

## AWAD 2021 Schedule

Aug 26 (Thu)			
	Main Room	Break-Out A	Break-Out B
9:00-9:15	<b>Opening Remarks</b>	-	-
9:15-10:45	-	<b>Session A1 :</b> Advanced semiconductor technologies I	<b>Session B1 :</b> Characterization and simulation
10:45-11:00	<b>Break</b>		
11:00-12:15	-	<b>Session A2 :</b> MOS logic and memory devices I	<b>Session B2 :</b> Emerging technology I
12:15-13:30	<b>Lunch</b> <b>Interactive Session (Free talk)</b>		
13:30-14:50	<b>PLENARY SESSION</b>	-	-
14:50-15:00	<b>Break</b>		
15:00-16:00	<b>Poster Session</b> Break-Out Session (Break-Out 1 - Break-Out 15)		
16:00-16:15	<b>Break</b>		
16:15-17:15	-	<b>Session A3 :</b> Emerging technology II	<b>Session B3 :</b> Emerging technology III
17:15-18:00	<b>Interactive Session (Free talk)</b>		

<b>Aug 27 (Fri)</b>			
	<b>Main Room</b>	<b>Break-Out A</b>	<b>Break-Out B</b>
9:00-10:45	-	<b>Session A4 :</b> Neuromorphic devices and compute technologies	<b>Session B4 :</b> Emerging technology IV
10:45-11:00	<b>Break</b>		
11:00-12:15	-	<b>Session A5 :</b> Advanced semiconductor technologies II	<b>Session B5 :</b> Quantum devices and compute technologies
12:15-14:00	<b>Lunch</b> <b>Interactive Session (Free talk)</b>		
14:00-14:40	<b>PLENARY SESSION</b>	-	-
14:40-15:00	<b>Break</b>		
15:00-16:30	-	<b>Session A6 :</b> MOS logic and memory devices II	<b>Session B6 :</b> Power electronic devices
16:30-16:45	<b>Closing Remarks</b>	-	-

## AWAD 2021 Program

August 26 (Thursday)

**Opening Remarks** 09:00-09:15

### Session A1 : Advanced Semiconductor Technologies

Session Co-Chairs: Takahiro Mori (AIST), Myounggon Kang (Korea Natl. Univ. of Transportation)

A1-1 9:15-9:45

[Invited] Compact Model for Reconfigurable Field-Effect Transistors

Sungyeop Jung (Advanced Institute of Convergence Technology); Seong Hyun Lee (Electronics and Telecommunications Research Institute); Sang Hoon Kim (Electronics and Telecommunications Research Institute); Jeong Woo Park (Electronics and Telecommunications Research Institute); Tae Moon Roh (Electronics and Telecommunications Research Institute); Dongwoo Suh (Electronics and Telecommunications Research Institute)

A1-2 9:45-10:00

Low-Temperature Formation of n-type GeSn on Insulator by Bi-Induced Layer Exchange Crystallization

Satoshi Kawahara (Kyushu Univ.); Sen Liu (Kyushu Univ.); Taizoh Sadoh (Kyushu Univ.)

A1-3 10:00-10:30

[Invited] Reaction Mechanism of Area-Selective Deposition for Advanced Device Fabrication

Il-Kwon Oh (Ajou University)

A1-4 10:30-10:45

Analysis of Work-Function Variation Effects on a Negative Capacitance Tunnel Field-Effect Transistor

Seungwon Go (Ajou University); Sangwan Kim (Ajou University)

### Session B1 : Characterization and Simulation

Session Co-Chairs: Shun-ichiro Ohmi (Tokyo Institute of Technology), Woo Young Choi (Sogang Univ.)

