiring, optical/wireless interconnect, power/sensor device packaging, controlling thermal-expansion coefficient, thermal management.

10) Sensor, MEMS, Bio-Electronics

- Chair: Hongyu Yu (The Hong Kong University of Science and Technology)
- Co-Chair: Hyunjoo Jenny Lee (Korea Advanced Institute of Science and Technology) Advances in sensors and actuators including MEMS, BioMEMS/NEMS, transducers, resonators, micro/nano-fluidic devices, bio-sensors, implantable biomedical devices, biomolecular-based memories, bio-transistors, semiconductor synthetic biological devices/ systems, semiconductor synaptic/neural devices, brain-inspired computing, brain-interface devices, and heterogeneous integration with CMOS.

1) Flexible and Wearable Electronics

- Chair: Feng Yan (Hong Kong Polytechnic University)
- Co-Chair: Yong-Young Noh (Pohang University of Science and Technology) Topics on flexible and wearable electronics including flexible and wearable transistors and related integrated circuits, sensors, RFID, light emitting diodes, lighting and display, energy harvesting and storage devices, novel and manufacturing process for flexible and wearable electronics, and materials for flexible and wearable electronics.

12 Nanotechnologies

- Chair: Xinran Wang (Nanjing University)
- Co-Chair: Gwan-Hyoung Lee (Seoul National University) Advances in nanotechnologies including nanomaterials, nanoelectronics, low-dimensional systems including 2D materials and devices, nanophotonics, nanofabrication, nanoenergy, nanobiomedicine, nanosensors, and related nano characterization/modelling techniques.

3 Disruptive Technologies - IoT, AI/ML, Neuromorphic & Quantum Computing

- Chair: Gina Adam (George Washington University)
- Co-Chair: Jin-Hong Park (Sungkyunkwan University) Topics on disruptive technologies.

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Welcome Reception

- Date & Time: March. 7 (Tue.) / 18:00-20:00
- Place: 3F, #327, Coex

All participants are cordially invited to the Welcome Reception. It will be a great opportunity to develop a broad, and diverse network of personal connections with participants from all over the world. Complimentary snacks and beverages will be offered by the Executive Committee of IEEE EDTM 2023.

2 Opening Ceremony

- Date & Time: March. 8 (Wed.) / 09:00-09:15
- Place: 4F, #401, Coex

③ WiEDS (Women in EDS Panel Session)

- Date & Time: March. 8 (Wed.) / 17:00-18:35
- Place: 3F, Room D (#308 bc), Coex
 In conjunction with International Women's Day 2023 and the 75th Anniversary of the Transistor, the IEEE Electron Devices Society has planned a Panel Session at the 2023
 IEEE Electron Devices Technology and Manufacturing Conference (IEEE EDTM 2023).

Rump Session

- Date & Time: March. 8 (Wed.) / 19:30-21:00
- Place: 3F, Room F (#317) / Room G (#318), Coex

The rump session is an opportunity for everyone to get involved. Under the theme of two topics, we encourage discussions of the topics listed below. The audience is encouraged to ask questions, make insightful comments, offer different perspectives, and challenge each other. And there will be lucky draw!

	Rump Session 1	Rump Session 2
Room	Room F (#317)	Room G (#318)
Theme	Sustainability in Semiconductor Manufacturing	Global Semiconductor R&D Cooperation. Is It Still Necessary or Possible to Continue in This Time of Supply Chain Crisis?



5) Banquet

- Date & Time: March. 9 (Thu.) / 18:30-20:30
- Place: 5F, Grand Ballroom, Grand InterContinental Seoul Parnas Hotel. We prepared performances by **Oh My Girl and the Jerk Family** for all participants to experience **K-Culture**.
 - ** Even if you register as a Student or Tutorial / Short Course without the banquet ticket, you can still come to see the special performances.
 - * For those who participate the banquet, please prepare your 'Banquet Ticket' at the entrance.

6 Closing Ceremony

- Date & Time: March. 10 (Fri.) / 15:00-15:30
- Place: 3F, Auditorium, Coex

Participants are required to show the 'Closing Ceremony Ticket' at the entrance. Awards ceremony and lucky draw will be there!

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Registration

- Place: 3F, Lobby, Coex
- Date & Time

	Date	Time
Exhibit Booth Set-Up	March 7 (Tue.) 14:00 ~	
	March 8 (Wed.)	09:00 - 18:00
Exhibititon Hours	March 9 (Thu.)	09:00 – 18:00
	March 10 (Fri.)	09:00 – 15:30
Exhibit Booth Dismantle and Move Out	March 10 (Fri.)	After 15:30



Floor Plan of the Exhibition



Company	Booth No.
SEMILAB	1
DONGJIN SEMICHEM Co., Ltd.	2
Siemens Korea	3
ASICLAND Co., Ltd.	4
TSE	5
SCREEN Semiconductor Solutions Co., Ltd.	6
ONSEMI-Korea	7
NEXTIN, Inc	8
Cadence Design Systems	9
SILVACO	10
WESCO	11

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Company Name	SEMILAB	Company Logo
Address	411~414, 830, Dongtansunhwan-daero, Hwaseong-si, Gyeonggi-do, Republic of Korea	
President	Suyong Park	
Website	www.semilab.com	(φ) SEMILAB
E-mail	shradmin.korea@semilab.com	
Telephone	82+31-630-2172~4	
Fax	82+31-630-2175	
Exhibitor Introduction	SEMILAB is a top professional company that designs, manufactures and sells measuring equipment for the purpose of analyzing electrical characteristics and step monitoring of mass production in high-tech industrial processes such as semiconductor, Photovoltaic, display and developing new materials in R&D.	
Exhibit Description	Metrology tools for Semiconductor / Photovoltaic / Display Industry	
Exhibit Product	Optical Characterization of 3D Structure Contamination Analysis and Monitoring Non Visual Defect Monitoring Electrical Characterization of Dielectric and Interfaces Epi Process Monitoring Ion Implant Monitoring Metallization Control Nano Surface Characterization Bulk Defect Monitoring Thin Film Thickness Measurement	

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➡ [Booth 2] DONGJIN SEMICHEM CO., LTD.

Company Name	DONGJIN SEMICHEM CO., LTD.	Company Logo
Address	644 Baekbeom-ro, Seo-gu, Incheon Republic of Korea	
President	Boo Sup Lee	
Website	www.dongjin.com	DONGJIN SEMICHEM
E-mail	zhum@dongjin.com	
Telephone	+82-31-353-6340	
Fax	+82-31-325-9459	
Exhibitor Introduction	As a pioneer of the Korean fine chemical industry, DONGJIN SEMICHEM has grown steadly along with the development of Korea's electronic materials market. DONGJIN SEMICHEM manufactures and sells display and semiconductor materials as well as materials for renewable energy applications (Rechargeable batteries, fuelcells) and foaming agents.	
Exhibit Description	 First domestic production of ArF Immersion Photoresist Largest share in global market 3D NAND KrF photoresist Largest share in Korean market for semiconductor thinners 	
Exhibit Product	DONGJIN SEMICHEM's semiconductor and display products include chemical process materials such as photoresist(PR), bottom anti-reflective coating(BARC), spin-on-carbon (SOC), chemical mechanical polishing (CMP) slurry, wet chemicals, color resist, organic insulators, etc.	

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Company Name	Siemens Korea	Company Logo
Address	D-Tower 9-10F, 17, Jong-ro 3-gil, Jongno-gu, Seoul 03155	
President	HaJoong Chung	
Website	https://eda.sw.siemens.com/	SIEMENS
E-mail	Support_KR@mentor.com	
Telephone	031-8061-0790	
Fax		
Exhibitor Introduction	Siemens EDA, a segment of Siemens Digital Industries Software, is a technology leader in software and hardware for electronic design automation (EDA). Siemens EDA offers proven software tools and industry-leading technology to address the challenges of design and system level scaling, delivering more predictable outcomes when transitioning to the next technology node. With a closed-loop digital twin managing the silicon lifecycle, data can move freely between design, manufacturing and the cloud for chips, boards and electrical and electronic systems. Our commitment to openness and industry alliances facilitates collaboration and interoperability across the EDA and electronics ecosystem Siemens is where EDA meets tomorrow.	
Exhibit Description	We exhibit machine learning capabilities being integrated into the Calibre platform to support smarter and faster IC manufacturing flows. Productivity, time to market, accuracy, and process window enhancement are all critical metrics that need to be met as we march along the process technology roadmap.	
Exhibit Product	Integration of machine learning in process modeling shows substantial improvements in accuracy and predictability for both the lithographic step as well as the etch step. The Siemens EDA machine learning OPC product, Calibre mIOPC, achieves 3X faster OPC runtimes compared to the prior Calibre OPC technology. Calibre mIOPC utilizes fast, intelligent feature extraction and machine learning algorithms to predict the OPC output to within a single nanometer of accuracy, and in the process eliminates up to 75 percent of OPC run time. In addition to using machine learning in OPC, it is also used in the Calibre LFD tool. The feature's predictive capability focuses on high-risk layout patterns for detailed lithography simulation, removing low-risk patterns from this compute-intensive step. The result is a 10X to 20X performance improvement over full chip model based simulation while maintaining optimal accuracy.	

➡ [Booth 3] Siemens Korea



Company Name	ASICLAND Co., Ltd	Company Logo
Address	3F, Richplaza3, 60, Daehak-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, Republic of Korea	
President	Jongmin Lee	
Website	www.asicland.com	ASICLAND A Promising Journey to Silicon Success
E-mail	asicland@asicland.com	
Telephone	+82-31-212-1984	
Fax	+82-31-212-1985	
Exhibitor Introduction	Drawing on its technologies and know-how, ASICLAND Co., Ltd., an ASIC total solution provider, has developed many semiconductors with high technology for 5nm, 6nm, 7nm, 12nm, 16nm and 28nm process. As the only Korean TSMC VCA(Value Chain Alliance), out of 8 VCAs worldwide, ASICLAND established a close partnership with TSMC, allowing the fabless companies to leverage TSMC's world-class foundry technology and ecosystem. With more than 250 tape-outs completed, ASICLAND has delivered high-quality ASIC products to its customers in a wide range of applications including AI, 5G, Display and Automotive, and committed to the growth of Korean semiconductor industry.	
Exhibit Description	 As an ASIC total solution provider, ASICLAND presents its business model with three divisions covering the entire semiconductor design and manufacturing process. SoC: With expertise of H/W and S/W solutions, it provides 'Spec-in' service, covering all from the initial design architecture to development of boards, F/W and OS porting. Design Service: ASICLAND's front-end, back-end, DFT engineers provide high quality design service from synthesis to GDS. Product Management: As a TSMC VCA, ASICLAND manages its customers' products from IP survey to post-processing, including test, package, QA, according to their requirements and application. 	
Exhibit Product	Business Introduction Materials	

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⑦ [Booth 5] TSE

Company Name	TSE	Company Logo	
Address	189, Gunsu 1-gil, Jiksan-eup, Seobuk-gu, Cheonan-si, Chungnam, 31032, Korea		
President	CH Kim		
Website	www.tse21.com	TSE	
E-mail	tse@tse21.com		
Telephone	+82-41-580-9955		
Fax	+82-41-581-8009		
Exhibitor Introduction	"Toward the Company Creating the Future Value of Technology" As a Technoloby and Science Enabler in the field of Semiconductor Test and Display Test,TSE has developed the innovative technologies needed by its customers and has engaged in continuous research and productivity improvement activities. Founded in 1994, it has engaged as a leader in interface systems for Semiconductor Test.		
Exhibit Description	Semiconductor Total Test Solution		
Exhibit Product	Interface Board, Load Board, Probe Card		

○ [Booth 6] SCREEN Semiconductor Solutions Co., Ltd.

Company Name	SCREEN Semiconductor Solutions Co., Ltd.	Company Logo	
Address	Tenjinkita-machi 1-1,Teranouchi-agaru 4-chome, Horikawa-dori, Kamigyo-ku, Kyoto 602-8585		
President	Masato Goto		
Website	https://www.screen.co.jp/spe/en	SCREEN	
E-mail	screenspe-info@screen.co.jp		
Telephone	+81-75-414-7111		
Fax			
Exhibitor Introduction	Our company started our journey in 1968 from Kyoto, Japan, as the Ishida Kyokuzan Printing Works. In the 1970s, we entered the semiconductor manufacturing equipment market and since have continued to grow alongside our customers, providing the forefront of cost and production efficient technology. We consistently hold the No.1 global share in wafer cleaning equipment, as well as contribute to the evolution of semiconductors through rigorous research and development of wafer surface treatment equipment for resist coating/development/annealing treatment, and agile yet precise inspection and measurement equipment.		
Exhibit Description	We are displaying the product information of SU-3400: our latest single-wafer cleaning equipment technology which debuted in December 2022. The SU-3400 is the latest edition to our SU series, which boasts the No.1 Global share for its de facto standard, consistent cleaning performance. We will also display information regarding: SS-3300S: our latest spin scrubber technology that also holds the No.1 Global share title. SB-3300: wafer back-side cleaning system delivering state-of-the-art performance through simultaneous brush and chemical cleaning functions.		
Exhibit Product	Wafer Cleaning System		

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[Booth 7] ONSEMI-Korea

Company Name	ONSEMI-Korea	Company Logo		
Address	55, Pyeongcheon-ro 850beon-gil, Bucheon-si, Gyeonggi-do, Korea 14487			
President	Byeonggon Kang and 1 other			
Website	https://onsemi-korea.com/	onsemi		
E-mail	Jinsung.hwang@onsemi.com			
Telephone	032-680-1114			
Fax	032-680-1429			
Exhibitor Introduction	onsemi (Nasdaq: ON) is driving disruptive innovations to help build a better future. With a focus on automotive and industrial end-markets, the company is accelerating change in megatrends such as vehicle electrification and safety, sustainable energy grids, industrial automation, and 5G and cloud infrastructure. onsemi offers a highly differentiated and innovative product portfolio, delivering intelligent power and sensing technologies that solve the world's most complex challenges and leads the way to creating a safer, cleaner, and smarter world. onsemi is recognized as a Fortune 500® company and included in the S&P 500® index. Learn more about onsemi at www.onsemi.com.			
Exhibit Description	onsemi has all systems of Substrates, Fab, Devices/Die, Modules, and Applications for developing the SiC(silicon carbide) products.			
Exhibit Product	SiC Boule, SiC Wafer, SiC Module package / Poster			



Company Name	NEXTIN, Inc	Company Logo		
Address	23-12 Dongtansandan 9-gil, Hwaseong-si, Gyeonggi-do 18487 Korea			
President	Chris Park			
Website	www.nextinsol.com			
E-mail	amy.lee@nextinsol.com			
Telephone	031-629-2312			
Fax	031-629-2399			
Exhibitor Introduction	NEXTIN, a technology leading company in patterned defect inspection field of semiconductor industry. Our innovative technology is qualified by leading-edge memory and logic device manufacturers. We keep providing the best solutions of defect inspection to device manufacturers.			
Exhibit Description	Wafer Inspection System			
Exhibit Product	AEGIS Patterned Wafer Inspection System Cost-effective, high-performance defect inspection equipment IRIS Wafer inspection systems for 3-dimensional process High-Aspect-Ratio process of 3D flash memory ResQ Wafer Discharging System Enhancement of EUV Process Yields by Removing Surface & Embedded Electric Charges in Film Stacks KROKY Macro Inspection System Pattern Dimension & Co-planarity Metrology			

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Company Name	Cadence Design Systems	Company Logo	
Address	5 th floor, Gumi-ro 8, Bundang-gu, Seongnam-si, Gyeonggi-do, Republic of Korea		
President	Anirudh Devgan		
Website	www.cadence.com	cadence	
E-mail	korea_crc@cadence.com	cuuciice	
Telephone	031-728-3114		
Fax	031-728-3115		
Exhibitor Introduction	About Cadence Cadence is a pivotal leader in electronic systems design, building upon more than 30 years of computational software expertise. The company applies its underlying Intelligent System Design strategy to deliver software, hardware and IP that turn design concepts into reality. Cadence customers are the world's most innovative companies, delivering extraordinary products from chips to boards to complete systems for the most dynamic market applications, including hyperscale computing, 5G communications, automotive, mobile, aerospace, consumer, industrial and healthcare. For eight years in a row, Fortune magazine has named Cadence one of the 100 Best Companies to Work For. Learn more at www.cadence.com.		
Exhibit Description	Cadence provides accurate solutions for circuit design, circuit verification, PCB design, PCB verification, and PCB verification, including OrCAD, Allegro, Sigrity, and AWR, which are one-stop design processes. Also, VTK supports solutions to customers with long experience and superior technology in the EDA field as a channel partner of Cadence.		
Exhibit Product	Sigrity / Clarity/ Celsius/ Voltus/ EMX / AWR / Allegro/ APD		



Company Name	SILVACO	Company Logo	
Address	5F, Star-City Bldg., 140, Gucheonmyeon-ro, Gangdong-gu, Seoul, Korea		
President	ManGyu Hwang		
Website	https://silvaco.com/ko/	SILVACO	
E-mail	krsales@silvaco.com		
Telephone	82-2-447-5421		
Fax	82-2-447-5420		
Exhibitor Introduction	Silvaco is a leading provider TCAD, EDA software, and semiconductor design IP, used for process and device development for advanced semiconductors, power IC, display, memory, and SoC design. For over 35 years, Silvaco has enabled its customers to develop next generation semiconductor products in the shortest time with reduced cost. The company is headquartered in Santa Clara, California and has a global presence with offices located in North America, Europe, Japan, China, Taiwan, Korea, and Singapore.		
Exhibit Description	Silvaco solutions span from atoms to systems: starting with simulation of material behavior impacting semiconductor devices, to design and analysis of transistor circuits, and lastly providing IP blocks for systems-on-chip (SoC) designs.		
Exhibit Product	 Victory – 2D/3D TCAD Process & Device Simulation Hipex – Full-chip Parasitic Extraction Gateway – Schematic Editor Expert – Layout Editor SmartDRC/LVS – Smart Physical Verification SmartSpice – Circuit Simulator Utmost IV– Device Characterization and SPICE Modeling VarMan – Statistical Variation and Yield Analysis Jivaro– Parasitic Reduction for Fast, Accurate Simulation Viso – Parasitic Analyzer and Debugger Belledonne – Layout Parastic Extraction Comparison Cello – Cell Library Creation, Migration and Optimization Viola – Cell Library Characterization 		

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Company Name	WESCO	Company Logo	
Address	ROOM 346,3F, 25 DEOKCHEON-RO 152BEON-GIL, MANAN-GU, ANYANG-SI, GYEONGGI-DO, KOREA		
President	LEE Jong Soo	🦰 예 ㅅ ㅋ	
Website	www. wesco.co.kr		
E-mail	sh.han@wesco.co.kr	💥 WESCO	
Telephone	031-460-0000		
Fax	031-460-0015		
Exhibitor Introduction	WESCO Co., Ltd. that initiated voltage sag compensator business for the first time in Korea has grown into the Korea's only voltage sag compensator company that developed own brand TSP that can be supplied from small to large capacity. In addition, TSP has been sold to the automotive., semiconductor, display, electronic and chemical fields in about 10 countries around the world including China, Japan, Malaysia, Singapore, India, Vietnam and Mexico and the superior performance of TSP has been demonstrated in the global market.		
Exhibit Description	 TSP TSP represented with initial letter of The Second POWER has the dual meaning both in-seconds voltage compensation and the second alternative power. TSP is the countervailing battery-free compensation unit against a momentary voltage drop developed by WESCO's own technology and design. TSP line-up consists of both TSP Large capacity maximizing to 3-phase 2400Kva and TSP Small, Medium capacity maximized. Sag Viewer It is a "Real-Time Voltage Sag Monitoring Application S/W Tool;" that the central monitoring center monitors status, run/stop, and fault recognition of all TSPs connected to LAN in real time and analyzes sag events, history D/B (SML file support) and statistical report of sag events. 		
Exhibit Product	TSP Small, Medium, Capacity TSP Large Capacity ETS(Emergency Transfer Switch), MBU (Manual Bypass Unit)		



VI Conference Information

Registration

- Place: 3F, Lobby, Coex
 Credit cards and Cash are the only accepted forms of payment for on-site registration.
 The registration desk is open during the conference according to the following schedule;
- Operating Hours

Date	Time
March. 7 (Tue.)	08:30-18:30
March. 8 (Wed.)	08:00-19:30
March. 9 (Thu.)	08:30-18:30
March. 10 (Fri.)	08:30-15:00

• On-site Registration Fee

(USD 1 = KRW 1,250)

Category	On-site Fee (\$, USD)		Fee Includes
	IEEE Life Members	325	Admission to the Main Conference. Program Book.
Main	IEEE Members	650	Welcome Reception, Lunch Gift Card, Rump Session,
Conference	Non-Members	850	and Banquet
Rates	IEEE Student Members	325	Admission to the Main Conference, Program Book,
	Student Non-Members	425	Welcome Reception, Lunch Gift Card, and Rump Session
	IEEE Life Members	100	
	IEEE Members	200	Admission to the Tutorial Session, and Tutorial Workbook
Tutorial Rates	Non-Members	250	
	IEEE Student Members	100	
	Student Non-Members	125	
	IEEE Life Members	100	
Short Course Rates	IEEE Members	200	Admission to the Short Course Session, and
	Non-Members	250	
	IEEE Student Members	100	
	Student Non-Members	125	

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Name Badge

For security purpose, participants must wear their name badges during the conference. If your badge needs any correction, please visit the registration desk for a replacement. There will be staff to check your badge at every gate of session rooms and exhibition.