B1-1 9:15-9:30

Characterization of Seebeck Coefficient Under Periodic Heating for Simultaneous Thermoelectric Properties Measurement

Faiz Salleh (University of Malaya)

B1-2 9:30-9:45

Electromotive Force Characteristics of Piezoelectric/Thermoelectric-Combined Power Generator

Naoki Kawamura (Shizuoka University); Ryoya Suzuki (Shizuoka University); Kotomu Naito (Shizuoka University); Yasuhiro Hayakawa (Shizuoka University); Kenji Murakami (Shizuoka University); Masaru Shimomura (Shizuoka University); Hiroya Ikeda (Shizuoka University)

- B1-3 9:45-10:00  
Output Power Characteristics of Flexible Thermoelectric Power Generators  
Daiki Kansaku (Shizuoka University); Nobuhiro Kawase (Shizuoka University); Naoki Fujiwara (Shizuoka University); Faizan Khan (Shizuoka University); Kristy Arockiyasamy Periyanyaga (Shizuoka University); Nisha Kuruvankatil Dharmajan (SRM Institute of Science and Technology); Toshitaka Yamakawa (Kumamoto University); Kazushi Ikeda (Nara Institute of Science and Technology); Yasuhiro Hayakawa (Shizuoka University); Kenji Murakami (Shizuoka University); Masaru Shimomura (Shizuoka University); Hiroya Ikeda (Shizuoka University)
- B1-4 10:00-10:15  
Implementation of High-Sensitivity Diode Temperature Sensor  
Chun-Hyung Cho (Hongik University)
- B1-5 10:15-10:30  
Local Electric Field Concentration of Tunnel Field-Effect Transistors  
Jaeseung Woo (Sogang University); Jang Woo Lee (Sogang University); Woo Young Choi (Sogang University)
- B1-6 10:30-10:45  
Assessment of Data Retainability in Capacitorless Dynamic Random-Access Memory by Time- and Position-Dependent Hole Diffusion Function  
Yi Ju Lee (Gachon University); Seungjo Baek (Gachon University); Seongjae Cho (Gachon University)
- Break** 10:45-11:00

### Session A2 : MOS logic and memory devices I

Session Co-Chairs: Yasuo Nara (Univ. of Hyogo), Garam Kim (Myongji Univ.)

- A2-1 11:00-11:30  
[Invited] Phase change materials enabling low-energy PCRAM  
Yuji Sutou (Tohoku University)
- A2-2 11:30-11:45  
The effect of inter layers on the ferroelectric undoped HfO<sub>2</sub> formation  
Masakazu Tanuma (Tokyo Institute of Technology); Joong-Won Shin (Tokyo Institute of Technology); Shun-ichiro Ohmi (Tokyo Institute of Technology)
- A2-3 11:45-12:00  
Effect of low sputtering gas pressure on the LaB<sub>x</sub>N<sub>y</sub> insulator formation for pentacene-based floating-gate memory application  
Eun-Ki Hong (Tokyo Institute of Technology); KyungEun Park (Tokyo Institute of Technology); Shun-ichiro Ohmi (Tokyo Institute of Technology)

- A2-4 12:00-12:15  
Nonvolatile Content-Addressable Memory using Nanoelectromechanical Memory Switches for Data-Intensive Computation  
Jae Seong Lee (Sogang University); Woo Young Choi (Sogang University)

**Session B2 : Emerging technology I**

Session Co-Chairs: Tomoyuki Suwa (Tohoku Univ.), Donghwan Ahn (Kookmin Univ.)

- B2-1 11:00-11:30  
[Invited] Ultra-thin and lightweight organic amplifier enabling bio-signal monitoring with reduced noise levels  
Tsuyoshi Sekitani (Osaka University)
- B2-2 11:30-11:45  
Surface-enhanced Raman scattering spectroscopy with utilizing Au thin film and green laser light  
Naoki Matsuda (AIST)
- B2-3 11:45-12:15  
[Invited] Low-Loss Polymer Cap Transfer Packaging of MMIC-Integrated RF-MEMS Switches  
Seonho Seok (C2N-Orsay)

**LUNCH / INTERACTIVE SESSION (Free talk) 12:15-13:30**

**PLENARY SESSION**

Session Co-Chairs: Takahiro Shinada (Tohoku Univ.), Hyungtak Kim (Hongik Univ.)

- K1-1 13:30-14:10  
STT-MRAM and MTJ/CMOS hybrid NV-application processor for IoT and AI era  
Tetsuo Endoh (Tohoku Univ.)
- K1-2 14:10-14:50  
Si highly resistive substrate (HRS) based RF process and devices for mobile front end applications  
Yoon Jong Lee (DB Hitek)

**Break 14:50-15:00**

**Poster Session 15:00-16:00**

- P-1 The Manufacture of Photo detectors consisting of Polysilicon Film as Light Absorption Layer  
Jae-Sung Lee (Uiduk University); Ihn-Seok Ahn (Uiduk University)

- P-2 Investigation of poly silicon channel variation in Vertical 3D NAND flash memory  
Inyoung Lee (Myongji University); Seongjae Cho (Gachon University); IL HWAN CHO (Myongji University)
- P-3 The TID Circuit Simulation in 5nm Node GAAFET  
Jongwon Lee (Korea national university of transportation); Myounggon Kang (Korea National University of Transportation)
- P-4 The Comparison of Single Event Upset in Gate-All-Around FET  
Yunjae Kim (korea national university of transportation); Myounggon Kang (Korea National University of Transportation)
- P-5 Operation of NO<sub>2</sub> gas sensor based on Pd-AlGa<sub>N</sub>/Ga<sub>N</sub> HEMT up to 500 °C  
Cuong Van Nguyen (Hongik University); Hyungtak Kim (Hongik University)
- P-6 Influence of Al Capping Layer Thickness on Stability and Electrical Performance of IGTO TFTs  
Hyun Seok Cha (School of Electrical and Electronics Engineering, Chung-Ang University); Hwan-Seok Jeong (School of Electrical and Electronics Engineering, Chung-Ang University); Seong Hyun Hwang (School of Electrical and Electronics Engineering, Chung-Ang University); Dong Ho Lee (School of Electrical and Electronics Engineering, Chung-Ang University); Hyuck In Kwon (Chung-Ang University)
- P-7 Fabrication of flexible bottom-gate MoS<sub>2</sub> transistor array on a Parylene C substrate  
Jaewon Park (university of seoul)
- P-8 Effect of Work Function Variation of Transfer Characteristics and Memory Performances in Gate-All-Around JLFET  
Sang Ho Lee (Kyungpook National University)\*; Young Jun Yoon (Korea Atomic Energy Research Institute); Jae Hwa Seo (Korea Electrotechnology Research Institute); Min Su Cho (Kyungpook National University); Jin Park (Kyungpook National University); Hee Dae An (Kyungpook National University); So Ra Min (Kyungpook National University); Geon Uk Kim (Kyungpook National University); Jaewon Jang (Kyungpook National University); Jin-Hyuk Bae (Kyungpook National University); Sin-Hyung Lee (Kyungpook National University); In Man Kang (Kyungpook National University)
- P-9 Effect of Body Thickness on the Electrical Characteristics of Source-Pocket (PNPN) Tunnel Field-Effect Transistor (TFET)  
Hyungju Noh (Ajou university); Sangwan Kim (Ajou University)
- P-10 A parallelly-connected resistance model for evaluating the electrical properties of polycrystalline graphene layers  
Jaewoon Kang (Kyungpook National University); Hongsik Park (Kyungpook National University)