Receipt of Registration

You can find receipt inside your name tag. If you have any inquiries or requests on receipt, please visit the registration desk to get it.

If you have completed registration during the pre-registration period, you can download it from the registration system.

• Certificate of Authors and Participants

If you need a certificate of attendance, please write your name and registration number at the registration desk.

You can pick it up on the next day. If you have completed registration during the pre-registration period, you can download it from the registration system.

Secretariat Office

- Place: 3F, #303, Coex
- Operating Hours

Date	Time
March. 7 (Tue.)	08:30~20:00
March. 8 (Wed.)	08:30~21:00
March. 9 (Thu.)	08:30~20:30
March. 10 (Fri.)	08:30~16:00

About Seoul



A Capital City

Seoul, the capital city of the Republic of Korea, has been the center of the country for the long period of its own history from the prehistoric era to the present day. Seoul was the capital of an ancient dynasty Baekje, from 18 BC to 475 AD.

After a long time had passed, Seoul has been serving again as the capital of the country since the Joseon Dynasty in 1394 until now for more than 600 years. From the Joseon



Dynasty (1392) to the present time, Seoul has gone through many changes and developments as the capital of Korea. Based on its long history and tradition, Seoul has been preserving its unique, beautiful cultural heritage and it is evolving into a highly advanced city through spectacular economic growth.

An Intercultural City

The Republic of Korea is surrounded by seas on three sides, and Seoul is in the west of the country, with Hangang River stretching across it. A number of bridges are connecting the southern and northern parts of the city, boasting beautiful sceneries of their own. Also, Seoul, the heart of the nation and home to 10 million national and foreign residents, is a world-class city where contemporary lifestyle meets long-standing history. Seoul houses 266 cultural properties including five grand royal palaces, and is also a proud epicenter of the "Korean Wave" pop culture that is adored by many. Every corner of the city is packed with friendly residents and extraordinary restaurants, teeming with modern streetscapes and dashing natural landscapes. Seoul indeed is a place of boundless discoveries, where no two visits are alike.

Venue (Coex)



 Coex, well known for its shopping and cultural diversity, is the heart of international exchange among nations and provides the biggest convention center and exhibition space in Korea. Directly connected to the Samseong Station of subway line 2 and Bongeunsa station of subway line 9, it includes a shopping center, a movie theater, a musical concert hall, exhibition halls and famous restaurants. It is also close to a casino, hotels, department stores, and other various amenities.

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VII) Tutorials

- Date & Time: March. 7 (Tue.) / 09:00-12:30
- Place: 3F, Room B (#307 bc) / Room D (#308 bc) / Room F (#317), Coex Our tutorial session focuses on providing introductory knowledge for those who are new to semiconductor-related technologies.

In particular, we strongly recommend this tutorial to beginner researchers or students who are researching in areas related to semiconductors.

Tutorial 1

- Title: Technology for Advanced Semiconductor Manufacturing
- Date & Time: March. 7 (Tue.) / 09:00-12:30
- Place: 3F, Room B (#307 bc), Coex
- Chair: Dr. Jin-Hang Jung (ASML)

T1-1	"Lithography Tutorial Enabling Density Scaling" by Michael Lercel (ASML)
T1-2	"Keystones of Optical and Extreme Ultra-Violet Lithography" by Hye-Keun Oh (Hanyang University)
T1-3	"Atomic Layer Etching and Its Technical Trend" by Geun Young Yeom (Sungkyunkwan University)

Tutorial 2

- Title: New Computing Paradigm: Quantum Computing
- Date & Time: March. 7 (Tue.) / 09:00-12:30
- Place: 3F, Room D (#308 bc), Coex
- Chair: Prof. Seyoung Kim (Pohang University of Science and Technology)

T2-1	"Introduction to Quantum Computing" by Sophy Shin (IBM Quantum)
T2-2	"Control Circuits for Superconducting Qubits" by Jae-Yoon Sim (Pohang University of Science and Technology)
T2-3	"Quantum Information with Trapped Ions" by Moonjoo Lee (Pohang University of Science and Technology)



Tutorial 3

- Title: Advanced Packaging Technology for Heterogeneous Integration
- Date & Time: March. 7 (Tue.) / 09:00-12:30
- Place: 3F, Room F (#317), Coex
- Chair: Prof. Sarah Eunkyung Kim (Seoul National University of Science and Technology) Prof. Ga-Won Lee (Chungnam National University)

T3-1	"Introduction to Advanced Packaging Technology for Heterogenous Integration" by Sarah Eunkyung Kim (Seoul National University of Science and Technology)
T3-2	"The Value of PKG Technology in the Era of Heterogeneous Interconnection" by Ki-III Moon (SK hynix)
T3-3	"ABSX: HI-PIM AI NPU on Advanced Packaging" by Youngsu Kwon (Electronics and Telecommunications Research Institute)
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- Date & Time: March. 7 (Tue.) / 14:00-17:30
- Place: 3F, Room B (#307 bc) / Room D (#308 bc) / Room F (#317), Coex
- Our short courses share the latest information related to semiconductor fields, with emphasis on analysis, development, trends, growth direction, and development potential. A short course is a great way to gain the skills and latest information you need faster. Whether you're looking to re-enter the workforce, gain specific training, or get the skills you need to move ahead, a short course is a great way to specialize your learning and gain the confidence to immediately be whatever you want to be.

Short Course 1 (in Korean)

- Title: Advances in Manufacturing and Processing Technologies
- Date & Time: March. 7 (Tue.) / 14:00-17:30
- Place: 3F, Room B (#307 bc), Coex
- Chair: Prof. Yunheub Song (Hanyang University, PeDiSem)

SC1-1	"Logic Technology" by Bongseok Kim (Hanyang University, PeDiSem)
SC1-2	"DRAM (Dynamic Random Access Memory) Technology" by Inho Nam (Hanyang University, PeDiSem)
SC1-3	"NAND Flash Technology" by Yunheub Song (Hanyang University, PeDiSem)

Short Course 2

- Title: CMOS Image Sensor Technology
- Date & Time: March. 7 (Tue.) / 14:00-17:30
- Place: 3F, Room D (#308 bc), Coex
- Chair: Dr. Jonghyun Bae (SK hynix)

SC2-1	"Pixel Architecture for Scaling Down" by Kyungdo Kim (SK hynix)
SC2-2	"Process Integration Technologies for Pixel Scaling Down" by Wonje Park (SK hynix)
SC2-3	"Introduction to Mobile 3D Imaging" by Min H. Kim (Korea Advanced Institute of Science and Technology)



Short Course 3

- Title: Power and Energy Devices
- Date & Time: March. 7 (Tue.) / 14:00-17:30
- Place: 3F, Room F (#317), Coex
- Chair: Prof. Jungwoo Oh (Yonsei University)

SC3-1	"GaN HEMT Technology for Power Switching Applications" by Chang Soo Suh (Texas Instrument)
SC3-2	"GaN Power Devices – Do We Understand How They Work?" by Martin Kuball (University of Bristol)
SC3-3	"New Device Applications of III-N Materials" by Jae-Hyun Ryou (University of Houston)

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- Date & Time: March. 8 (Wed.) / 17:00-18:35
- Place: 3F, Room D (#308 bc), Coex

Chair: Dr. Pei-Wen Li (National Yang Ming Chiao Tung University) In conjunction with International Women's Day 2023 and the 75th Anniversary of the Transistor, the IEEE Electron Devices Society has planned a Panel Session at the 2023 IEEE Electron Devices Technology and Manufacturing Conference (IEEE EDTM 2023).

Welcoming Remarks	Kazunari Ishimaru (Kioxia Corporation)
Panel 1	"Woman Engineers and Their Journey for Success: Passion and Vision" by Mijung (MJ) Noh (Samsung Electronics Co., Ltd.)
Panel 2	"Finding My Story in the Semiconductor Industry" by Myung-Hee Na (SK hynix)
Panel 3	"Journey through Academia" by Andrea Armani (University of Southern California)

March 7th - 10th, 2023 / Coex, Seoul, Korea



- Date & Time: March. 8 (Wed.) / 19:30-21:00
- Place: 3F, Room F (#317) / Room G (#318), Coex

The Rump sessions allow participants to discuss new or ongoing research, present ideas, and engage in discussions or debates regarding the themes of two topics below. In a relaxed atmosphere, participants can propose new ideas, and engage in lively debates with their peers, making it an exciting opportunity to network and exchange ideas. Drinks and snacks will be provided to create a relaxing atmosphere.

Overall, the Rump sessions provide an excellent opportunity for academics, researchers, and professionals to share their latest findings and engage in collaborative discussions outside of the formal conference setting.

Rump Session 1

- Title: Sustainability in Semiconductor Manufacturing
- Date & Time: March. 8 (Wed.) / 19:30-21:00
- Place: 3F, Room F (#317), Coex
- Chair: Dr. Tomasz Brozek (PDF Solutions)

Panel 1	Tomasz Brozek (PDF Solutions)
Panel 2	Hosong Hwang (Samsung Electronics Co., Ltd.)
Panel 3	Song-Moon Suh (SK hynix)
Panel 4	Koen De Backer (Micron Technology Inc.)
Panel 5	David M. Fried (Lam Research Corp.)
Panel 6	James Nehlsen (Merck)

Rump Session 2

- Title: Global Semiconductor R&D Cooperation.

Is It Still Necessary or Possible to Continue in This Time of Supply Chain Crisis?

- Date & Time: March. 8 (Wed.) / 19:30-21:00
- Place: 3F, Room G (#318), Coex
- Chair: Prof. Rino Choi (Inha University)

Panel 1	Byoung Hun Lee (Pohang University of Science and Technology)
Panel 2	Seokjoon Kwon (Sungkyunkwan University)
Panel 3	Yasumitsu Orii (Rapidus Inc.)
Panel 4	Sung-Kyu Lim (Georgia Institute of Technology)
Panel 5	Lode Lauwers (Imec)

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	Date / Time: March. 8(Wed.), 2023 / 09:15-10:00				
Plenary 1	▶ Place: 4F, #401, Coex				
	Session Chair: Prof. Rino Choi (Inha University)				



Title: Journey of Memory Innovation in the AI Computing Era

Dr. Seon Yong Cha SK hynix

Biography

As the executive vice president and the head of R&D at SK hynix, Dr. Seon-Yong Cha has been leading the company's R&D efforts to enable innovation in the next generation memory technology. Prior to becoming the head of R&D in 2021, Dr. Cha held various leadership positions for the company. He previously served as the head of DRAM Development, overseeing the development of the company's DRAM technology, which resulted in the mass production of HBM2E, the industry's fastest DRAM, and the release of the world's first DDR5 DRAM. Prior to leading DRAM technology development at R&D from 2017, Dr. Cha was the appointed leader of 1xnm DRAM technology development organization where he laid the foundation to enhance the company's competitiveness in DRAM technology from 2014. Dr. Seon-Yong Cha first joined Hyundai Electronics (now, SK hynix) as a senior engineer in 1995. He received a bachelor's degree, a master's degree, and a doctorate degree in electrical engineering from KAIST.

Abstact

In the last few years after the onset of the COVID-19 pandemic, we are in the midst of changes that we have never experienced before. However, at the same time, the semiconductor industry has continued to grow, and now it is expected to have new growth opportunities as AI technology advances. Given the situation, it will be important to know what to prepare in order to respond to changes that are difficult to predict.

In this talk, we will share the journey of memory innovation and the core competencies memory companies should have in order to survive in the AI computing era.

First of all, the journey begins with how to maintain the continuity of technology development. We would like to identify emerging challenges and present a technology platform for overcoming those challenges and maintaining development continuity. Along with that, a memory-based convergence solution will be introduced to get ready for changes in the computation paradigm. Finally, this journey will arrive at the ESG, a newly emerging customer requirement. We will understand the importance of ESG and how to accordingly change our way of working.

Building core competencies is not something that can be done alone and cooperation from the entire ICT industry is required. SK hynix truly believes that the journey to the AI computing era will only possible if the ICT industry as a whole embraces open innovation to create a better and more sustainable world.

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- ▶ Date / Time: March. 8(Wed.), 2023 / 10:00-10:45
- Plenary 2
- ▶ Place: 4F, #401, Coex
- Session Chair: Prof. Rino Choi (Inha University)



Title: Semiconductor Scaling for the Next Decade Enabled by Holistic Lithography

Dr. Michael Lercel ASML

Experience

2015-Present – ASML 2012-2015 – SEMATECH Chief Scientist 2010-2012 – Cymer, Product marketing EUV sources 2005-2008 – SEMATECH Lithography director 1996-2010 – IBM, advanced masks, lithography research, semiconductor equipment selection

Biography

Experience in many parts of semiconductor manufacturing with particular emphasis on lithography and patterning topics. Has worked on many "next generation lithography" techniques – including first EUV work in 1998. PhD in physics from Cornell University in using ebeam lithography on monomolecular self-assembled films. Currently working on corporate strategy, product portfolio, and (as always) customer impact

Abstract

With a continued drive to increase performance and reduce power for semiconductors, opportunities arise to extend Moore's law through a combination of dimensional scaling and device and system level improvements. In this paper, we examine trends in holistic lithography that drive scaling – not just in pure dimensions but also the associated variability control. (Keywords: Lithography, Patterning and EUV)



- Date / Time: March. 9(Thu.), 2023 / 09:00-09:45
- Plenary 3 > Place: 3F, Auditorium, Coex
 - Session Chair: Prof. Min Hyuk Park (Seoul National University)



@edtm

Title: A System Driven Approach to Semiconductor Innovation

Prof. Suman Datta Georgia Institute of Technology

Biography

Suman Datta is the Joseph M Pettit Chair of Advanced Computing and Georgia Research Alliance (GRA) Eminent Scholar and Professor in the School of Electrical & Computer Engineering at Georgia Tech. He received his B.Tech degree in Electrical Engineering from the Indian Institute of Technology, Kanpur, India, and his Ph.D. degree in Electrical and Computer Engineering from the University of Cincinnati, Ohio, USA. His research group focuses on semiconductor devices that enable new compute models such as in-memory compute, brain-inspired compute, cryogenic compute, resilient compute etc.

From 2015 till 2022, Datta was the Stinson Endowed Chair Professor of Nanotechnology in the Electrical Engineering Department at the University of Notre Dame, where he was the Director of a multi-university microelectronics research center, ASCENT, funded by the Semiconductor Research Corporation (SRC) and the Defense Advanced Research Projects Agency (DARPA). Datta also served as the Director of a six-university research center for Extremely Energy Efficient Collective Electronics (EXCEL), funded by the SRC and National Science Foundation (NSF) to explore an alternate computing hardware that leverages continuous-time dynamics of emerging devices to execute optimization, learning, and inference tasks. From 2007 till 2015, he was a Professor of Electrical Engineering at The Pennsylvania State University, where his group pioneered advances in compound semiconductor-based quantum-well field effect transistors and tunneling field effect transistors.

From 1999 till 2007, he was in the Advanced Transistor Group at Intel Corporation, where he led device R&D effort for several generations of high-performance logic transistors such as high-k/metal gate, Tri-gate and strained channel CMOS transistors. He has published over 425 journal and refereed conference papers and holds more than 187 issued patents related to semiconductor devices. In 2013, Datta was named a Fellow of the Institute of Electrical and Electronics Engineers (IEEE) for his contributions to high-performance advanced silicon and compound semiconductor transistor technologies. In 2016, he was named Fellow of the National Academy of Inventors (NAI) in recognition of his inventions that have made a tangible impact on quality of life, economic development, and the welfare of society.

IEEE EDTM 2023

Abstract

Advances in the theory of semiconductors in the 1930s and the purification of germanium and silicon crystals in the 1940s enabled the point-contact junction transistor in 1947 and initiated the era of semiconductor electronics. Transistor density doubling through "scaling" with each new process node continues today, albeit at a slower pace. Transistor scaling has resulted in exponential gain in performance and energy efficiency of integrated circuits that has transformed computing from main-frames to personal computers, from mobile computing to cloud computing. Innovations in new materials, transistor structures, cryogenic operation and design technology co-optimization will enable future transistor scaling. Monolithic 3D integration and polylithic chiplet stacking will result in exponential increase in transistor count, whereas backside power delivery and power conversion technologies will enable use of silicon estate below the transistors. Together, these technologies will lead to continued advances in performance and energy efficiency of future microsystems.

The research is supported by the the Defense Advanced Research Program Agency (DARPA), the Applications and Systems-Driven Center for Energy-Efficient Integrated Nano Technologies (ASCENT), one of six centers in the Joint University Microelectronics Program (JUMP), a SRC program sponsored by the DARPA.