- P-11 Operating Characteristics of Gamma Irradiated Si BJT  
Sung Ho Ahn (Korea Atomic Energy Research Institute); Gwang Min Sun (Korea Atomic Energy Research Institute); Hani Baek (Korea Atomic Energy Research Institute); Byung Gun Park (Korea Atomic Energy Research Institute)
- P-12 Prediction of Variability for Super-Junction IGBT with separated N-buffer Layers using a Machine Learning Approach  
Kiyeong Kim (Pukyong University); Jooseok Noh (Pukyong University); Janghyun Kim (Pukyong University)
- P-13 Design and Analysis of DC/DC Boost Converter Using Vertical GaN Power Device based on GaN-on-Sapphire epitaxial  
Min Su Cho (Kyungpook National University); Sang Ho Lee (Kyungpook National University); Hee Dae An (Kyungpook National University); Jin Park (Kyungpook National University); So Ra Min (Kyungpook National University); Geon Uk Kim (Kyungpook National University); Young Jun Yoon (Korea Atomic Energy Research Institute); Jae Hwa Seo (Korea Electrotechnology Research Institute); Jaewon Jang (Kyungpook National University); Jin-Hyuk Bae (Kyungpook National University); Sin-Hyung Lee (Kyungpook National University); In Man Kang (Kyungpook National University)
- P-14 Electrical Performance of Vertical GaN-based Trench MOSFETs with Cylindrical and Hexagonal Structure  
Geon Uk Kim (Kyungpook National University); Young Jun Yoon (Korea Atomic Energy Research Institute); Jea Hwa Seo (Korea Electrotechnology Research Institute); Min Su Cho (Kyungpook National University); Sang Ho Lee (Kyungpook National University); Jin Park (Kyungpook National University); Hee Dea An (Kyungpook National University); So Ra Min (Kyungpook National University); Jeawon Jang (Kyungpook National University); Jin-Hyuk Bea (Kyungpook National University); Sin-Hyung Lee (Kyungpook National University); In Man Kang (Kyungpook National University)
- P-15 AlGa<sub>N</sub>/Ga<sub>N</sub> HEMT-based NO<sub>2</sub> gas sensor  
dahee kim (Ajou University); Seongho hong (Ajou University); Hyeonchae kwon (Ajou University); Junseok Heo (Ajou University)

### Session A3 : Emerging technology II

Session Co-Chairs: Taiji Noda (Panasonic), Joon Young Kwak (KAIST)

- A3-1 16:15-16:45  
[Invited] A Numerical Investigation of Delta-Doped  $\beta$ -(Al<sub>x</sub>Ga<sub>1-x</sub>)<sub>2</sub>O<sub>3</sub>/ $\beta$ -Ga<sub>2</sub>O<sub>3</sub> Double Channel Heterostructure MODFETs  
Gokhan Atmaca (Hongik University); Ho-Young Cha (Hongik University)

- A3-2 16:45-17:15  
[Invited] Monolithic 3D for high frequency mixed-signal IC  
Sanghyeon Kim (KAIST)

**Session B3 : Emerging technology III**

Session Co-Chairs: Michihiko Suhara (Tokyo Metropolitan Univ.), Sangwan Kim (Ajou Univ.)

- B3-1 16:15-16:30  
Solar-blind ultraviolet-C AlGaIn photodetector  
Yeongseok Shim (Ajou University); Junseok Heo (Ajou University)
- B3-2 16:30-16:45  
Magnetic-Field Dependent Electron Transport of Fe<sub>3</sub>Si Nanodots  
Jialin Wu (Nagoya Univ.); Katsunori Makihara (Nagoya Univ.); Hai Zhang (Inner Mongolia University of Technology); Noriyuki Taoka (Nagoya Univ.); Akio Ohta (Nagoya Univ.); Seiichi Miyazaki (Nagoya Univ.)
- B3-3 16:45-17:00  
Pseudo-magnetic field-induced slow carrier dynamics in periodically strained graphene  
Dong-Ho Kang (Nanyang Technological University); Donguk Nam (NTU)
- B3-4 17:00-17:15  
MoS<sub>2</sub>-Ge Visible-IR wideband photodetector  
Hwang Aujin (Ajou University); Junseok Heo (Ajou University); Youngseo Park (Ajou University)

**INTERACTIVE SESSION (Free talk) 17:15-18:00**



August 27 (Friday)

**Session A4 : Neuromorphic devices and compute technologies**

Session Co-Chairs: Nobuaki Kobayashi (Nihon Univ.), Garam Kim (Myongji Univ.)

- A4-1 9:00-9:30  
 [Invited] Application of electromigrated Au nanogaps to artificial synaptic devices and physical reservoir computing  
 Keita Sakai (Tokyo Univ. of Agriculture and Technology)
- A4-2 9:30-9:45  
 Nonlinear Node Using Tunnel Diode and Its Connection for Physical Reservoir Computing System  
 Shunsuke Saito and Seiya Kasai (Hokkaido Univ.)
- A4-3 9:45-10:15  
 [Invited] Capacitor-less Neuron Circuit with Floating-body Positive Feedback Field Effect Transistor for Low Power operation  
 MinWoo Kwon (Gangneung-Wonju National University); Kyungchul Park (Seoul National University); Byung-Gook Park (Seoul National University)
- A4-4 10:15-10:30  
 Two-dimensional Materials-based Floating Gate Memory Device for Linear Synaptic Weight Update  
 Eunpyo Park (Korea Institute of Science and Technology); Gichang Noh (Korea Institute of Science and Technology); In Soo Kim (Korea Institute of Science and Technology); Jiwon Chang (Yonsei University); Kibum Kang (KAIST); Joon Young Kwak (Korea Institute of Science and Technology)
- A4-5 10:30-10:45  
 Ionic Memristive Behavior of Spontaneous Potassium Ion Intercalated Layered MnO<sub>2</sub> for Synaptic Device  
 Gichang Noh (Korea Institute of Science and Technology); Jeongho Kim (Korea Advanced Institute of Science and Technology); Eunpyo Park (Korea Institute of Science and Technology); Hamid Reza Rasouli (Bilkent University UNAM); Naveed Mehmood (Bilkent University UNAM); Ali Sheraz (Bilkent University); Min-kyung Jo (Korea Advanced Institute of Science and Technology); Talip Serkan Kasirga (Bilkent University UNAM); Kibum Kang (Korea Advanced Institute of Science and Technology); Joon Young Kwak (Korea Institute of Science and Technology)

**Session B4 : Emerging technology IV**

Session Co-Chairs: Hiroya Ikeda (Shizuoka Univ.), Sanghyeon Kim (KAIST)

B4-1 9:00-09:30

[Invited] Present Status and Prospect of Graphene Interconnect Applications

Kazuyoshi Ueno (Shibaura Institute of Technology)

B4-2 9:30-9:45

Low-temperature atomic layer deposition of AlN by using trimethylaluminum and plasma excited ammonia

Kentaro Saito (Yamagata University); Kazuki Yoshida (Yamagata University); Masanori Miura (Yamagata University); Kensaku Kanomata (Yamagata University); Bashir Ahmmad (Yamagata University); Shigeru Kubota (Yamagata University); Fumihiko Hirose (Yamagata University)

B4-3 9:45-10:15

[Invited] The role of photon to electron converted organic materials for image sensor

Kyung-Bae Park (Samsung Advanced Institute of Technology)

B4-4 10:15-10:30

Study of MFIM structure-based ferroelectric tunnel junction according to dielectric thickness and annealing temperature

Joonho Park (Ajou university); Moonjung Choi (Ajou university); Sangwan Kim (Ajou university)

**Break** 10:45-11:00

**Session A5 : Advanced semiconductor technologies II**

Session Co-Chairs: Seiichi Miyazaki (Nagoya Univ.), Junseok Heo (Ajou Univ.)

A5-1 11:00-11:30

[Invited] GaN-based light-emitting diode with hole distribution layer for high efficiency and color tunability

Garam Kim (Myongji University)

A5-2 11:30-11:45

Negative Differential Resistance (NDR) in Hetero-Gate-Dielectric Negative Capacitance Tunnel Field-Effect Transistor (NCTFET)

Shinhee Kim (Ajou University); Jae Yeon Park (Ajou University); Sangwan Kim (Ajou University)

A5-3 11:45-12:15

[Invited] Charge-Balanced GaN Super-Heterojunction Schottky Barrier Diode: Design and Experimental Demonstration

Sang-Woo Han (Pennsylvania State University)

**Session B5 : Quantum devices and compute technologies**

Session Co-Chairs: Seiya Kasai (Hokkaido Univ.), Seongjae Cho (Gachon Univ.)