	Date / Time: March. 9(Thu.), 2023 / 09:45-10:30		
Plenary 4 > Place: 3F, Auditorium, Coex			
	► Session Chair: Prof. Min Hyuk Park (Seoul National University)		



Title: Semiconductor Manufacturing Challenges toward 2030 and beyond

Dr. Junichi Kitano Tokyo Electron Ltd.

Biography

Junichi Kitano is deputy general manager of corporate innovation division at Tokyo Electron Ltd., vice president and general manager at Tokyo Electron Kyushu Ltd., and member of the board at TEL Manufacturing and Engineering of America, Inc.

He is leading process and hardware R&D at Tokyo Electron Group. He joined Tokyo Electron Ltd., in 1991 and has been responsible for lithography/coater developer, cleaning, advanced package, yield improvement and future generation development. He has contributed many innovations relating to each generation lithography and cleaning technology.

Abstract

Semiconductors have made the modern world possible and greatly enriched people's lives. On the other hand, there is a view that digitization and automation, which will advance due to the progress of semiconductors, will lead to many jobs being lost to automation in the future. Can we in the semiconductor industry offer a bright future or a dark future?

The world is moving toward a life enriched by technology. Telework, online classes, online medical care, video distribution services, have all become common, and the metaverse is expected in the future. In our lives, industries, and society, the digital shift is progressing rapidly. Efforts to solve global environmental problems are progressing around the world, and the advance of semiconductor technology is indispensable for realizing digitalization and greening of society simultaneously.

Looking back at the recent world situation, the spread of the new coronavirus infection and the frequent occurrence of natural disasters due to climate change have brought major constraints to the global economy. In addition, geopolitical and other risks are having a major impact on industry, society, and people's lives. To enable a strong and resilient society in which economic activity does not stop under any circumstances, the world will strongly implement Information and Communication technology (ICT) as part of a Digital Transformation (DX) that aims to build a decarbonized society. The world is now undergoing digitalization, but this has only just begun.

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With the rapid transition to a data economy, semiconductors are becoming even more important. In 2021, the semiconductor market exceeded \$500 billion for the first time, and it is expected to continue to expand further, exceeding \$1.35 trillion in 2030, more than doubling the current level due to the emergence of new products and services as a result of the ongoing development of ICT. Global data communication is expected to increase at an annual rate of 26% and be 10 times the current level by 2030, and if the amount of data continues to increase at an annual rate of 26% after 2030, it will be 100 times the current volume by 2040.

It is estimated that the world's population exceeded 8 billion in November 2022, from 4 billion in 1975, and environmental costs due to economic and population growth is expected to increase resource needs to the equivalent of 2.1 "earths" by 2040. Is this leading to a bright or dark future?

The evolution of the structure of future logic devices is shown in Fig. 1. From the 5nm FinFET structure currently mass-produced, through the Gate All Around Nanosheet structure, it will evolve into a 3D Stacked CFET structure, and high-performance and low-power consumption devices will appear. One of the important technologies to realize this complex and fine structure is EUV lithography, and High NA EUV that realizes further miniaturization will be introduced from the 1.4 nm node.

To realize the evolution of semiconductors, miniaturization according to Moore's law will advance even more, moving towards more Moore, which requires processing close to the atomic level. Depending on the required functions, manufacturing technologies are expected to diversify, primarily between Customization, which is manufactured by optimizing design and manufacturing technology, and Hyper-Mass, which pursues high productivity of mature generation devices. As a result, the technologies required of equipment manufacturers are becoming more sophisticated and diversified. In order to improve yield, maximize the process performance of equipment, reduce variations between equipment and chambers, improve operation rate, throughput, and space efficiency, reduce environmental impact by saving energy, and develop equipment in a timely manner while increasing the sophistication of process technology, many efforts are needed.

One of the solutions favored by TEL is DX. A nano-sheet structure was simulated, and the film deposition process was evaluated (Fig. 2). The data on the left is based only on recipes created by an engineer. As can be seen, patterns were deformed, and film coverage was insufficient, while it took a considerable period to achieve the expected results. Using machine learning, we succeeded in developing the successful process imaged on the right in just one day. We believe that DX will become a key factor in the equipment industry.

Currently, there are many social issues that need to be solved for the sustainable development of the world, and various technologies and solutions are being developed to address them. In the field of semiconductors, there is an increasing demand for high capacity, high speed, high reliability, and low power consumption. The key to developing ICT and realizing low power consumption is to build the most advanced semiconductor, that is, achieve the ultimate



miniaturization. It has been shown that the environmental impacts of manufacturing, such as energy cost, water consumption, and device size, when normalized per transistor, shrinks with each advancing node, and miniaturization contributes greatly to reducing the environmental impact.

Will semiconductors show a bright future or a dark future? The presenter will discuss from the perspective of global trends, including geopolitical risks, semiconductor business outlook, technology trends and approaches to social issues.



Fig.1: The evolution of the structure of future logic devices



Fig.2: The film deposition process optimization by DX

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	Date / Time: March. 10(Fri.), 2023 / 09:00-09:45
Plenary 5	▶ Place: 3F, Auditorium, Coex
	Session Chair: Dr. Kangwook Lee (SK hynix)



Title: Innovation of Process Technology for Future Semiconductor

Dr. Jong Myeong Lee Samsung Electronics Co., Ltd.

Biography

Dr. Jong Myeong Lee is corporate EVP and leader of process development of semiconductor R&D center at Samsung electronics. He received the B.S., M.S. and Ph.D in inorganic materials science and engineering from Seoul national university. He joined Samsung electronics in 1998 and has been working on development of various unit processes for DRAM, NAND and logic devices. He has authored or co-authored more than 100 journal/conference papers and patents.

Abstract

Since Jack Kilby made the first integrated circuit(IC) in 1958, the ICs, such as DRAM, NAND and Logic devices, have been developed for narrow design rules and entered to sub 10nm generation nowadays. And finally 2-dimensional scaling faced serious technical limitations, which required the breakthroughs and innovations. The NAND device already adapted the 3-dimensional vertical structure and the Logic device has moved to the 3D MOSFET and reached gate-all-around concept. However the process technologies for future semiconductor devices still will be challenged due to more complex structures, smaller dimension, lower power and lower cost, etc. In this presentation, new innovative technologies such as new concept of vertical structures, atomic selective deposition and cryogenic etch, etc. will be discussed. (Keywords: 3-dimensional Vertical Structure, Atomic Selective Deposition, Cryogenic Etch)



	►	Date /	Time:	March.	10(Fri.),	2023	/ 09:45-10:30
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- Plenary 6
 Place: 3F, Auditorium, Coex
 - Session Chair: Dr. Kangwook Lee (SK hynix)



Title: Meeting Scaling Challenges through Materials Engineering

Dr. Mukund Srinivasan Applied Materials

Biography

Dr. Mukund Srinivasan is the Group Vice President and General Manager for the Etch Business Unit and Integrated Module Solutions Group.

Previously, Dr. Srinivasan was General Manager of the CVD and ALD Business Unit within the Patterning and Packaging Group. He joined Applied in January 2013. Prior to Applied, Dr. Srinivasan spent 16 years at Lam Research in different positions, including General Manager for the Clean Product Group and leadership positions in Etch.

He holds a Ph.D. degree in mechanical engineering from University of California, Berkeley.

Abstract

The industry's technology response to the slowing of Moore's Law is a "New Playbook" for driving continuous improvements in chip performance, power consumption, area/cost, and time to market, which we call P-PAC-t. This improvement is being driven by new compute architectures; new structures and building into the third dimension, like GAA; the adoption of an increasingly larger set of new materials; new ways to shrink that complement traditional dimensional scaling with DTCO techniques for area shrink; advanced packaging to connect a wide range of devices with higher bandwidth and lower power interconnects; and finally, solutions that allow for a faster time-to-market using process co-optimization and AI based solutions to accelerate R&D and HVM ramps. Foundational to addressing these challenges is Materials Engineering and the advanced process solutions that enable products in high volume. This talk will review some of the ways materials engineering is solving these scaling challenges: from new materials and innovative process solutions to address fundamental limits or build new structures, to unique ways we can connect a range of technologies together to create completely novel solutions, including integrated systems that deliver precisely engineered material properties and interface control, to area or materials selective removal and deposition processes. In short, Materials Engineering solutions that enable scaling and accelerate time-to-market for semiconductor manufacturing solutions. (Keywords: Manufacturing, CMOS, GAA, PPAC, DTCO)

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XII) Technical Program

Information on Technical Program

- Oral Presentation Guidelines
 - ① The authors of abstracts accepted for oral presentation are asked to bring Power Point (or PDF) slides and present their research in a podium presentation. Presentation Time (It may be different for each session.)

* Length of the presentation should be in accordance with the assigned time as follows;

Presentation Type	Presentation Time
Plenary Talk	45 min. including Q&A
Keynote/ Invited Talk	25 min. including Q&A
Oral Talk	15 min. including Q&A

- We will prepare a computer for presentation, and authors are encouraged to use the conference computer for presentation, to avoid wasting time switching between personal laptops. (It is not recommended to bring your own laptop computer (especially MacBook) unless your presentation requires any special software and/or hardware).
- * To avoid software compatibility problems (MS Power Point), speakers are advised to save their Power Point presentation on a USB memory stick. And bring a backup version of their presentation.
- Files should be uploaded to the local PCs in the session room during the breaks between the sessions.
- ② Speakers should arrive in the session room 10 minutes before the start of their sessions to prepare their files with the session chair.

Poster Presentation Guidelines



1m



- * Please check out the allowable size (0.9 m X 1.5 m) and prepare the poster.
- We do not specify the poster format, but each poster should include the paper title, authors and their affiliations.
- * Each paper's code will be shown on the board.
- Presenters are responsible for creating, preparing, and transporting posters to the conference.
- Presenters are required to prepare their posters in advance and post them according to the set-up time.
- * During the session for anticipated discussion with participants.
- Please remove your poster according to the take-down time. All remaining posters will be discarded.
- The materials such as scissors, scotch tapes, and thumb tacks will be provided in the session room.

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Oral Session

1A. Advanced Interconnect for Packaging				
Session Date	March 8(Wed.), 2023			
Session Time	10:55-12:30			
Session Room	Room A (#301)			
Session Chair	Prof. Taek-Soo Kim (Korea Advanced Institute of Science and Technology)			

[1A-1] [Keynote]

Al Semiconductor Chips Using Heterogeneous Integration: Why the Hype and What Next? Sung Kyu Lim Georgia Institute of Technology

[1A-2] [Invited]

Flip Chip Joining with Injection Molded Solder Technology Takashi Hisada and Toyohiro Aoki IBM Japan Ltd.

[1A-3]

Erosion Improvement through Chemical-Mechanical-Polishing (CMP) Process Control for the Application of Cu Hybrid Bonding

Jihye Lee, Wooseok Seo, Jaehyung Lim, Mincheol Kang, Youngsu Yun, Hyuk Kwon, Jinwon Park, Gyuhyun Kim and Jiho Kang SK hynix

[1A-4]

Study on the Application of Gallium as an Interconnection Material for Microelectronic Packaging

Yoonchul Sohn

Chosun University

[1A-5]

Low Temperature SiCN as Dielectric for Hybrid Bonding

Venkat Sunil Kumar Channam¹, Serena Iacovo¹, Edward Walsby², Igor Belov², Anne Jourdain¹, Alfonso Sepulveda¹ and Eric Beyne¹

¹Imec Leuven, ²SPTS Technologies Ltd., a KLA company

12:00-12:15

12:15-12:30

10:55-11:20

11:20-11:45

11:45-12:00

Kyungnam Kang¹, Seongmin Im¹, Changhun Lee¹, Jungho Kim² and Donghyun Kim¹ ¹Yonsei University, ²Kyung Hee University [2B-5] 12:25-12:40

Sung-Chan Jo Samsung Display Co., Ltd.

Display through Glasses to the New World of Hyper-Connectivity

[2B-2] [Invited]

Skin-Integrated Wireless Haptic Interface for VR and AR Jaeman Lim and Yei Hwan Jung Hanyang University

[2B-3] [Invited]

Halide Perovskite Spray-Synthesized Nano-Crystal and Vacuum-Sublimated Thin-Film **Optoelectronic Devices** Hao-Wu Lin National Tsing Hua University

Optimized Metasurface Design for Enhanced Organic Light-Emitting Diodes

[2B-4]

SK hynix

A 120-mW 5-µm VGA Indirect Time-of-Flight CMOS Image Sensor with a Differential Column ADC Jeongeun Song, Gyubeom Hwang, Eunchang Lee, Minseok Shin, Hoesam Jeong and Kangbong Seo

March 7th - 10th, 2023 / Coex, Seoul, Korea

2B. Advanced Display Technologies		
Session Date	March 8(Wed.), 2023	
Session Time	10:55-12:40	
Session Room	Room B (#307 bc)	
Session Chair	Prof. Sung Hun Jin (Incheon National University) Prof. Jeongkyun Roh (Pusan National University)	

[2B-1] [Keynote]

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11:45-12:10

10:55-11:20

11:20-11:45

12:10-12:25

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3C. Emerging Materials and Devices		
Session Date	March 8(Wed.), 2023	
Session Time	10:55-12:15	
Session Room	Room C (#307 a)	
Session Chair	Prof. Chun-Jung Su (National Yang Ming Chiao Tung University) Prof. Kiyoung Lee (Hongik University)	

[3C-1] [Invited]

Material Challenges for Next Generation Memory and Logic Devices Kong-Soo Lee, Sung-Uk Jang, Suk Yang, Sanghoon Ahn, Young-Geun Park, Bong Jin Kuh, and Jong Myeong Lee Samsung Electronics Co., Ltd

[3C-2] [Invited]

Multi-Layer Stacked Nanosheet Hetero-Structure Realized by Layer Transfer Technology for CFET Application

Wen Hsin Chang¹, Xin Ren Yu², Tzu Chieh Hong^{3,4}, Hiroyuki Ishii¹, Toshifumi Irisawa¹, Yao Jen Lee^{3,4}, Tien Sheng Chao³, Yeong Her Wang² and Tatsuro Maeda¹

¹National Institute of Advanced Industrial Science and Technology, ²National Cheng Kung University, ³Taiwan Semiconductor Research Institute, ⁴National Yang Ming Chiao Tung University

[3C-3]

Demonstration of MoS_2 Memtransistor with Poly-Si Source/Drain Featuring Tunable Conductance States and Boosted I_{ON}

K. S. Li¹, M. K. Huang², Y. H. Wang², Y. C. Tseng¹ and C. J. Su^{1,3} ¹National Yang Ming Chiao Tung University, ²National Cheng Kung University, ³Taiwan Semiconductor Research Institute

[3C-4]

Van der Waals Metal-Semiconductor Contacts for High-Performance Polymer Field-Effect Transistors

Xilin Lai¹, Chunyan Zhao¹, Ru Huang^{1,2} and Ming He^{1,2}

¹Peking University, ²Beijing Advanced Innovation Center for Integrated Circuits

11:20-11:45

10:55-11:20

11:45-12:00

12:00-12:15

r Technology

High Q-Value Solid Mounted Resonator Based on Aluminum Nitride Film

Yuanhang Qu, Xiang Chen, Xiyu Gu, Zhiwei Wen, Yao Cai, Yan Liu and Chengliang Sun Wuhan University

[4D-4] [Invited]

Micro/Nano-Engineered, Self-Powered Physical/Chemical Sensors for Smart IoT Inkyu Park Korea Advanced Institute of Science and Technology

[4D-5] [Invited]

Thermal Packaging Utilizing Gallium-Based Liquid Metals Seokkan Ki and Youngsuk Nam Korea Advanced Institute of Science and Technology

[4D-6]

ZnO Pressure Sensor with TFT Structures Based on Piezotronic Effect Ki-Nam Kim, Woon-San Ko, Jun-Ho Byun, Do-Yeon Lee, Eun-Gi Kim, Eun-A Koo, So-Yeon Kwon and Ga-Won Lee

Chungnam National University

March	7th -	10th,	2023	Coex,	Seoul,	Korea	
	/	,	,				

4D. Physical Sensors and Resonators		
Session Date	March 8(Wed.), 2023	
Session Time	10:55-12:40	
Session Room	Room D (#308 bc)	
Session Chair	Prof. Hongyu Yu (The Hong Kong University of Science and Technology) Prof. Seonaiun Park (Korea Advanced Institute of Science and Technology)	

[4D-1] [Invited]

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Piezoelectric Micromachined Ultrasonic Transducers for Consumer Electronics Applications Lei Zhao and Yipeng Lu Peking University

[4D-2]

Transverse Spurious Mode Free SAW Resonators and Delay Line on GaN/Si with High **Quality Factor**

Guofang Yu, Renrong Liang, Haiming Zhao, Jun Fu and Tian-Ling Ren Tsinghua University

[4D-3]

11:45-12:05

12:05-12:25

12:25-12:40

11:30-11:45

11:15-11:30

10:55-11:15

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5E. Advanced Manufacturing Techniques		
Session Date	March 8(Wed.), 2023	
Session Time	10:55-12:25	
Session Room	Room E (#308 a)	
Session Chair	Dr. Tomasz Brozek (PDF Solutions) Dr. Shinichi Yoshida (Sony Semiconductor Solutions Co.)	

[5E-1] [Invited]

Advanced Atomic Layer Deposition Tae Joo Park Hanyang University

[5E-2] [Invited]

Nanoimprint Lithography: Today and Tomorrow

Yukio Takabayashi¹, Mitsuru Hiura¹, Keita Sakai¹, Osamu Morimoto¹, Takehiko Iwanaga and Jin ${\rm Choi}^2$

¹Canon Inc., ²Canon Nanotechnologies Inc.

[5E-3]

Extending Resolution Limit of EUV Lithography Using RETs

Jung Sik Kim, Jinhyung Kim, Bumki Shin, Junggun Heo, Sarohan Park and Jae Wook Seo SK hynix

[5E-4]

Fast Missing Source Contact Electrical Method Detection on Low Voltage TrenchFET Technology

F. Cordiano, D. Sanfilippo, A. Stassi, B. Mazza, R. Perego, G. Di Martino, G. Calvagno, M. Astuto, F. Di Venere, G. Pulvirenti and D. Patti *STMicroelectronics Inc.*

10:55-11:20

11:20-11:45

12:05-12:25

11:45-12:05

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6F. DRAM and Flash		
Session Date	March 8(Wed.), 2023	
Session Time	10:55-12:30	
Session Room	Room F (#317)	
Session Chair	Prof. Jiyong Woo (Kyungpook National University) Prof. Jongwook Jeon (Konkuk University)	

[6F-1] [Invited]

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DRAM Technology Trends and Future Perspective

Sangyeon Han, Junsoo Kim, Suklae Kim, Sung Ho Jang, Seokhan Park, Jin-Woo Han and Jemin Park

Samsung Electronics Co., Ltd.

[6F-2]

Dual-Float-Gate Capacitor for Low-Voltage Multi-Level Nonvolatile Memory with Enhanced Retention

Haixia Li¹, Hongxu Liao¹, Baotong Zhang¹, Ran Bi¹, Ru Huang^{1,2} and Ming Li^{1,2} ¹Peking University, ²Beijing Advanced Innovation Center for Integrated Circuits

[6F-3]

Quantitative Analysis of Tunnel Oxide Nitrogen Concentration in 3D NAND Using Low Acceleration Voltage, Low Current and Low Temperature STEM-EELS Jun-Young Lee, Woo-Young Jung, Jongkyu Cho, Jangwon Oh, Jonghun Kim and Minki Choi SK hynix

[6F-4]

Temperature-Induced Instability of Retention Characteristics in 3-D NAND Flash Memory Ukju An, Gilsang Yoon, Donghyun Go, Jounghun Park, Donghwi Kim, Jongwoo Kim and Jeong-Soo Lee Pohang University of Science and Technology

[6F-5] [Invited]

2-Transistor (2T) Dynamic Random-Access Memory towards Processing-in-Memory Featuring **Bitwise Dual-Mode Operations**

Jong-Ho Bae¹, Yong Shim² and Seongjae Cho³ ¹Kookmin University, ²Chung-Ang University, ³Gachon University

11:50-12:05

10:55-11:20

11:20-11:35

11:35-11:50

12:05-12:30

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7G. RF Device Modeling and Simulation		
Session Date	March 8(Wed.), 2023	
Session Time	10:55-12:05	
Session Room	Room G (#318)	
Session Chair	Prof. Hyeong Chul Shin (Seoul National University)	

[7G-1] [Keynote]

High-Frequency Characterization and Modeling of Low and High Voltage FinFETs for RF SoCs Yogesh S. Chauhan¹, Anirban Kar¹, Shivendra S. Parihar¹, Jun Z. Huang², Huilong Zhang², Weike Wang² and Kimihiko Imura²

¹Indian Institute of Technology Kanpur, ²MaxLinear Inc.

[7G-2]

Small-Signal Model of Nanosheet FET for High-Frequency Range: A Design Perspective of Parallel Stacking and Dual-Dielectric Spacer

Jyoti Patel¹, Nitya Aggarwal², Navjeet Bagga³ and S. Dasgupta¹ ¹Indian Institute of Technology Roorkee, ²Indian Institute of Technology Kanpur, ³Indian Institute of Technology Bhubaneswar

[7G-3]

Statistical Analysis of Intrinsic High-Frequency Characteristic Fluctuation of Emerging Silicon Gate-All-Around Nanosheet (NS) MOSFETs at Sub-3-nm Nodes

Sekhar Reddy Kola¹, Yiming Li¹, Min-Hui Chuang¹, Kazuhiko Endo^{2,3} and Seiji Samukawa¹ ¹National Yang Ming Chiao Tung University, ²Tohoku University, ³National Institute of Advanced Industrial Science and Technology

[7G-4]

Radio Frequency Performance of High Mobility 2D Monolayer Au₂S-Based Transistors Om Maheshwari¹, Jiang Cao², Youseung Lee², Mathieu Luisier² and Tarun Agarwal¹ ¹Indian Institute of Technology Gandhinagar, ²ETH Zurich

11:20-11:35

10:55-11:20

11:50-12:05

11:35-11:50

Andong National University

14:40-14:55 [8A-5] Effect of Photo-Definable Dielectric Process Conditions on the Interfacial Reliabilities of Polyimide Capping Layer/ Cu RDL for Fan-Out Gahui Kim, Doheon Kim and Young-Bae Park

Selective Cu Electrodeposition for Through Glass Via (TGV) Fan Yang, Qing Wang, Jinhyun Lee, Sanghwa Yoon and Bongyoung Yoo Hanyang University

[8A-4]

SK hynix

Taewook Kang, Youjung Lee, Joonrak Kim, Joohwan Cho, Sangho Lee, Bumsu Kim, Wontae Kim and Sijeo Park

On-Chip Canary Circuit Design for Electronic Interconnects by Utilizing RF Resonance

Mathematical Optimization Models for Auto Interposer Routing Problem for Improving

Signal Integrity

[8A-3]

Session Chai	Dr.	Akihiro	Horibe	(IBM	Resea
[8A-1] [Invited]					

Tae Yeob Kang¹, Donghwan Seo¹ and Taek-Soo Kim²

Peak Movement as a Prognostic Factor

Interposer Trends and Technologies of Heterogeneous Integration

8A. Advanced Interposer RDL Technology		
Session Date	March 8(Wed.), 2023	
Session Time	13:30-14:55	
Session Room	Room A (#301)	
Session Chair	Prof. Bong-Young Yoo (Hanyang University)	

arch Tokyo)

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Gu-Sung Kim Kangnam University

[8A-2]

13:30-13:55

¹Agency for Defense Development, ²Korea Advanced Institute of Science and Technology

13:55-14:10

14:25-14:40

14:10-14:25

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9B. Flexible Optoelectronics and Biophotonics		
Session Date	March 8(Wed.),2023	
Session Time	13:30-15:00	
Session Room	Room B (#307 bc)	
Session Chair	Prof. Hyungjin Kim (Inha University)	

[9B-1] [Invited]

Assembly of Microscale LEDs for Stretchable Display Tae-II Kim Sungkyunkwan University

[9B-2] [Invited]

Bioinspired Artificial Imaging Systems: from Optic Components to System Integrations Young Min Song *Gwangju Institute of Science and Technology*

[9B-3] [Invited]

Bio-Inspired Electronic Eyes Using Ultrathin Nanoscale Materials Changsoon Choi¹ and Dae-Hyeong Kim^{2,3} ¹Korea Institute of Science and Technology, ²Seoul National University, ³Institute for Basic Science

[9B-4]

Artificial Compound Eye with Amphibious and Ultra-Wide Field of View Imaging Features Gil Ju Lee¹ and Young Min Song² ¹Pusan National University, ²Gwangju Institute of Science and Technology

14:45-15:00

13:30-13:55

13:55-14:20

14:20-14:45

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10C. Materials for	Ferroelectric and Electronic Devices
Session Date	March 8(Wed.), 2023
Session Time	13:30-14:50
Session Room	Room C (#307 a)
Session Chair	Dr. Jinseong Heo (Samsung Advanced Institute of Technology)

[10C-1] [Invited]

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Hafnia-Based Ferroelectric Devices for Lower Power Memory and Al Applications Shinichi Takagi, Kasidit Toprasertpong, Eishin Nako, Mitsuru Takenaka and Ryosho Nakane The University of Tokyo

[10C-2] [Invited]

Wurtzite-Type Ferroelectrics for Microelectronic Devices: Scalability and Integration to Silicon Based Ferroelectric FETs

Simon Fichtner^{1,2}, Georg Schönweger^{1,2}, Frank Dietz¹, Henning Hanssen¹, Heiko Züge¹, TomNiklas Kreutzer¹, Fabian Lofink², Hermann Kohlstedt², Holger Kapels^{1,2} and Michael Mensing¹ ¹Fraunhofer ISIT, ²Kiel University

[10C-3]

Laser Assisted Ge Film Crystallization on MgO Substrates

Jongyeon Baek¹, Seung-Hwan Kim², Heejae Jeong³, Manh-Cuong Nguyen¹, Daeyoon Baek², Seunghun Baik³, An Hoang-Thuy Nguyen¹, Jong-Hwa Baek¹, Anh-Duy Nguyen¹, Hyung-Jun Kim²⁴, Hyuk-Jun Kwon³ and Rino Choi¹

¹Inha University, ²Korea Institute of Science and Technology, ³Daegu Gyeongbuk Institute of Science and Technology, ⁴KIST School, University of Science and Technology

[10C-4]

Tuning Indirect-to-Direct Bandgap of lonsdaleite Si_{0.5}Ge_{0.5} Alloy via Compressive Strain for **Optical Gain**

Rishikanta Mayengbam, Subhasis Das, Chuan Seng Tan and Weijun Fan Nanyang Technological University

14:20-14:35

14:35-14:50

13:55-14:20

13:30-13:55

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11D. Optical and Motion Sensors		
Session Date	March 8(Wed.), 2023	
Session Time	13:30-14:45	
Session Room	Room D (#308 bc)	
Session Chair	Prof. Beomjoon Kim (The University of Tokyo) Prof. Kyungnam Kang (Yonsei University)	

[11D-1] [Keynote]

Organic Small Molecule Integrated Photonic Devices Andrea M. Armani University of Southern California

[11D-2] [Invited]

Plasmonically Enhanced Spectroscopies for Optical Nanoimaging and Sensing Prabhat Verma Osaka University

[11D-3]

 $\textsc{Bi}_2\textsc{O}_2\textsc{Se-Perovskite}$ Heterostructure Based Bipolar Photosensors as Reconfigurable Logic-In-Sensor Devices

Lei Xu¹, Shuo Liu¹, Ru Huang^{1,2} and Ming He^{1,2} ¹Peking University, ²Beijing Advanced Innovation Center for Integrated Circuits

[11D-4]

A Liquid Medium Coriolis Gyroscope Based on Electrochemical Molecular Electronic Transducer for Low Angular Rate Sensing Yik Kin Cheung and Hongyu Yu

The Hong Kong University of Science and Technology

14:15-14:30

14:30-14:45

13:30-13:55

13:55-14:15

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12E. Manufacturing Process Control	
Session Date	March 8(Wed.), 2023
Session Time	13:30-15:00
Session Room	Room E (#308 a)
Session Chair	Prof. Min Hyuk Park (Seoul National University) Prof. Woongkyu Lee (Soongsil University)

[12E-1] [Invited]

@edtm

Process Control Challenges and Solutions for Advanced Semiconductor Devices Yun Jung Jee¹, Sang Hyun Han² and Shay Wolfling³ ¹Nova Measuring Instruments LTD., ²Nova Measuring Instruments, Inc. ³Nova LTD.

[12E-2] [Invited]

Hybrid SPM Metrology and Defect Inspection Technologies in Advanced Process Control ByungWoon Ahn, Ahjin Jo and Sang-Joon Cho Park Systems Corp.

[12E-3]

In-line SIMS Enables Better SiGe Epi Process Control for Nanosheets Lawrence Rooney, Benjamin Hickey, Bruno Schueler, Sarah Okada and Feng Zhang *Nova Inc.*

[12E-4]

Budgeting and Predicting Pattern Defects Using Edge Placement Error and Machine Learning Taekwon Jee¹, Joonsang You¹, Hong-Goo Lee¹, Sang-Ho Lee¹, Seungmo Hong¹, Jaewook Seo¹, Roi Meir², Noam Oved², Jun Park², Shin-Ik Kim², Byung-Jo Lim², Chan-Hee Kwak² and Jeong-Ho Yeo²

¹SK hynix, ²Applied Materials

13:30-13:55

13:55-14:20

14:40-15:00

14:20-14:40

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13F. Memory for Computing (I)	
Session Date	March 8(Wed.), 2023
Session Time	13:30-15:05
Session Room	Room F (#317)
Session Chair	Prof. Tuo-Hung (Alex) Hou (National Yang Ming Chiao Tung University) Dr. Seung Jae Baik (Samsung Electronics Co., Ltd.)

[13F-1] [Keynote]

The Realizing Metaheuristic Functions for Neural Computing by Using Spontaneity of Memristor Devices

Hongsik Jeong

Ulsan National Institute of Science and Technology

[13F-2] [Invited]

Oxide Memristor Research for Bio-Inspired Computing Applications Jung Ho Yoon Korea Institute of Science and Technology

[13F-3]

Vector-Matrix-Multiplication Acceleration with Multi-Input $Pr_{0.7}Ca_{0.3}MnO_3$ Based RRAM for Highly Parallel In-Memory Computing

Jayatika Sakhuja, Vivek Saraswat, Sandip Lashkare and Udayan Ganguly Indian Institute of Technology Bombay

[13F-4]

TaOX ReRAM Cell-Level Unidirectional Neural Network Weight Control for Non-Linearity & Variation Robust Transfer Learning of Low Cost Digital eCiM Ayumu Yamada¹, Naoko Misawa¹, Shunsaku Muraoka², Ken Kawai², Chihiro Matsui¹ and Ken Takeuchi¹

¹The University of Tokyo, ²Nuvoton Technology Corporation Japan

[13F-5]

Neuromodulation-Inspired Stashing System for Energy-Efficient Learning of Spiking Neural Network Using a Self-Rectifying Memristor Array Woon Hyung Cheong, Jae Bum Jeon and Kyung Min Kim

Korea Advanced Institute of Science and Technology

14:35-14:50

14:50-15:05

13:30-13:55

14:20-14:35

13:55-14:20

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14G. Neural Network Based Modeling and Simulation

Session Date	March 8(Wed.), 2023
Session Time	13:30-14:55
Session Room	Room G (#318)
Session Chair	Prof. Min-Hwi Kim (Chung-Ang University)

[14G-1] [Invited]

Neural Compact Modeling: Motivation, State of the Art, Future Perspectives Hyunbo Cho Alsemy Inc.

[14G-2]

Coupled Multiple Physics-Informed Deep Operator Networks for Boltzmann Transport Simulations of Nanowire Field Effect Transistors

Bokyeom Kim and Mincheol Shin

Korea Advanced Institute of Science and Technology

[14G-3]

Accelerated Simulation and Performance Optimization of 3D Multigate Logic Transistors by **Using Neural Networks**

Seung-Cheol Han, In Ki Kim and Sung-Min Hong Gwangju Institute of Science and Technology

[14G-4]

Variability Aware FET Model with Physics Knowledge Based Machine Learning Kumar Sheelvardhan, Surila Guglani, M. Ehteshamuddin, Sourajeet Roy and Avirup Dasgupta Indian Institute of Technology Roorkee

[14G-5]

Graphical Approach of Equipment Health Monitoring Using Network Analysis Wanwook Ki, Minjae Choi, Yongjun Lee, Kiseop Yoon, Hanchan Hwang, Jisoo Park, Taewook Kang, Jaeyong Park and Younghoon Kim Samsung Electronics Co., Ltd

14:10-14:25

13:30-13:55

13:55-14:10

14:25-14:40

14:40-14:55

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15A. Advanced Fan-Out Package		
Session Date	March 8(Wed.), 2023	
Session Time	15:15-16:50	
Session Room	Room A (#301)	
Session Chair	Prof. Hak-Sung Kim (Hanyang University)	

[15A-1] [Invited]

A Closer Look to Fan-out Panel Level Packaging

Tanja Braun¹, Ole Hölck², Marcus Voitel², Mattis Obst¹, Steve Voges¹, Karl-Friedrich Becker¹, Rolf Aschenbrenner¹ and Martin Schneider-Ramelow² ¹Fraunhofer Institute for Reliability and Microintegration, ²Technical University of Berlin

[15A-2] [Invited]

Status of the Advanced Packaging and IC Substrate Yik-Yee Tan Yole Intelligence

[15A-3]

Enhancing Predictability of Thermal Warpage of Molded Wafer by Applying Accurate Thermo-Mechanical Properties of Molded Underfill

Junmo Kim¹, Myoung Song¹, Chang-Yeon Gu¹, Sung Woo Ma², Mu-Hyeon Jeong², Jin Hee Lee², Woong-Sun Lee² and Taek-Soo Kim¹

¹Korea Advanced Institute of Science and Technology, ²SK hynix

[15A-4]

A Noble VFO (Vertical wire Fan Out) Technology for Small Form Factor and High Performance Memory Applications

Ki-Jun Sung, Kyoungtae Eun, Seowon Lee, Sungwon Yoon, Ho-Young Son and Kang-Wook Lee

SK hynix

[15A-5]

Development of Curing Process for EMC to Reduce the Warpage of Semiconductor Package

Seong Yeon Park and Seong Su Kim Korea Advanced Institute of Science and Technology

16:05-16:20

15:40-16:05

15:15-15:40

16:20-16:35

16:35-16:50

Photomultiplication: A Smart Approach Sampati Rao Sridhar, Medha Joshi Pandey and Brijesh Kumar Indian Institute of Technology Roorkee

Highly Responsive Ultraviolet Narrowband Organic Photodetector Based on Acceptor Free

[16B-5]

A Five-Transistor Active Pixel Sensor with a Wide Dynamic Range and a High-Speed **Pixel Operation**

Tao Ma¹, Chao Gao¹, Qian Li¹, Yihong Qi², Shaozhi Deng¹ and Kai Wang¹ ¹Sun Yat-sen University, ²Foshan Retinal Insights Technology Co., Ltd.