B5-1 11:00-11:30

[Invited] Information processing nanodevices learning from natural system  
Takahide Oya (Yokohama National University)

B5-2 11:30-11:45

Method for Extracting Quantum Transport Parameters from Measured S-parameters in Triple-Barrier Resonant Tunneling Diodes

Kotaro Aikawa (Tokyo Metropolitan University); Michihiko Suhara (Tokyo Metropolitan University); Takumi Kimura (Tokyo Metropolitan University); Junki Wakayama (Tokyo Metropolitan University); Takeshi Makino (Tokyo Metropolitan University); Katsuhiro Usui (Tokyo Metropolitan University); Kiyoto Asakawa (Tokyo Metropolitan College of Industrial Technology); Kouichi Akahane (National Institute of Information and Communication Technology (NICT)); Issei Watanabe (National Institute of Information and Communications Technology)

B5-3 11:45-12:15

[Invited] Quantum Chemical Understanding of Atomic Layer Deposition Process  
Bonggeun Shong (Hongik University)

**LUNCH / INTERACTIVE SESSION (Free talk) 12:15-14:00**

**PLENARY SESSION**

Session Chair: Seiya Kasai (Hokkaido Univ.)

K2-1 14:00-14:40

Towards topological quantum bits  
Koji Ishibashi (RIKEN)

**Break** 14:40-15:00

**Session A6 : MOS logic and memory devices II**

Session Co-Chairs: Toshiro Hiramoto (Univ. of Tokyo), Il Hwan Cho (Myongji Univ.)

A6-1 15:00-15:30

[Invited] Phase stability of ferroelectric HfO<sub>2</sub>-based films  
Hiroshi Funakubo (Tokyo Institute of Technology, Japan); Yuki Tashiro (Tokyo Institute of Technology, Japan); Takanori Mimura (Tokyo Institute of Technology, Japan); Takao Shimizu (National Institute for Materials Science)

- A6-2 15:30-15:45  
Sputtering power dependence of Pt gate electrode deposition on 5 nm thick ferroelectric nondoped HfO<sub>2</sub> formation  
Joong-Won Shin (Tokyo Institute of Technology); Shun-ichiro Ohmi (Tokyo Institute of Technology); Masakazu Tanuma (Tokyo Institute of Technology)
- A6-3 15:45-16:15  
[Invited] SiC MOSFET - Key Device for Future Electrification  
Tomohide Terashima (Mitsubishi Electric corporation)
- A6-4 16:15-16:30  
28nm Atom-Switch FPGA: Static Timing Analysis and Evaluation  
Xu Bai (NanoBridge Semiconductor, Inc.)\*; Ryusuke Nebashi (NanoBridge Semiconductor, Inc.); Makoto Miyamura (NanoBridge Semiconductor, Inc.); Kazunori Funahashi (NanoBridge Semiconductor, Inc.); Naoki Banno (NanoBridge Semiconductor, Inc.); Koichiro Okamoto (NanoBridge Semiconductor, Inc.); Hideaki Numata (NanoBridge Semiconductor, Inc.); Noriyuki Iguchi (NanoBridge Semiconductor, Inc.); Tadahiko Sugibayashi (NanoBridge Semiconductor, Inc.); Toshitsugu Sakamoto (NanoBridge Semiconductor, Inc.); Munehiro Tada (NanoBridge Semiconductor, Inc.)

### Session B6 : Power electronic devices

Session Co-Chairs: Takahiro Mori (AIST), Junseok Heo (Ajou Univ.)

- B6-1 15:00-15:30  
[Invited] Investigation of HfSiO<sub>x</sub> gate insulator formed by changing fabrication process conditions for GaN power device  
Toshihide Nabatame (National Institute for Materials Science)
- B6-2 15:30-16:00  
[Invited] GaN HEMT technology for low-loss and high-voltage applications  
Masaaki Kuzuhara (Kwansei Gakuin Univ.)
- B6-3 16:00-16:30  
[Invited] Approaches of Highly Reliable Package for High Power Electronic Devices  
Sang Won Yoon (Hanyang University)

**Closing Remarks** 16:30-16:45