Lead Oxide X-Ray Photoconductive Layers for Application in Direct Conversion Medical **Imaging Detectors**

Oleksandr Grynko¹ and Alla Reznik^{1,2} ¹Lakehead University, ²Thunder Bay Regional Health Research Institute

[16B-2] [Invited]

[16B-1] [Invited]

Broadband Graphene-Silicon Integrated Imagers

Yang Xu, Li Chen, Li Peng, Wenzhang Fang, Yance Chen, Xiaocheng Wang, Yunfan Dong,

[16B-4]

Pb-Free Inorganic Photodetector Arrays for UV-Visible-NIR Spectrum Mokurala Krishnaiah, Ajit Kumar, Dhananjay Mishra and Sung Hun Jin Incheon National University

Srikrishna Chanakya Bodepudi, Yuda Zhao, Chao Gao and Bin Yu Zheijang University

[16B-3]

16B. Detectors and Imaging Technologies (I) Session Date March 8(Wed.), 2023 Session Time 15:15-16:50 Session Room Room B (#307 bc) Session Chair Prof. Ki Jun Yu (Yonsei University)

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15:15-15:40

15:40-16:05

16:20-16:35

16:05-16:20

16:35-16:50

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17C. Advanced BEOL Materials and Technologies		
Session Date	March 8(Wed.), 2023	
Session Time	15:15-16:35	
Session Room	Room C (#307 a)	
Session Chair	Prof. Kiyoung Lee (Hongik University)	

[17C-1] [Invited]

On the Dopant, Mobility and Defect States in W Doped Amorphous ${\sf In}_2{\sf O}_3$ for BEOL Transistors

Yaoqiao Hu¹, Khandker Akif Aabrar², Andrea Palmieri³, Matthew Bergschneider¹, Milan Pešić³, Chadwin D. Young¹, Suman Datta² and Kyeongjae Cho¹

¹The University of Texas at Dallas, ²Georgia Institute of Technology, ³Applied Materials

[17C-2] [Invited]

Emerging III-Nitride Ferroelectrics and Their Applications in Memory Devices D. Jariwala University of Pennsylvania

[17C-3]

Ru Stress Assessment by Membrane Wrinkling for Interconnect Applications Valeria Founta^{1,2}, Jean-Philippe Soulié¹, Ingrid De Wolf^{1,2}, Joris Van de Vondel², Johan Swerts¹, Zsolt Tőkei¹ and Christoph Adelmann¹ ¹Imec, ²Catholic University of Leuven

[17C-4]

Scaling Properties of Ru, Rh and Ir for a Future Generation Interconnect Keun Wook Shin¹, Min-Sik Kim^{1,2}, Hyeon-Jin Shin¹ and Ki-Bum Kim² ¹Samsung Electronics Co., Ltd., ²Seoul National University

15:40-16:05

16:05-16:20

15:15-15:40

16:20-16:35

18D Chemical and Elevible Sensors

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Session Date	March 8(Wed.), 2023
Session Time	15:15-16:45
Session Room	Room D (#308 bc)
Session Chair	Prof. Hyoun Woo Kim (Hanyang University)
	Prof. Sung Jae Kim (Seoul National University)

[18D-1] [Keynote]

@edtm

Biomimetic Approaches with Stretchable Ionics Jeong-Yun Sun Seoul National University

[18D-2] [Invited]

The Development Progress of Origami-Enabled Flexible Electronics

Ruoqin Wang¹, Rui Jiao¹, Xingru Chen¹, Yixin Wang¹, Yongkai Li¹, Yang Deng¹, Yue Hou¹, Chili Wu¹ and Hongyu Yu^{1,2}

¹The Hong Kong University of Science and Technology, ²HKUST Shenzhen-Hong Kong Collaborative Innovation Research Institute

[18D-3]

Low-Resistance $(NH_4)_xWO_3$ Nanowire Sensors for Acetone Recognition Operating at Low Voltage with Low Power Consumption

Yuki Narita, Takahisa Tanaka and Ken Uchida *The University of Tokyo*

[18D-4]

Hybrid Graphene Oxide FET to Achieve Amplified Gas Sensitivity Arnab Hazra and Radha Bhardwaj Birla Institute of Technology & Science

[18D-5]

Temperature Measurement Method Using FET Type Gas Sensor

Chayoung Lee^{1,2}, Gyuweon Jung¹, Wonjun Shin¹, Yujeong Jeong¹, Jinwoo Park¹, Donghee Kim¹, Jae-Joon Kim¹ and Jong-Ho Lee^{1,3}

¹Seoul National University, ²SK hynix, ³Ministry of Science and ICT

15:40-16:00

15:15-15:40

16:15-16:30

16:00-16:15

16:30-16:45

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19E. Smart Manufacturing and Machine Learning		
Session Date	March 8(Wed.), 2023	
Session Time	15:15-16:40	
Session Room	Room E (#308 a)	
Session Chair	Dr. Han-Wool Yeon (Gwangju Institute of Science and Technology)	

[19E-1] [Invited]

Next Generation Semiconductor Manufacturing Using Machine Learning, Process Models, Advanced Metrology and Equipment Intelligence® David M. Fried Lam Research

[19E-2]

ML-Assisted IC Test Binning with Real-Time Prediction at the Edge

Tomonori Honda, Thijs Haarhuis, Jeffrey D. David, Henri Hannink, Greg Prewitt and Vishnu Rajan PDF Solutions Inc.

[19E-3]

Development of Outlier Detection Algorithms for Sensors with Time-Varying Characteristics Chang Ho Lee, Jung Min Lee, Bo Bae Lee, Jae Seok Park, Ji Yeon Park, Young Hoon Kim and Jae Yong Park Samsung Electronics Co., Ltd

[19E-4]

An Approach to Represent Time Series by Patterns and Process Dependent Statistics to **Present Properties of Signals**

Sunjung Kim, Chulhyun Park, Soohyun Chae, Minkyu Sohn, Changho Lee, Younghoon Kim and Jae-Yong Park

Samsung Electronics Co., Ltd

16:20-16:40

16:00-16:20

15:40-16:00

15:15-15:40

[20F-1] [Invited]

Device-Algorithm Co-optimization for Neuromorphic Computing Sangbum Kim Seoul National University

[20F-2]

@edt

Analysis of Valence Change Mechanism Memristors Considering Charge Transition of Oxygen Vacancies

Juseong Park and Kyung Min Kim

Korea Advanced Institute of Science and Technology

[20F-3]

Controllable Conductive Filament Formation in Resistive-RAM Using ZnO Nanoparticles and Its Mechanisms

Jun-Ho Byun, Woon-San Ko, Ki-Nam Kim, Do-Yeon Lee, Eun-Gi Kim, Eun-A Koo, So-Yeon Kwon and Ga-Won Lee

Chungnam National University

[20F-4]

Crossbar Arrays Based on "Wall" Phase-Change Memory (PCM) and Ovonic-Threshold Switching (OTS) Selector: a Device Integration Challenge Towards New Computing Paradigms in Embedded Applications

G. Bourgeois, V. Meli, R. Antonelli, C. Socquet-Clerc, T. Magis, F. Laulagnet, B. Hemard, M. Bernard, L. Fellouh, P. Dezest, J. Krawczyk, S. Dominguez, F. Baudin, J. Garrione, C. Pellissier, J.-A. Dallery, N. Castellani, M.-C. Cyrille, C. Charpin, F. Andrieu and G. Navarro Université Grenoble Alpes CEA-Leti

[20F-5]

Five-Fold Reduction in RESET Energy Consumption by Nitrogen Doping in Phase Change Memory

Wasi Uddin¹, Ajay Kumar Agrawal¹, Paritosh Meihar¹, Avinash Singh², Tarun Malviya², Rohit Ranjan², Sandip Lashkare¹, Kumar Priyadarshi¹ and Udayan Ganguly¹ ¹Indian Institute of Technology Bombay, ²Semi-Conductor Laboratory

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20F. RRAM and PCM		
Session Date	March 8(Wed.), 2023	
Session Time	15:15-16:40	
Session Room	Room F (#317)	
Sossion Chair	Dr. Cabriele Navarro (CEA-LETI)	

16:10-16:25

15:55-16:10

15:40-15:55

15:15-15:40

16:25-16:40
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21G. Emerging Devices Modeling (I)	
Session Date	March 8(Wed.), 2023
Session Time	15:15-16:25
Session Room	Room G (#318)
Session Chair	Prof. Dae Woong Kwon (Hanyang University)

[21G-1] [Invited]

DC and Transient Microscopic Simulation of Nanowire NMOSFETs Christoph Jungemann¹, Tobias Rippchen¹, Maziar Noei² and Tobias Linn¹ ¹*RWTH Aachen University,* ²*Infineon Technologies*

[21G-2]

Interpolative Device Models for Hafnia-Based FeFETs

Imtiaz Hossen¹, Andreu L. Glasmann², Sina Najmaei² and Gina C. Adam¹ ¹The George Washington University, ²DEVCOM Army Research Laboratory

[21G-3]

New Understanding of Screen Radius and Re-Evaluation of Memory Window in Cylindrical Ferroelectric Capacitor for High-Density 1T1C FeRAM

Minyue Deng¹, Chang Su¹, Zhiyuan Fu¹, Kaifeng Wang¹, Ru Huang^{1,2} and Qianqian Huang^{1,2,3} ¹Peking University, ²Beijing Advanced Innovation Center for Integrated Circuits, ³Beijing Superstring Academy of Memory Technology

[21G-4]

Impact of Device Geometry, Physical Doping and Electrostatic Doping on the Frequency CV-Dispersion of TFT Devices with IWO Channels

Andrea Palmieri¹, Karim Cherkaoui², Khandker Akif Aabrar³, Yaoqiao Hu³, Luca Larcher¹, Kyeongjae Cho⁴, Suman Datta³, Paul Hurley² and Milan Pešić¹

¹Applied Materials, ²Tyndall National Institute, ³Georgia Institute of Technology, ⁴The University of Texas at Dallas

15:55-16:10

16:10-16:25

15:40-15:55

15:15-15:40

[22A-1] [Invited] Latest Interconnection Technologies and Package Substrate Trend

Eun-Yong Chung, Seong-Bo Shim and Sung-Gil Kim Intel Corp.

[22A-2] [Invited]

Advanced SiC Power Technology and Package

ByongJin Kim¹, Alexander Bolotnikov², Helen Jeong¹, Chandong Kim¹, Hrishkesh Das² and Ganesh Ponram² ¹onsemi Korea, ²onsemi USA

[22A-3] [Invited]

Strategies for Mechanically Reliable Thin-Film Flexible Electronics Taek-Soo Kim Korea Advanced Institute of Science and Technology

[22A-4] [Invited]

Thermoreflectance-Based Thermometry for Electronics Packaging Hyejin Jang Seoul National University

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22A. Advanced Packaging Structure and Process	
Session Date	March 8(Wed.), 2023
Session Time	17:00-18:40
Session Room	Room A (#301)
Session Chair	Prof. Caroline Sunyoung Lee (Hanyang University) Dr. Yik Yee Tan (Yole Intelligence)

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17:00-17:25

17:25-17:50

18:15-18:40

17:50-18:15

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23B. Advanced Photonics	
Session Date	March 8(Wed.), 2023
Session Time	17:00-18:10
Session Room	Room B (#307 bc)
Session Chair	Prof. Hyungjin Kim (Inha University) Prof. Ki Jun Yu (Yonsei University)

[23B-1] [Invited]

Heavy Metal-Free Colloidal Quantum Dots For Display Applications Wanki Bae Sungkyunkwan University

[23B-2]

Analysis and Mitigation of Interference in a Multi-RADAR Environment Elochukwu Onyejegbu¹, Arman Lee¹, Aigerim Ashimbayeva¹, Bikash Nakarmi² and Ikechi A. Ukaegbu¹ ¹Nazarbayev University, ²Nanjing University of Aeronautics and Astronautics

[23B-3]

Robust Real-Time 4K-UHD Videos Streaming Transmission through Photonic-Based Terahertz Wireless Communication System

Xuan-Wei Miao, Po-Cheng Su, Fu-Kai Shih, Pouya Torkaman, Kai-Ming Feng and Shang-Hua Yang

National Tsing Hua University

[23B-4]

Design and Optimization of a Double Cladding Octo-Wing Segmented Cladding Fiber Using Response Surface Methodology

Marzieh Pournoury and Donghyun Kim Yonsei University

17:55-18:10

17:40-17:55

17:00-17:25

17:25-17:40

Stochastic Resonance Effects of Floating Gate Technology-Based Leaky Integrate-and-Fire (FG LIF) Neurons in Summing Network

Akira Goda, Chihiro Matsui and Ken Takeuchi The University of Tokyo

[24C-4]

Ferroelectric FET Based Signed Synapses of Excitatory and Inhibitory Connection for Stochastic Spiking Neural Network Based Optimizer

Jin Luo¹, Tianyi Liu¹, Zhiyuan Fu¹, Xinming Wei¹, Qianqian Huang^{1,2,3} and Ru Huang^{1,2,3} ¹Peking University, ²Beijing Advanced Innovation Center for Integrated Circuits, ³Chinese Institute for Brain Research

[24C-5]

IGZO Photonic-Synaptic Transistors with Outstanding Linearity by Controlling Oxygen Vacancy for Neuromorphic Computing

Taewon Seo, Juyoung Yun and Yoonyoung Chung Pohang University of Science and Technology

Session Room Room C (#307 a)

Session Date

Session Time

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Prof. Myungsoo Kim (Ulsan National Institute of Science and Technology) Session Chair Prof. Byung Chul Jang (Kyungpook National University)

24C. Novel Computing Device Technologies (I) (Neuromorphic, Quantum, MVL Computing)

March 8(Wed.), 2023

17:00-18:35

[24C-1] [Invited]

Partial Reset for Analog Phase Change Memory and Improved Resistance Drift Eilam Yalon Technion - Israel Institute of Technology

[24C-2] [Invited]

Pseudo-Magnetic Fields in Strained Graphene for Building Optical Quantum Computing Systems

Dong-Ho Kang¹, Hao Sun², Manlin Luo² and Donguk Nam² ¹Gwangju Institute of Science and Technology, ²Nanyang Technological University

[24C-3]

17:50-18:05

18:20-18:35

18:05-18:20

17:00-17:25

17:25-17:50

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25E. Processing of New Materials for Future Technologies	
Session Date	March 8(Wed.), 2023
Session Time	17:00-18:25
Session Room	Room E (#308 a)
Session Chair	Dr. Yi-Chiau Huang (Applied Materials) Dr. Yoshiki Yamamoto (Renesas)

[25E-1] [Invited]

Contacts for 2D-Material MOSFETs: Recent Advances and Outstanding Challenges Steven J. Koester University of Minnesota-Twin Cities

[25E-2]

[25E-3]

Grain-Size Enlargement of MoS₂ Film by Low-Rate Sputtering with Molybdenum Grid Shinya Imai, Ryo Ono, Iriya Muneta, Kuniyuki Kakushima, Tetsuya Tatsumi, Shigetaka Tomiya, Kazuo Tsutsui and Hitoshi Wakabayashi Tokyo Institute of Technology

Development of MFMIS Gatestack with Thick Hafnium Zirconium Oxide (HZO) for Nonvolatile Memory Application

Bohyeon Kang¹, Jongseo Park¹, Junghyeon Hwang², Sangho Lee², Hunbeom Shin², Jehyun An¹, Hyunseo You¹, Sung-Min Ahn¹, Sanghun Jeon² and Rock-Hyun Baek¹ ¹Pohang University of Science and Technology, ²Korea Advanced Institute of Science and Technology

[25E-4]

Alternative EUV Mask Absorber with Platinum-Based Allov for High-NA EUV Lithography Yunsoo Kim^{1,2}, Dongmin Jeong^{1,2}, Minsun Cho^{1,2} and Jinho Ahn^{1,2} ¹Hanyang University, ²EUV Industry-University Collaboration Center

17:25-17:45

17:00-17:25

17:45-18:05

18:05-18:25

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26F. Oxide-Channel Ferroelectric Memories	
Session Date	March 8(Wed.), 2023
Session Time	17:00-18:15
Session Room	Room F (#317)
Session Chair	Prof. Jiyong Woo (Kyungpook National University)

[26F-1]

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3D NAND Memory Operation of Oxide-Semiconductor Channel FeFETs and the Potential Impact of In-Plane Polarization

Junxiang Hao, Xiaoran Mei, Takuya Saraya, Toshiro Hiramoto and Masaharu Kobayashi The University of Tokyo

[26F-2]

Guideline of Device Optimization for Ferroelectric InGaZnO Transistor Yu-Hao Chen, I-Ting Wang, Yue-Min Zheng and Tuo-Hung Hou National Yang Ming Chiao Tung University

[26F-3]

Back-End-of-Line-Compatible Anneal-Free Ferroelectric Field-Effect Transistor

Shih-Hao Tsai¹, Zhonghua Li¹, Ma Mo Mo Ei Phyu¹, Zihang Fang¹, Sonu Hooda¹, Chun-Kuei Chen¹, Evgeny Zamburg^{1,2} and Aaron Voon-Yew Thean^{1,2}

¹National University of Singapore, ²Singapore Hybrid-Integrated Next-Generation µ-Electronics Centre

[26F-4]

High-Endurance (>10¹¹cycles) and Thermally-Stable Sub-100nm TiO₂ Channel FeFET for Low-Power Memory Centric 3D-LSI Applications

Taro Shiokawa, Reika Ichihara, Takamasa Hamai, Kiwamu Sakuma, Kota Takahashi, Kazuhiro Matsuo and Masumi Saitoh Kioxia Corporation

[26F-5]

Charge-Storage-Based vs. Non-Charge-Storage-Based 1T Non-Volatile Memory through the Interaction between Oxide Semiconductor Channel and Gate Oxide Layer Jimin Han, Boyoung Jeong, Taeyun Noh and Tae-Sik Yoon Ulsan National Institute of Science and Technology

17:30-17:45

17:15-17:30

17:00-17:15

17:45-18:00

18:00-18:15

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27G. High Voltage Compact Modeling	
Session Date	March 8(Wed.), 2023
Session Time	17:00-18:25
Session Room	Room G (#318)
Session Chair	Prof. Jongwook Jeon (Konkuk University)

[27G-1] [Invited]

Macquarie University

[27G-2]

An Improved Robust Infinitely Differentiable Drift Resistance Model for BSIM High Voltage **Compact Model**

Anant Singhal¹, Garima Gill¹, Girish Pahwa², Chenming Hu² and Harshit Agarwal¹ ¹Indian Institute of Technology Jodhpur, ²University of California

Deep-Learning Based Parameter Extraction of Device Models

Sourabh Khandelwal and Fredo Chavez

[27G-3]

A New Back-To-Back Graded AlGaN Barrier for Complementary Integration Technique Based on GaN/AlGaN/GaN Platform

Jinggui Zhou¹, Huy-Binh Do² and Maria Merlyne De Souza¹ ¹The University of Sheffield, ²Ho Chi Minh City University of Technology and Education

[27G-4]

Characterization and Modeling of I-V, C-V and Trapping Behavior of SiC Power MOSFETs Mohammmad Sajid Nazir, Ahtisham Pampori, Yawar Hayat Zarkob, Anirban Kar and Yogesh Singh Chauhan Indian Institute of Technology Kanpur

[27G-5]

Accurate Dynamic Performance of SiC MOSFET SPICE Modeling with Parasitic **Capacitances Optimization**

Chien-Neng Huang, Kung-Yen Lee, Chih-Jung Chang and Yan-Yu Wen National Taiwan University

17:40-17:55

17:25-17:40

17:00-17:25

18:10-18:25

17:55-18:10

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Session Date	March 9(Thu.), 2023
Session Time	13:00-14:35
Session Room	Room A (#301)
Session Chair	Prof. Jae-Hyun Ryou (University of Houston)
	Prof. Gökhan Atmaca (Hongik University)

28A. Power Devices and Widebandgap Heterostructures (I)

[28A-1] [Keynote]

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Investigation of β -Ga₂O₃ Material Properties for High Power Applications

Thaddeus J. Asel¹, Adam T. Neal¹, Brenton A. Noesges^{1,2}, Yunjo Kim^{1,3}, Kyle J. Liddy¹, Ahmad Islam¹, Kevin Leedy¹, Daniel M. Dryden^{1,4}, Jeremiah Wiliams¹, Nicholas P. Seplak^{1,4}, Andrew J. Green¹, John Blevins¹, Kelson D. Chabak¹ and Shin Mou¹ ¹Air Force Research Laboratory, ²Azimuth Corporation, ³ARCTOS, ⁴KBR, Inc.

[28A-2] [Invited]

Enhance Gate Reliability and Threshold Voltage Stability of p-GaN Gate High-Electron-Mobility Transistors

Haohao Chen, Junting Chen, Chengcai Wang, Zuoheng Jiang and Mengyuan Hua Southern University of Science and Technology

[28A-3]

Suppressed Dynamic Avalanche and Enhanced Turn-Off dV/dt Controllability in 3300V Scaled IGBTs

Xiang Zhou, Munetoshi Fukui, Kiyoshi Takeuchi, Takuya Saraya and Toshiro Hiramoto *The University of Tokyo*

[28A-4]

High Conduction Band Offset of ALD BeO Film on Wide-Bandgap Semiconductors Dohwan Jung¹, Yoonseo Jang¹, Prakash R. Sultane², Christopher W. Bielawski^{2,3} and Jungwoo Oh¹ ¹Yonsei University, ²Institute for Basic Science, ³Ulsan National Institute of Science and Technology

[28A-5]

Effects of Oxide Species on the Reduction of Contact Resistivity of Al/oxide/n-GaN MIS Devices

Jiro Koba^{1,2} and Junichi Koike¹ ¹Tohoku University, ²JX Nippon Mining & Metals Corporation

13:25-13:50

13:50-14:05

13:00-13:25

14:05-14:20

14:20-14:35

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29B. Fabrication and Integration	
Session Date	March 9(Thu.), 2023
Session Time	13:00-14:20
Session Room	Room B (#307 bc)
Session Chair	Prof. Sung Hun Jin (Incheon National University) Prof. Jeongkyun Roh (Pusan National University)

[29B-1] [Invited]

Integrated Light Source Technologies for Enabling Laser-Integrated Silicon Photonics Chips Harini Raghavan, Youngmin Kim, Hyo-Jun Joo, Yongduck Jung, Yadong Wang, Kunze Lu, Manlin Luo, Dong-Ho Kang, Hao Sun and Donguk Nam Nanyang Technological University

[29B-2] [Invited]

Liquid-Assistant Transfer Printing Technology Yue Zhang and Baoxing Xu The University of Virginia

[29B-3]

Pixel Design with Improved Demodulation Contrast for Indirect Time-of-Flight CMOS Image Sensor

Jaehyung Jang, Hoon-Moo Choi, Jongchae Kim, Kyungdo Kim, Hoon-Sang Oh and Chang-Rock Song

SK hynix

[29B-4]

Silicon-Based High-Gain Photodetector with a Strong 254-nm Response for Chemical Oxygen Demand (COD) Monitoring in City Sewage Water

Xin Jin¹, Haolin Zhao¹, Chao Gao¹, Tao Ma¹, Zhou Zhou¹, Xinghui Liu², Wangchang Guo² and Kai Wang¹

¹Sun Yat-sen University, ²Guangke Chipwey Sensing Technologies Co., Ltd.

..

13:25-13:50

13:50-14:05

14:05-14:20

13:00-13:25

The University of Tokyo [30C-5] Neural Network Quantization is All You Need for Energy Efficient ISP Hyunwoo Je, Dongil Ryu, Haechang Lee and Kijeong Kim

Variation Compensation of Non-Volatile Memories at Edge AI Shinsei Yoshikiyo, Naoko Misawa, Chihiro Matsui and Ken Takeuchi

[30C-4] NN Algorithm Aware Alternate Layer Retraining on Computation-In-Memory for Write

[30C-3] 13:50-14:05

Gachon University

Bio-Inspired Optoelectronics Based on Flexible and Synaptic Devices Changsoon Choi Korea Institute of Science and Technology

[30C-1] [Invited]

[30C-2] [Invited]

Control Strategies for Negative Differential Transconductance in Heterojunction Transistors Hocheon Yoo

Optimization of Performance Metrics of Charge Trapping Synaptic Device for Neuromorphic Applications

Md. Hasan Raza Ansari and Nazek El-Atab King Abdullah University of Science and Technology

SK hynix

Computing) Session Date March 9(Thu.), 2023 Session Time 13:00-14:35 Session Room Room C (#307 a) Prof. Bongjun Kim (Sookmyung Women's University) Session Chair Prof. Keun Heo (Jeonbuk National University)

30C. Novel Computing Device Technologies (II) (Neuromorphic, Quantum, MVL

@edtm March 7th - 10th, 2023 / Coex, Seoul, Korea

13:25-13:50

13:00-13:25

14:05-14:20

14:20-14:35

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31D. Ferroelectric Technology for Logic and Memories	
Session Date	March 9(Thu.), 2023
Session Time	13:00-14:35
Session Room	Room D (#308 bc)
Session Chair	Prof. Gong Xiao (National University of Singapore) Dr. Kyung Chul Jang (SK hynix)

[31D-1] [Keynote]

University of California [31D-2] [Invited]

Saveef Salahuddin

Ferroelectric Field-Effect Transistors: Logic Compatibility and Microstructure Asif Isla Khan Georgia Institute of Technology

Integrated, Ultra Thin Ferroelectric Materials for Logic and Memory

[31D-3]	13:50-14:05
A Comprehensive Simulation Study on Capacitive	Memory with Metal-Ferroelectric-Insulator-
Semiconductor Structure	

Hongrui Zhang¹, Chengji Jin¹, Xiaole Jia², Jiajia Chen¹, Huan Liu¹, Yan Liu², Xiao Yu¹ and Genquan Han² ¹Zhejiang Lab, ²Xidian University

[31D-4]

Ferroelectric-like Behaviors of Mobile-Ionic Field-Effect Transistors with Amorphous Dielectrics

Huan Liu¹, Chengji Jin¹, Jiajia Chen¹, Xiao Yu¹, Jing Li², Yue Peng², Ran Cheng³, Bing Chen³, Yan Liu², Yue Hao² and Genquan Han² ¹Zhejiang Lab, ²Xidian University, ³Zhejiang University

[31D-5]

Self-Heating and Interface Traps Assisted Early Aging Revelation and Reliability Analysis of Negative Capacitance FinFET

Rajeewa Kumar Jaisawal¹, Sunil Rathore¹, Navneet Gandhi¹, P. N. Kondekar¹, Shashank Banchhor², V. Bharath Sreenivasulu³, Young Suh Song⁴ and Navjeet Bagga⁵

¹Pandit Dwarka Prasad Mishra Indian Institute of Information Technology, Design and Manufacturing Jabalpur, ²Indian Institute of Technology Roorkee, ³Vellore Institute of Technology, ⁴Korea Military Academy, ⁵Indian Institute of Technology Bhubaneswar

14:05-14:20

14:20-14:35

13:00-13:25

13:25-13:50

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32E. Flexible Electronic Device Fabrication and Process	
Session Date	March 9(Thu.), 2023
Session Time	13:00-14:30
Session Room	Room E (#308 a)
Session Chair	Prof. Keehoon Kang (Seoul National University)

[32E-1] [Keynote]

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Ultra-Thin Atomic-Layer-Deposited InGaZnO Thin Film Transistors with Back-End-of Line Compatibility

Jie Zhang, Zhuocheng Zhang, Zehao Lin, Dongqi Zheng, and Peide D. Ye *Purdue University*

[32E-2] [Invited]

Flexible Electronics with Two-Dimensional and Layered Chalcogenide Compounds Alwin Daus RWTH Aachen University

[32E-3] [Invited]

Additive Manufacturing for Flexible Micro-and Nanoelectronics Ji Tae Kim The University of Hong Kong

[32E-4]

Continuous Liquid Metal Printing for Rapid Metal Oxide TFT Integration William J. Scheideler, Andrew B. Hamlin, Youxiong Ye and Simon Agnew Dartmouth College

13:50-14:15

14:15-14:30

13:00-13:25

13:25-13:50

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33F. Memory for Computing (II)	
Session Date	March 9(Thu.), 2023
Session Time	13:00-14:35
Session Room	Room F (#317)
Session Chair	Prof. I-Ting Wang (National Yang Ming Chiao Tung University) Prof. Tae-Sik Yoon (Ulsan National Institute of Science and Technology)

[33F-1] [Invited]

Prospect and Challenges in Hf-Based Non-Volatile Memory Devices for Al Applications Featuring Analog Training

Sun-Ghil Lee¹, S. Consiglio¹, K. Tapily¹, R. D. Clark¹, C. Wajda¹, T. Tsunomura², C. Catano¹, Q. Yang¹, J. Shearer¹, A. Metz¹, D. Triyoso¹, Y. Kim³, P. Jamison⁴, I. Saraf⁴, C. Silvestre⁴, H. Miyazoe³, M. Rasch³, N. Gong³, T. Ando³, V. arayanan³ and Gert L¹

¹Tokyo Electron Limited Technology Center, ²Tokyo Electron Limited, ³IBM T. J. Watson Research Center, ⁴IBM Research

[33F-2]

Scheme of Opposite Polarity Assistance De-Trapping (OPAD) to Improve Potentiation Non-Linearity for FeFET Synapse

C.-Y. Liao¹, S.-H. Chanq¹, F.-C. Hsieh¹, T.-C. Chen² and M. H. Lee¹ ¹National Taiwan Normal University, ²Taiwan Semiconductor Manufacturing Company

[33F-3]

Analysis and Design of Stacked-Nanosheet FeFET Synapse Conductance Response under Identical Pulse Scheme for Neuromorphic Applications

Heng Li Lin and Pin Su

National Yang Ming Chiao Tung University

[33F-4]

Highly Linear and Symmetric 2T Synaptic Device Composed of IGZO Transistors by Identical Charging and Discharging Characteristics

Suwon Seong, Seongmin Park, Hyunyoung Cho and Yoonyoung Chung Pohang University of Science and Technology

[33F-5] [Invited]

Organic Memristor Devices, Integration and Neuromorphic Computing Applications Shuzhi Liu, Jianmin Zeng and Gang Liu Shanghai Jiao Tong University

13:55-14:10

14:10-14:35

13:25-13:40

13:00-13:25

National Taiwan University [34G-5] 14:10-14:25 Cryogenic Characterization and Model Extraction of 5nm Technology Nodes FinFETs

Scalable Addressing Circuits for a Surface Code Quantum Computer in Silicon Rubaya Absar, Hazem Elgabra, Xuesong Chen, François Sfigakis, Jonathan Baugh and

[34G-2]

Lan Wei

[34G-1] [Invited]

University of Waterloo

Ferroelectric Probabilistic Bits Based on Thermal Noise Induced Randomness for Stochastic Computing

Sheng Luo, Yihan He, Baofang Cai, Xiao Gong and Gengchiau Liang National University of Singapore

Yen-Ming Pan, Cheng-Kai Lu and Vita Pi-Ho Hu

[34G-3]

Study on Sub-100-nm-Scale Measurement of Temperature Distribution in Joule-Heated Au Nanosheet Gas Sensors Using Self-Assembled Monolavers as Temperature Probes Taro Kato, Takahisa Tanaka, Hiromichi Miyagishi, Jun Terao and Ken Uchida The University of Tokyo

Linearity Analysis of FeFET Synaptic Devices Considering Random Phase Distributions

Shivendra Singh Parihar¹, Girish Pahwa², Jun Z. Huang³, Weike Wang³, Kimihiko Imura³, Chenming Hu² and Yogesh Singh Chauhan¹

¹Indian Institute of Technology Kanpur, ²University of California Berkeley, ³MaxLinear Inc.

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34G. Emerging Devices Modeling (II)		
Session Date	March 9(Thu.), 2023	
Session Time	13:00-14:25	
Session Room	Room G (#318)	
Session Chair	Prof. Jiwon Chang (Yonsei University)	

[34G-4]

13:40-13:55

13:55-14:10

13:00-13:25

13:25-13:40

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35A. Power Devices and Widebandgap Heterostructures (II)		
Session Date	March 9(Thu.), 2023	
Session Time	14:45-16:20	
Session Room	Room A (#301)	
Session Chair	Prof. Hyemin Kang (Korea Institute of Energy Technology) Prof. Wataru Saito (Kyushu University)	

[35A-1] [Invited]

Ultrawide Bandgap CMOS Platform for Heterogenous Power Integration Saravanan Yuvaraja and Xiaohang Li *King Abdullah University of Science and Technology*

[35A-2] [Invited]

Transfer Printed Power Electronics Based on ß-Ga₂O₃ and Diamond Membranes Edward Swinnich, Yixiong Zheng, Junyu Lai and Jung-Hun Seo *The University at Buffalo*

[35A-3]

Novel Trench Type Complementary LIGBTs with Common Double Drift Layers for Simple Process and Improvement in Switching Characteristics

Zijian Zhang, Qi Tang, Suyang Liu and Masahide Inuishi Waseda University

[35A-4]

The Study of Dislocation Propagation in Si Wafer during IGBT High Thermal Budget Process

Jiuyang Yuan, Yoshiji Miyamura, Satoshi Nakano, Wataru Saito and Shin-Ichi Nishizawa Kyushu University

[35A-5]

Characterization of Oxide Interface Charges in Trench Field Stop IGBT Zhi Lin Sim^{1,2}, Wei Mien Chin², Yi Xiang Bong², David Goh² and Voon Cheng Ngwan² ¹Nanyang Technological University. ²STMicroelectronics Inc.

15:35-15:50

15:50-16:05

16:05-16:20

14:45-15:10

15:10-15:35

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36B. Detectors and imaging technologies (II)		
Session Date	March 9(Thu.), 2023	
Session Time	14:45-16:15	
Session Room	Room B (#307 bc)	
Session Chair	Prof. Sang Min Won (Sungkyunkwan University) Prof. Jeongkyun Roh (Pusan National University)	

[36B-1] [Invited]

@edtm

Solid-State High-Gain Optical Sensors with a Non-Avalanche Approach Yihong Ql^{1,2}, Chao Gao¹ and Kai Wang^{1,2} ¹Sun Yat-sen University, ²Foshan Retinal Insights Technology Co., Ltd.

[36B-2] [Invited]

Enhanced Emission from the Bright Exciton and Locating the Dark Exciton in Strained Compositionally Graded CdSe/CdxZn1-xSe Quantum Dots

Igor Fedin^{1,2}, Mateusz Goryca², Scott Crooker², Victor I. Klimov², Dan Liu² and Sergei Tretiak² ¹The University of Alabama, ²Los Alamos National Laboratory

[36B-3] [Invited]

Intelligent Skin Electronics for Healthcare Monitoring and Touch VR Xinge Yu City University of Hong Kong

[36B-4]

A Backside Trench Guide Enhancing Optical Efficiency of Near-Infrared in CMOS Image Sensor

Hyungjune Yoon, Tae-Ho Lee, Kyungsu Byun, Jaehyun Park, Hyekyung Jung, Heesung Kim, Jinhee Cho, Hun Jeong, Dongho Ha, Hoonmoo Choi, Seunghyun Yoon, Namryeol Kim, Wonje Park, Seonghun Kang, Kyungdo Kim, Kangbong Seo, Hoon-Sang Oh and Chang-Rock Song

SK hynix

16:00-16:15

15:35-16:00

14:45-15:10

15:10-15:35

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37C. IoT, Wearable & Flexible Devices		
Session Date	March 9(Thu.), 2023	
Session Time	14:45-16:20	
Session Room	Room C (#307 a)	
Session Chair	Prof. Donghee Son (Sungkyunkwan University)	

[37C-1] [Invited]

Soft and Highly Deformable Electronic Devices for Future Wearables Naoji Matsuhisa The University of Tokyo

[37C-2] [Invited]

All-Inkjet-Printed Organic Thin-Film Transistor and Amplifier for Low-Power High Gain Wearables

Chen Jiang Tsinghua University

[37C-3]

Thermal Modeling of 2.5D Integrated Package of CMOS Image Sensor and FPGA for Autonomous Driving

Janak Sharda, Madison Manley, Ankit Kaul, Wantong Li, Muhannad Bakir and Shimeng Yu Georgia Institute of Technology

[37C-4]

Optoelectronic Synapses Based on Inorganic-Organic Hybrid Phototransistors for Neuromorphic Vision System

Dingwei Li^{1,2}, Yitong Chen^{1,2}, Yingjie Tang^{1,2}, Kun Liang^{1,2}, Huihui Ren^{1,2}, Yan Wang^{1,2}, Fanfan Li^{1,2}, Guolei Liu^{1,2}, Chunyan Song² and Bowen Zhu² ¹Zhejiang University, ²Westlake University

[37C-5]

A Solid Electrolyte ZnO Thin Film Transistor for Classification of Spoken Digits Using Reservoir Computing

Ankit Gaurav¹, Xiaoyao Song², Sanjeev Kumar Manhas¹, Partha Pratim Roy¹ and Maria Merlyne De Souza²

¹Indian Institute of Technology Roorkee, ²University of Sheffield

15:35-15:50

15:50-16:05

16:05-16:20

15:10-15:35

14:45-15:10

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38D. Wide Bandgap Channel Devices		
Session Date	March 9(Thu.), 2023	
Session Time	14:45-16:10	
Session Room	Room D (#308 bc)	
Session Chair	Prof. Masaharu Kobayashi (The University of Tokyo)	
	Prof. ByungChul Jang (Kyungpook National University)	

[38D-1] [Invited]

Avoiding Plasma Damage: MacEtch Enabled $\beta\text{-}Ga_2O_3$ FinFETs for On-Resistance Reduction and Hysteresis Elimination

Hsien-Chih Huang¹, Zhongjie Ren², A F M Anhar Uddin Bhuiyan³, Zixuan Feng³, Xixi Luo², Alex Q. Huang², Hongping Zhao³ and Xiuling Li^{1.2} ¹University of Illinois, ²University of Texas, ³The Ohio State University

[38D-2]

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Demonstration of p-Channel GaN FinFETs on Silicon Substrates with Ultrahigh Current ON/OFF Ratio of 10⁹ and Reduced Interface Trap Density

Hanghai Du, Zhihong Liu, Tao Zhang, Lu Hao, Guangjie Gao, Weichuan Xing, Jincheng Zhang and Yue Hao

Xidian University

[38D-3]

Effects of Unisolated Top Gate on Performance of Dual-Gate InGaZnO Thin-Film Transistor Chao Zhang and Xiaodong Huang Southeast University

[38D-4]

BEOL Compatible Extremely Scaled Bilayer ITO/IGZO Channel FET with High Mobility 106 $\mbox{cm}^2\mbox{/V.s}$

Sonu Hooda¹, Manohar Lal^{1,2}, Chen Chun-Kuei¹, Shih-Hao Tsai¹, Evgeny Zamburg^{1,2} and Aaron Voon-Yew Thean^{1,2}

¹National University of Singapore, ²Singapore Hybrid-Integrated Next-Generation µ-Electronics Centre

[38D-5]

Effects of In/Zn Composition on the Performance of Ultra-Thin Atomic Layer Deposited $In_xZn_{1:x}O$ Channel Thin-Film Transistors

Yan-Kui Liang¹, June-Yang Zheng¹, Jing-Wei Lin¹, Yi Miao Hua¹, Tsung-Te Chou², Chun-Chieh Lu³, Huai-Ying Huang³, Yu-Ming Lin³, Chi-Chung Kei², Edward-Yi Chang¹ and Chun-Hsiung Lin¹ ¹National Yang Ming Chiao Tung University, ²Taiwan Instrument Research Institute, ³Taiwan Semiconductor Manufacturing Company

15:10-15:25

15:25-15:40

15:40-15:55

14:45-15:10

15:55-16:10

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39E. Health Monitoring System and Therapy		
Session Date	March 9(Thu.), 2023	
Session Time	14:45-16:15	
Session Room	Room E (#308 a)	
Session Chair	Prof. Sungjun Park (Ajou University)	

[39E-1] [Invited]

Ultra-Flexible Organic Electronics for Health Monitoring Tomoyuki Yokota, Sunghoon Lee and Takao Someya *The University of Tokyo*

[39E-2] [Invited]

On-Skin Biosensors: Wearable Sweat-Analytics for Healthcare

Xinting Zheng¹, Yong Yu¹, Changyun Jiang¹, Jiajia Gao¹, Wei Peng Goh¹, Sherwin Chong Li Tan¹, Ruth T Arwani^{1,2}, Yuxin Liu^{1,3}, Tandy Tantan Zhang¹, Yuan Gao¹, Xiangyu Zhang³, Aaron VY Thean³ and Le Yang^{1,3}

¹Agency for Science, Technology and Research, ²Nanyang Technological University, ³National University of Singapore

[39E-3] [Invited]

A Transient Closed-Loop System for Temporary Electrotherapy Yeonsik Choi Yonsei University

[39E-4]

A Breathable and Flexible Electronic Skin for Long-Term Electroencephalogram Monitoring Tian-Rui Cui¹, Ying-Fen Zeng¹², Xiao-Shi Li¹, Yan-Cong Qiao¹, Ding Li¹, He Tian¹, Yi Yang¹, Si-Fan Yang² and Tian-Ling Ren¹

¹Tsinghua University, ²Tsinghua Shenzhen International Graduate School

15:10-15:35

14:45-15:10

15:35-16:00

16:00-16:15

Zhi Gong¹, Jiajia Chen¹, Chengji Jin¹, Huan Liu¹, Yan Liu², Xiao Yu¹ and Genquan Han² ¹Zhejiang Lab, ²Xidian University

Atomic-Scale Study on Amorphous ZrO₂/TaON Interface for Ferroelectric-Like Insulator Films

[40F-5]

A Study on the Thermal Budget of Ferroelectric TiN/Hf0.5Zr0.5O2 /TiN Capacitors for Next-Generation Memory Applications

Hye Ryeon Park¹, Jeong Gyu Yoo¹, Jong Mook Kang¹, Min Kwan Cho¹, Taeho Gong¹, Seongbin Park¹, Seungbin Lee¹, Jin-Hyun Kim², Seojun Lee^{2,3}, Rino Choi³, Harrison Sejoon Kim², Yong Chan Jung², Jivoung Kim² and Si Joon Kim¹

¹Kangwon National University, ²The University of Texas at Dallas, ³Inha University

40F. Ferroelectric	Memories
Session Date	March 9(Thu.), 2023

Session Time 14:45-16:10

Session Room Room F (#317)

Session Chair	Prof. Jian	shi Tang	(Tsinghua	University)	
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Prof. Si Joon Kim (Kangwon National University)

[40F-1] [Invited]

The Top Electrode Tensile Stress Effect on Ferroelectricity of Hf_{0.5} Zr_{0.5}O₂ Thin Films Runhao Han^{1,2}, Peizhen Hong³, JingWen Hou¹, Wenjuan Xiong¹, Shuai Yang¹, Jianfeng Gao¹ and Zongliang Huo^{1,2,4}

¹Institute of Microelectronics of The Chinese Academy of Sciences, ²University of Chinese Academy of Sciences. ³Nankai University. ⁴Yanatze Memory Technologies Co., Ltd.

[40F-2]

Performance Evaluation of AFeRAM under Low Temperature Operation

Yi-Chuan Chen¹, Yu-Chen Chen¹, Kuo-Yu Hsiang^{1,2}, Min-Hung Lee² and Pin Su¹ ¹National Yang Ming Chiao Tung University, ²National Taiwan Normal University

[40F-3]

Energy-Efficient Annealing Process of HfO2-Based Ferroelectric Capacitor Using UV-LED for Green Manufacturing

Hirotaka Yamada^{1,2}, Satoru Furue¹, Takehiko Yokomori¹, Yuki Itoya², Takuya Saraya², Toshiro Hiramoto² and Masaharu Kobayashi²

¹Ushio Inc., ²The University of Tokyo

[40F-4]

15:10-15:25

15:55-16:10

15:25-15:40

15:40-15:55

14:45-15:10

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41G. TCAD for Nano-Scale FET		
Session Date	March 9(Thu.), 2023	
Session Time	14:45-16:10	
Session Room	Room G (#318)	
Session Chair	Prof. Rock-Hyun Baek (Pohang University of Science and Technology)	

[41G-1] [Invited]

Deep Learning for Semiconductor Materials and Devices Design

Changwook Jeong¹, Sanghoon Myung², Byungseon Choi², Jinwoo Kim², Wonik Jang², In Huh², Jae Myung Choe², Young-Gu Kim² and Dae Sin Kim²

¹Ulsan National Institute of Science and Technology, ²Samsung Electronics Co., Ltd.

[41G-2]

Optimization of Ge Mole Fraction in Sacrificial Layers for Sub-3-nm Node Silicon Nanosheet FETs

Sanguk Lee, Jinsu Jeong, Jun-Sik Yoon, Seunghwan Lee, Junjong Lee, Jaewan Lim and Rock-Hyun Baek

Pohang University of Science and Technology

[41G-3]

Investigation of Self-Heating Effect in Forksheet FETs for Sub-3-nm Node Jaewan Lim, Jinsu Jeong, Junjong Lee, Seunghwan Lee, Sanguk Lee and Rock-Hyun Baek Pohang University of Science and Technology

[41G-4]

Process Condition Effects on Saddle Fin Profile and Its Device Performance below 20nm Advanced DRAM

Yexiao Yu, Zhongming Liu and Hong Ma ChangXin Memory Technologies, Inc.

[41G-5]

Process-Induced Uniaxial Strain in Nanosheet-FET Based CMOS Technology - Is It Still **Beneficial?**

Ramandeep Kaur and Nihar R. Mohapatra Indian Institute of Technology Gandhinagar

15:40-15:55

15:25-15:40

14:45-15:10

15:10-15:25

15:55-16:10

[42A-1] [Invited]

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Deep Insights into Recessed-Gate MOS-HEMT Technology for Power Applications B. Mohamad, C. Le Royer, F. Rigaud-Minet, C. Piotrowicz, P. Fernandes Paes Pinto Rocha, C. Leurquin, W. Vandendaele, R. Escoffier, J. Buckley, S. Bécu, J. Biscarrat and R. Gwoziecki Université Grenoble Alpes

[42A-2] [Invited]

Vertical GaN Power Devices Wenwen Li and Dong Ji The Chinese University of Hong Kong

[42A-3]

Effect of Parasitic Leakage Currents Associated with the Regrown Aperture of AlGaN/GaN Current Aperture Vertical Electron Transistors (CAVETs) Sara Pouladi and Jae Hyun Ryou

University of Houston

[42A-4]

Fabrication of AlGaN/GaN MIS-HEMTs with Post-Growth Annealing Meihua Liu^{1,2}, Yong Zhang¹ and Guoyong Huang² ¹Shenzhen Institute of Advanced Technology, ²SMiT

[42A-5]

A Width-Scalable SPICE Model of GaN-HEMTs for X-Band RF Applications

Md Hasnain Ansari¹, Raghvendra Dangi¹, Ahtisham Pampori¹, Pragya Kushwaha², Ekta Yadav², Santanu Sinha² and Yogesh Singh Chauhan¹

¹Indian Institute of Technology Kanpur, ²Indian Space Research Organisation

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42A. Power Devices and Widebandgap Heterostructures (3)		
Session Date	March 9(Thu.), 2023	
Session Time	16:30-18:05	
Session Room	Room A (#301)	
Session Chair	Prof. Jungwoo Oh (Yonsei University) Prof. Man Hoi Wong (The Hong Kong University of Science and Technology)	

16:55-17:20

17:20-17:35

17:35-17:50

16:30-16:55

17:50-18:05

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43B. Device Reliability		
Session Date	March 9(Thu.), 2023	
Session Time	16:30-18:05	
Session Room	Room B (#307 bc)	
Session Chair	Dr. Stanislav Tyaginov (imec)	
ocosion onali	Dr. Minsoo Yoo (SK hynix)	

[43B-1] [Keynote]

A Comprehensive Cryogenic CMOS Variability and Reliability Assessment Using Transistor Arrays

A. Grill¹, J. Michl², J. Diaz-Fortuny¹, A. Beckers¹, E. Bury¹, A. Chasin¹, T. Grasser³, M. Waltl³, B. Kaczer¹ and K. De Greve^{1,2}

¹Imec, ²Katholieke Universiteit Leuven, ³Institute for Microelectronics, TU Wien

[43B-2] [Invited]

Modeling Framework Linking Material Characterization to Reliability Prediction

L. Larcher¹, V. Milo¹, A. Palmieri¹, P. La Torraca², A. Padovani², F. Nardi¹ and M. Pesic¹ ¹Applied Materials Inc., ²University of Modena and Reggio Emilia

[43B-3]

On the Contribution of Secondary Holes in Hot-Carrier Degradation – A Compact Physics Modeling Perspective

S.E. Tyaginov^{1,2}, E. Bury¹, A. Grill¹, Z. Yu^{1,3}, A. Makarov¹, A. De Keersgieter¹, M.I. Vexler², M. Vandemaele¹, R. Wang³, A. Spessot¹, A. Chasin¹ and B. Kaczer¹ ¹Imec, ²The loffe Physical-Technical Institute, ³Peking University

[43B-4]

Forward Body Bias Technique in DRAM Peripheral Transistor at Cryogenic Temperature for Quantum Computing Applications

Hyunseo You¹, Jehyun An¹, Kihoon Nam¹, Bohyeon Kang¹, Jongseo Park¹, Namhyun Lee², Seonhaeng Lee² and Rock-Hyun Baek¹

¹Pohang University of Science and Technology, ²Samsung Electronics Co., Ltd.

[43B-5]

A Study of High Voltage NMOSFET Degradation for NAND HVSW Circuit Young Gon Lee, Sang Ho Lee and Sung Kye Park *SK hvnix*

17:50-18:05

17:20-17:35

17:35-17:50

16:55-17:20

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16:30-16:55

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44C. Nanoscale Materials	
Session Date	March 9(Thu.), 2023
Session Time	16:30-18:05
Session Room	Room C (#307 a)
Session Chair	Prof. Gwan-Hyoung Lee (Seoul National University)
	Prof. Jong-Hoon Kang (Pohang University of Science and Technology)

[44C-1] [Invited]

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Automated Assembly of Synthetic Van Der Waals Solids Andrew Mannix Stanford University

[44C-2] [Invited]

Boosting Electrochemical CO_2 Reduction on Zeolite-Imidazolate-8 via Transition Metal Doping-Induced Local Effect Jin Hyuk Cho and Soo Young Kim

Korea University

[44C-3]

Generalized Direct Optical Patterning of Photocurable Inorganic Materials Seongheon Baek and Jae Sung Son Ulsan National Institute of Science and Technology

[44C-4]

A Study on the Flash-Light Sintering Characteristics with Respect to the Pattern Width and Interval of the Inkjet-Printed Copper Nano Ink on the Paper Substrate Sungjun Choi, Yong-Rae Jang, Hak-Sung Kim and Caroline Sunyong Lee Hanyang University

[44C-5]

Graphene via Contact Architecture for Vertical Integration of vdW Heterostructure Devices Yongjun Shin¹, Junyoung Kwon², Yeonsu Jeong², Kenji Watanabe³, Takashi Taniguchi³, Seongil Im² and Gwan-Hyoung Lee¹

¹Seoul National University, ²Yonsei University, ³National Institute for Materials Science

17:20-17:35

17:35-17:50

17:50-18:05

16:30-16:55

16:55-17:20

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45D. Advanced CMOS Technology		
Session Date	March 9(Thu.), 2023	
Session Time	16:30-17:55	
Session Room	Room D (#308 bc)	
Session Chair	Prof. Sanghyeon Kim (Korea Advanced Institute of Science and Technology)	

[45D-1] [Invited]

Substrate and Device Engineering for Extending Moore's Law

Bich-Yen Nguyen, Guillaume Besnard, Walter Schwarzenbach, Hankel Chang, Ionut Radu and Christophe Maleville Soitec

[45D-2]

A New Insight into the Saturation Phenomenon in Nanosheet Transistor: A Device Optimization Perspective

Shashank Banchhor¹, Navjeet Bagga², Nitanshu Chauhan^{1,3}, Manikandan S¹, Avirup Dasgupta¹, S. Dasgupta¹ and Anand Bulusu¹

¹Indian Institute of Technology Roorkee, ²Indian Institute of Technology Bhubaneswar, ³National Institute of Technology, Uttarakhand

[45D-3]

Heat Dissipation Improvement by MgO Interlayer Dielectric in CMOS Technology Ye-Eun Hong¹, Gyounghoon Oh², Anh-Duy Nguyen¹, Si-Un Song¹, Jongyeon Baek¹, Dongseok Suh² and Rino Choi1

¹Inha University, ²Sungkyunkwan University

[45D-4]

Performance Evaluation of Strain Effectiveness of Sub-5 nm GAA FETs with Compact Modeling Based on Neural Networks

Ji Hwan Lee¹, Kihwan Kim¹, Kyungjin Rim², Soogine Chong², Hyunbo Cho² and Saeroonter Oh¹ ¹Hanyang University, ²Alsemy Inc.

[45D-5]

Negative-Thermal-Expansion Gate Electrode to Introduce Tensile Strain into the Channel of **MOSFETs for Mobility Enhancement**

Hisashi Kino. Takafumi Fukushima and Tetsu Tanaka Tohoku University

17:10-17:25

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17:25-17:40

17:40-17:55

16:30-16:55

16:55-17:10

46E. Energy Harvesting Device and System		
Session Date	March 9(Thu.), 2023	
Session Time	16:30-17:35	
Session Room	Room E (#308 a)	
Session Chair	Prof. Kibum Kang (Korea Advanced Institute of Science and Technology)	

[46E-1] [Invited]

Ultrathin Organic Solar Cells for Wearable/Soft Robot Applications Kenjiro Fukuda¹ and Takao Someya^{1,2} ¹*RIKEN*, ²*The University of Tokyo*

[46E-2] [Invited]

Grain Boundary Engineering at the Atomic-Level of Two-Dimensional Materials Cheol-Joo Kim^{1,2}

¹Institute for Basic Science, ²Pohang University of Science and Technology

[46E-3]

Intrinsic Mobility Enhancement of 2D Sn(II)-Based Perovskites via Molecular Doping Youjin Reo, Huihui Zhu, Ao Liu and Yong-Young Noh Pohang University of Science and Technology

17:20-17:35

16:30-16:55

16:55-17:20

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47F. Memory for New Applications	
Session Date	March 9(Thu.), 2023
Session Time	16:30-18:00
Session Room	Room F (#317)
Session Chair	Prof. Tae-Sik Yoon (Ulsan National Institute of Science and Technology)
	Prof. Kyung Min Kim (Korea Advanced Institute of Science and Technology)

[47F-1]

Demonstration of Ultra-Thin Ferroelectric/Dielectric and Anti-Ferroelectric/Dielectric Bilayers for Future DRAM Cell Capacitors

Dong Ik Suh, Won-Tae Koo, Youngmo Kim, Ja-Yong Kim, Seung Wook Ryu, Heeyoung Jeon, Ki Vin Im, Gwangyeob Lee, Taeone Youn, Hyeonho Jeong, Seho Lee, Myung-Hee Na and Seon Yong Cha *SK hynix*

[47F-2]

A Ferroelectric Differential Bit Cell Based Multiple-Time Programmable Physical Unclonable Function (PUF) for IoT Devices Security

Paritosh Meihar, Srinu Rowtu, Sandip Lashkare and Udayan Ganguly Indian Institute of Technology Bombay

[47F-3]

A Novel Pulse-Width-Modulated FeFET-Based Analog Content Addressable Memory with High Area- And Energy-Efficiency

Weikai Xu¹, Jin Luo¹, Qianqian Huang^{1,2,3} and Ru Huang^{1,2,3} ¹Peking University, ²Beijing Advanced Innovation Center for Integrated Circuits, ³Chinese Institute for Brain Research

[47F-4]

Novel Complementary FeFET-Based Lookup Table and Routing Switch Design and Their Application in Energy/Area-Efficient FPGA

Yuan-Yu Huang, Po-Tsang Huang, Po-Yi Lee and Pin Su National Yang Ming Chiao Tung University

[47F-5]

A 40-nm Embedded 1T-OTP MACRO with Gate-Oxide-Charge Storage by Channel-Hot-Electron-Injection Featuring 0.086 μm²/cell, 1.8 V of Program-Voltage, 125 °C Retention Y. H. Ye, Y. X. Huang, H. S. Su, R. Q. Lin, Y.-H. Lin, K. H. Chang, T. H. Shen and E Ray Hsieh

National Central University

[47F-6]

Self-Clocking Fast and Variation Tolerant True Random Number Generator Based on a Stochastic Mott Memristor

Gwangmin Kim, Jae Hyun In, Young Seok Kim, Hakseung Rhee, Woojoon Park, Hanchan Song, Juseong Park and Kyung Min Kim

Korea Advanced Institute of Science and Technology

17:15-17:30

17:30-17:45

17:45-18:00

16:45-17:00

17:00-17:15

16:30-16:45

Advanced Compact Modeling for Transistor Aging: Trap-Based Approaches and Mixed-Mode Coupling

Runsheng Wang¹, Zixuan Sun¹, Yu Li¹, Yongkang Xue², Zirui Wang¹, Pengpeng Ren², Zhigang Ji^{1,2}, Lining Zhang¹ and Ru Huang¹

¹Peking University, ²Shanghai Jiao Tong University

[48G-2]

@edtm

Integrated Wafer and Die Level Simulation of Back End of Line Chemical Mechanical Polishing Processes

Ushasree Katakamsetty¹, Stefan Nikolaev Vovkov², Boris Vasilev³, Sam Nakagawa⁴, Tamba Tugbawa⁵, Jansen Chee⁶, Aaron Gower-Hall⁷, Brian Lee⁷, Weiyang Zhu⁸, Bifeng Li⁸ and Kimiko Ichikawa⁹ ¹Global Foundries, Singapore, ²Global Foundries, Sofia, Bulgaria, ³Global Foundries, Dresden, Germany, ⁴Global Foundries, Santa Clara, CA, ⁵Cadence Design Systems, Inc., San Jose, CA, USA, ⁶Cadence Design Systems, Inc., Singapore, ⁷Cadence Design Systems, Inc., Burlington, MA, USA, ⁸Cadence Design Systems, Inc., Shanghai, China, ⁹Cadence Design Systems, Inc., Yokohama, Japan

[48G-3]

Introduction and Research of All Wafer Intelligent Monitoring (AIM) System Junho Roh, Jinil Kim, Hong-Goo Lee, Sang-Ho Lee and Jaewook Seo SK hynix

[48G-4]

Drain Current Variability in 2-Levels Stacked Nanowire Gate All Around P-Type Field Effect Transistors

Donghyun Kim^{1,2}, Sylvain Barraud³, Gerard Ghibaudo¹, Christoforos Theodorou¹ and Jae Woo Lee² ¹Univ. Grenoble Alpes, Univ. Savoie Mont Blanc, Grenoble INP, CNRS, IMEP-LAHC, ²Korea University, ³Université Grenoble Alpes CEA-Leti

[48G-5]

Application of Deep Artificial Neural Network to Model Characteristic Fluctuation of Multi-Channel Gate-All-Around Silicon Nanosheet and Nanofin MOSFETs Induced by Random Nanosized Metal Grains

Sagarika Dash, Yiming Li and Wen-Li Sung National Yang Ming Chiao Tung University

March 7th - 10th, 2023 / Coex, Seoul, Korea

48G. Modeling for	Variability and Manufacturing
Session Date	March 9(Thu.), 2023
Session Time	16:30-17:55
Session Room	Room G (#318)
Session Chair	Prof. Jong-Ho Bae (Kookmin University)

[48G-1] [Invited]

17:10-17:25

16:30-16:55

16:55-17:10

17:25-17:40

17:40-17:55

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49A. Power Devices and Widebandgap Heterostructures (IV)	
Session Date	March 10(Fri.), 2023
Session Time	10:40-12:15
Session Room	Room A (#301)
Session Chair	Prof. Ho-Young Cha (Hongik University)
	Dr. Jiyoung Lim (Magnachip)

[49A-1] [Invited]

SiC CMOS Integrated Circuits and Image Sensors for Extreme Environment Applications Shin-Ichiro Kuroki¹, Toya Kai¹, Masayuki Tsutsumi¹, Tatsuya Meguro¹, Vuong Van Cuong¹, Akinori Takeyama², Takahiro Makino², Takeshi Ohshima², Kazutoshi Kojima³ and Yasunori Tanaka³ ¹Hiroshima University, ²National Institutes for Quantum Science and Technology, ³National Institute of Advanced Industrial Science and Technology

[49A-2] [Invited]

Growth of BN and BAIGaN on Foreign Substrates for Electronic Device Applications Jen-Inn Chyi¹, Rather Muzafar¹, Ravi Loganathan¹, Tung-Yuan Yu², Chien-Ting Wu², Kun-Lin Lin² and Kun-Yu Lai¹ ¹National Central University, ²Taiwan Semiconductor Research Institute

[49A-3]

A Novel 1.2kV Snap-Back Suppressed RC-VIGBT with Small Switching Energy Loss and Simple Fabrication Process

Suyang Liu, Gai Tsukamoto, Haoming Che, Sichang Zhang, Zijian Zhang and Masahide Inuishi Waseda University

[49A-4]

Correlation Analysis on Local Capacitance-Voltage Profiles of a SiO $_2$ /SiC Interface Observed by Time-Resolved Scanning Onlinear Dielectric Microscopy

Kohei Yamasue and Yasuo Cho Tohoku University

[49A-5]

Selective Area Carrier Concentration Modulation of Single Crystal β -Ga₂O₃ Film through High Temperature Oxygen Annealing Process

Qiming He¹, Qiuyan Li², Xuanze Zhou², Qi Liu², Weibin Hao², Zhao Han², Guangwei Xu², Xiaojun Wu¹ and Shibing Long²

¹Beihang University, ²University of Science and Technology of China

10:40-11:05 Applications

11:05-11:30

11:30-11:45

11:45-12:00

12:00-12:15

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50B. Application Reliability	
Session Date	March 10(Fri.), 2023
Session Time	10:40-11:50
Session Room	Room B (#307 bc)
Session Chair	Dr. Jin-Woo Han (Samsung Electronics Co., Ltd.)

[50B-1] [Invited]

@edtn

Reliable Resistive Switching of Janus Graphene Oxide Based Memristive Crossbar Array Fei Hui¹, Conghui Zhang¹, Tingting Han², Mario Lanza³ and Peisong Liu⁴

¹Zhengzhou University, ²Soochow University, ³King Abdullah University of Science and Technology, ⁴Henan University

[50B-2]

Demonstration of a Junctionless Negative Capacitance FinFET-Based Hydrogen Gas Sensor: A Reliability Perspective

Navneet Gandhi¹, Rajeewa Kumar Jaisawal¹, Sunil Rathore¹, P. N. Kondekar¹, Shashank Banchhor² and Navjeet Bagga³

¹Pandit Dwarka Prasad Mishra Indian Institute of Information Technology, Design and Manufacturing Jabalpur, ²Indian Institute of Technology Roorkee, ³Indian Institute of Technology Bhubaneswar

[50B-3]

Electro-Thermal Properties and Self-Heating Effect in Multi-Nanosheet FETs: Junctionless Mode versus Inversion Mode

Nitish Kumar, Kanyakumari Ashok Bhinge, Ankur Gupta and Pushpapraj Singh Indian Institute of Technology Delhi

[50B-4]

Cross-Temperature Reliabilities in TLC 3D NAND Flash Memory: Characterization and Solution

Yifan Guo, Kenie Xie, Xiaotong Fang, Xuepeng Zhan, Jixuan Wu and Jiezhi Chen Shandong University

11:05-11:20

11:35-11:50

11:20-11:35

10:40-11:05

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51C. Nanoscale Devices		
Session Date	March 10(Fri.), 2023	
Session Time	10:40-12:10	
Session Room	Room C (#307 a)	
Session Chair	Prof. Soo Young Kim (Korea University) Prof. Gwan-Hyoung Lee (Seoul National University)	

[51C-1] [Keynote]

Distributed Polarization Doping (DPD) in DUV, Power, and RF III-Nitride Semiconductor Devices Huili Grace Xing and Debdeep Jena Cornell University

[51C-2] [Invited]

Atomically Engineered Thin Films and Devices Saien Xie Princeton University

[51C-3] [Invited]

Nanoscale Memory and Switching Devices with Atomically-Thin Body Joonki Suh Ulsan National Institute of Science and Technology

[51C-4]

20nm Symmetrical FinFET with Upward Gate, Grooved Gate, Double Gate: Comparison, Analysis, and Evaluation

Tejaswini Sahoo and Prasanna Kumar Sahu National Institute of Technology Rourkela

11:30-11:55

11:55-12:10

10:40-11:05

11:05-11:30

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52D. Group IV Devices	
Session Date	March 10(Fri.), 2023
Session Time	10:40-12:20
Session Room	Room D (#308 bc)
Session Chair	Prof. Woo Young Choi (Seoul National University)

[52D-1] [Invited]

Building the Path to Ubiquitous Wireless Connectivity, from Materials to Systems Luis Andia and Yvan Morandini Soitec

[52D-2]

@edtn

Operation Scheme Optimization for Charge Trap Transistors (CTTs) Based on Fully Depleted Silicon-on-Insulator (FDSOI) Platform

Wannian Wang¹, Bing Chen¹, Jiayi Zhao¹, Sebastien Loubriat², Guillaume Besnard³, Christophe Maleville³, Olivier Weber⁴ and Ran Cheng¹

¹Zhejiang University, ²CEA-Leti, ³Soitec, ⁴STMicroelectronics

[52D-3]

Variable-Temperature Broadband Noise Characterization of MOSFETs for Cryogenic Electronics: from Room Temperature down to 3 K Kenji Ohmori¹ and Shuhei Amakawa²

¹Device Lab Inc., ²Hiroshima University

[52D-4]

Improved Electrical Characteristics of Ge p-MOSFET with Ti-GeO_x Interfacial Layer by In-Situ Plasma-Enhanced Atomic Layer Deposition

Hui-Hsuan Li¹, Yu-Hsien Lin², Tsung-Yen Tu² and Chao-Hsin Chien¹ ¹National Yang Ming Chiao Tung University, ²National United University

[52D-5]

SiGe-Based Nanowire HBT for THz Applications

Soumya Ranjan Panda^{1,2}, Sebastien Fregonese¹, Anjan Chakravorty² and Thomas Zimmer¹ ¹University of Bordeaux, ²Indian Institute of Technology Madras

[52D-6]

1T FDSOI Based LIF Neuron without Reset Circuitry: A Proposal and Investigation V Rajakumari¹, S R Panda² and K P Pradhan¹

¹Indian Institute of Information Technology, Design and Manufacturing Kancheepuram, ²University of Bordeaux

11:35-11:50

11:50-12:05

12:05-12:20

10:40-11:05

11:05-11:20

11:20-11:35

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53E. Wearable and Skin Compatible Sensor	
Session Date	March 10(Fri.), 2023
Session Time	10:40-11:55
Session Room	Room E (#308 a)
Session Chair	Prof. Jimin Kwon (Ulsan National Institute of Science and Technology)

[53E-1] [Invited]

Flexible Pressure Sensor and Its Applications in Skin-Inspired Electronics Jiangbo Hua and Lijia Pan

Nanjing University

[53E-2] [Invited]

Multimodal Flexible Sensor Systems Kuniharu Takei Osaka Metropolitan University

[53E-3] [Invited]

11:30-11:55

10:40-11:05

11:05-11:30

Laser-Induced Recrystallization of Perovskite Quantum Dots for Flexible/Wearable Light-Emitting Devices

Ji Eun Kim¹, Jae Chan Heo², Jung Hwan Park² and Han Eol Lee¹

¹Jeonbuk National University, ²Kumoh National Institute of Technology

54A. Energy Materials and Devices	
Session Date	March 10(Fri.), 2023
Session Time	13:15-14:25
Session Room	Room A (#301)
Session Chair	Dr. Hyung-Seok Lee (Electronics and Telecommunications Research Institute)
	Prof. DongHan Seo (Korea Institute of Energy Technology)

[54A-1] [Invited]

Physical Modelling of Ga_2O_3 Schottky Barrier Diodes (SBDs) Nouredine Sengouga¹, Madani Labed^{1,2} and You Seung Rim²

¹University of Biskra, ²Sejong University

[54A-2]

Plasma Enhanced Atomic Layer Deposition of Crystalline BeO Films for Wide-Bandgap Semiconductors

Yoonseo Jang¹, Dohwan Jung¹, Christopher W. Bielawski^{2,3} and Jungwoo Oh¹ ¹Yonsei University, ²Institute for Basic Science, ³Ulsan National Institute of Science and Technology

[54A-3]

Highly Flexible Piezoelectric Pressure Sensor at Extremely High-Temperature Range Using Ultrawide-Bandgap III-N Thin Films

Nam-In Kim, Miad Yarali, Muhammad Aqib and Jae-Hyun Ryou University of Houston

[54A-4]

All-Solid-State Thin Film Lithium-Ion Battery with High Ionic Conductivity Material ${\sf LiNbO}_3$ as Anode

Xuechen Hu, Fuhan Cui and Xiaodong Huang Southeast University

14:10-14:25

13:55-14:10

13:15-13:40

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55B. System Reliability	
Session Date	March 10(Fri.), 2023
Session Time	13:15-14:40
Session Room	Room B (#307 bc)
Session Chair	Dr. Alexander Grill (imec)
	Prof. Sangwan Kim (Sogang University)

[55B-1] [Invited]

Enhanced Thermo-Mechanical Reliability of High Bandwidth Memory through Mass Reflow Bonding and Molded Underfill

Sangyong Lee, Jong-Kyu Moon, Taehee Kim, Kyungbeom Seo, Minsuk Kim and Gyujei Lee SK hynix

[55B-2]

Prediction of Crack Type and Life of Printed Circuit Board under Thermal Cycling with Respect to Solder Composition

Heon-Su Kim¹, You-Gwon Kim¹, Do-Hyung Kim², Dong-Min Jang², Jin-Woo Jang², Seung-Yeong Lee² and Hak-Sung Kim¹

¹Hanyang University, ²Samsung Electronics Co., Ltd.

[55B-3]

Impact of RF Frequency Bands on the DC and Large Signal Reliability of a 45nm RFSOI NFET Based Power Amplifier Cell

Aarti Rathi¹, P. Srinivasan² and Abhisek Dixit¹ ¹Indian Institute of Technology Delhi, ²GlobalFoundries

[55B-4]

Reliability Prediction for Automotive 5nm and 7nm Technology Node by Using Machine Learning **Based Solution**

Hyung Joo Lee¹, Dongin Kim², Sanghyun Choi¹, Seungpyo Hong¹, Doohwan Kwak¹, Srividya Jayaram¹, Seungwon Paek², Minho Kwon², Yeongdo Kim², Hyobe Jung², Ivan Kissiov¹, Melody Tao¹, Andres Torres¹, Nathan Greeneltch¹ and Ho Lee²

¹Siemens EDA, ²Samsung Electronics Co., Ltd.

[55B-5]

Predictable ESD Criteria with Proposed Comparison Diagram between TLP and HBM ESD for Various Device Technologies and Different Substrates

Hyeokjae Lee¹, Dong-Sung Kim¹, Jae-Young Noh¹, Youngboo Kim¹, Jisun Park² and Hyungsoon Shin² ¹QRT Inc., ²Ewha Womans University

13:55-14:10

14:10-14:25

14:25-14:40

13:15-13:40

John F. Hardy II¹, John A. Castañeda¹, John Gibbs^{1,2} and Ying-Chen Chen^{1,2} ¹Northern Arizona University, ²Center for Materials Interfaces in Research and Applications

Helical-Shaped Tungsten Oxide as Active Layer with Dual Switching Behaviors for Emerging

[56C-5]

Electric Polarization Switching in Rhombohedral-Stacked Transition Metal Dichalcogenides Homobilavers

Ji-Hwan Baek¹, Seong Chul Hong¹, Yeonjoon Jung¹, Yeon Ho Kim², Kenji Watanabe³, Takashi Taniguchi³, Chul-Ho Lee² and Gwan-Hyoung Lee¹

¹Seoul National University, ²Korea University, ³National Institute for Materials Science

[56C-2]

@edtn

Role of Carrier Gas and Its Flow Rate to Produce Uniform, Large-Sized MoS₂ Monolayer via CVD

Chandrabhan Patel¹, Mayank Dubey¹, Sumit Chaudhary¹, Vikash Kumar¹ and Shaibal Mukherjee^{1,2} ¹Indian Institute of Technology Indore, ²RMIT University

[56C-3]

Control of Orientation of Reactive Sputtering Grown MoS₂ Films Myeongok Kim¹, Tomah Sogabe^{1,2} and Yoshitaka Okada¹ ¹The University of Tokyo, ²The University of Electro-Communications

[56C-4]

Memory Applications

[56C-1] [Invited] Three-Dimensional Architecture of Atomically Thin Semiconductors Jong-Hoon Kang

Pohang University of Science and Technology

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56C. Nanoscale Fabrication	
Session Date	March 10(Fri.), 2023
Session Time	13:15-14:40
Session Room	Room C (#307 a)
Session Chair	Prof. Joonki Suh (Ulsan National Institute of Science and Technology) Prof. Gwan-Hyoung Lee (Seoul National University)

14:10-14:25

14:25-14:40

13:55-14:10

13:15-13:40
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57D. Devices for Emerging Applications			
Session Date	March 10(Fri.), 2023		
Session Time	13:15-14:50		
Session Room	Room D (#308 bc)		
Session Chair	Dr. Kakushima Kuniyuki (Tokyo Institute of Technology)		

[57D-1] [Invited]

Phosphosilicate Glass-Based Nanosecond Protonic Programmable Resistors for Analog Deep Learning

Murat Onen, Ju Li, Bilge Yildiz and Jesús A. del Alamo Massachusetts Institute of Technology

[57D-2] [Invited]

Strategy for Low Temperature HZO Ferroelectric Capacitors for Back-End of Line Applications Jin-Hyun Kim¹, Minjong Lee¹, Seojun Lee^{1,2}, Yong Chan Jung¹, Rino Choi², Hyun Jae Kim³, Si Joon Kim⁴ and Jiyoung Kim¹

¹The University of Texas at Dallas, ²Inha University, ³Yonsei University, ⁴ Kangwon National University

[57D-3]

Sharp Turn-On Diode by Steep SS "PN-Body Tied SOI FET" for Ultra-Low Power RF Energy Harvesting

Masayuki Ono¹, Jiro Ida¹, Takayuki Mori¹ and Koichiro Ishibashi² ¹Kanazawa Institute of Technology. ²The University of Electro-Communications

[57D-4]

Intercalated Multilayer Graphene / Nickel Hybrid Antenna with Enhanced Inductance Density for Size Reduction

Keigo Hosokawa, Kenta Matsunaga and Kazuyoshi Ueno Shibaura Institute of Technology

[57D-5]

Design and Demonstration of Cu/ Al₂O₃ /Cu RRAM with Complementary Resistance Switching Characteristic

Huanmei Yuan^{1,2,4}, Yang Chai³, Shungi Dai^{1,2}, Cristine Jin Estrada¹, Yuging Zhang¹, Annan Xiong^{1,2}, Hao Bai³, Guangyu Du³, Songhua Cai³, Zhimin Li³, Songcen Xu¹ and Mansun Chan^{1,2} ¹The Hong Kong University of Science and Technology, ²InnoHK Centers, ³The Hong Kong Polytechnic University, ⁴University of Science and Technology Beijing

14:05-14:20

14:20-14:35

13:40-14:05

13:15-13:40

14:35-14:50

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58E. Wearable Display and Theoretical Study			
Session Date	March 10(Fri.), 2023		
Session Time	13:15-14:25		
Session Room	Room E (#308 a)		
Session Chair	Prof. Keehoon Kang (Seoul National University)		

[58E-1] [Invited]

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Technical Advances of Stretchable Display for High Pixel Density and High Stretchability

Samsung Display Co., Ltd.

[58E-2]

Space-Charge-Limited Currents in Organic Diodes: Are They Always There? Chang-Hyun Kim Gachon University

Jangyeol Yoon, Sangwoo Kim, Jong-Ho Hong and Yongjo Kim

[58E-3]

Efficient P-Doping on Solution-Processed WSe_2 Nano-Flake Thin-Film Transistors for Flexible Electronics

Taoyu Zou and Yong-Young Noh Pohang University of Science and Technology

[58E-4]

Organic Transistors with Biopolymer Gate Dielectric for Circuit and Photo Sensing Applications

Gargi Konwar, Sachin Rahi and Shree Prakash Tiwari Indian Institute of Technology Jodhpur

13:15-13:40

13:55-14:10

13:40-13:55

14:10-14:25

7th IEEE Electron Devices Technology and Manufacturing (EDTM) Conference 2023

Poster Session

P. Poster SessionSession DateMarch 9(Thu.), 2023Session Time10:30-13:00Session RoomRoom #300

[P-001]

Relation of Electrical Property and Mean Coordination Number at OTS Material Based Ge-As-Se-Si

Gwang Sun Jung, Uk Hwang, Jongho Lee, Jun Ku Ahn, Sung Lae Cho and Kyoung Ryul Yoon $SK\ hynix$

[P-002]

Periodic Fine Dimple Lines on the Surface of the Grain-Boundary Free Si Films Grown by Continuous-Wave-Laser Lateral Crystallization

Nobuo Sasaki^{1,2}, Satoshi Takayama², Rikuto Sasai² and Yukiharu Uraoka² ¹Sasaki Consulting, ²Nara Institute of Science and Technology

[P-004]

Heteroepitaxial InP Growth on a Si(001) Substrate Using a Ge Buffer Layer in MOCVD Keun Wook Shin¹, Kiyoung Lee² and Euijoon Yoon¹ ¹Seoul National University, ²Hongik University

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