# Tuesday, September 9

## Opening & Plenary Sessions (Main Convention Hall)

**Opening Session**
Chair: Y. Miyamoto, Tokyo Tech

**10:00**
Welcome Address
K. Masu, Tokyo Tech

**10:15**
SSDM Award / Paper Award Ceremony

**Non-Technical Plenary Session**
Chair: S. Takagi, Univ. of Tokyo

**10:30 PL-1**
"Strategy for Science and Technology Innovations - Expectations for Solid State Devices and Materials"
K. Kyuma / Council for Science and Technology Policy, Cabinet Office, Japan

**Technical Plenary Session**
Chair: S. Takagi, Univ. of Tokyo

**11:15 PL-2**
"New Channel Materials and Devices Beyond Si CMOS"
P. D. Ye / Purdue Univ., USA

**Lunch**

| 2F Conv. Hall 200 | 2F 201A | 2F 201B | 2F 202A | 4F 405 | 4F 406 | 4F 403 |
|---|---|---|---|---|---|---|
| **A-1: ReRAM(I)**<br>(13:30-15:00)<br>Chairs: K. Kinoshita (Tottori Univ.)<br>Y. Sasago (Hitachi) | **B-1: Group-IV Optical Devices**<br>(13:30-15:00)<br>Chairs: Y. Ishikawa (Univ. of Tokyo)<br>N. Iizuka (Toshiba) | | **D-1: Nano Devices for Chemical & Biosensing**<br>(13:30-15:15)<br>Chairs: T. Sakata (Univ. of Tokyo)<br>T. Tanaka (Tohoku Univ.) | **E-1: GaN Devices & Characterization**<br>(13:30-15:15)<br>Chairs: T. Suzuki (JAIST)<br>T. Hashizume (Hokkaido Univ.) | **F-1: Advanced Process and Reliability**<br>(13:30-15:20)<br>Chairs: T. Tsunomura (Tokyo Electron)<br>L. Grenouillet (CEA-LETI) | **G-1: 3D/TSV**<br>(13:30-15:15)<br>Chairs: M. Kodera (Toshiba)<br>K. -N. Chen (NCTU) |
| **13:30 A-1-1 (Invited)**<br>**Scaling of Resistive Switching Devices**<br>*D. Ielmini, Politecnico di Milano and IU.NET (Italy)* | **13:30 B-1-1 (Invited)**<br>**Germanium Tin Light Emitters on Silicon**<br>*E. Kasper and M. Oehme, Univ. of Stuttgart (Germany)* | | **13:30 D-1-1 (Invited)**<br>**Silicon and reduced graphene oxide device concepts for electronically interfacing individual cells in culture**<br>*S. Ingebrandt[1], X. -T. Vu[1,2], L. Delle[1], R. L. F. Hempel[1], A. Müller[1], J. K. -Y. Law[1] and V. Pachauri[1], [1]Univ. of Applied Science Kaiserslautern, [2]RWTH Aachen Univ. (Germany)* | **13:30 E-1-1 (Invited)**<br>**Physical effects limiting performance and reliability of GaN High Electron Mobility Transistors**<br>*E. Zanoni[1], G. Meneghesso[1], M. Meneghini[1], D. Bisi[1], A. Chini[2], C. De Santi[1], F. Rampazzo[1], I. Rossetto[1], A. Stocco[1] and G. Verzellesi[3], [1]Univ. di Padova, [2]Dipartimento di Ingegneria "Enzo Ferrari" and [3]Dipartimento di Scienze e Metodi dell'Ingegneria, Università di Modena e Reggio Emilia (Italy)* | **13:30 F-1-1 (Invited)**<br>**Heated Ion Implantation Technology for High Performance SOI FinFETs**<br>*W. Mizubayashi, H. Onoda, Y. Nakashima, Y. Ishikawa, T. Matsukawa, K. Endo, Y.X. Liu, S. O'uchi, J. Tsukada, H. Yamauchi, S. Migita, Y. Morita, H. Ota and M. Masahara, AIST (Japan)* | **13:30 G-1-1 (Invited)**<br>**Technology and Application Requirements of 2.5D/3D Field Programmable System-in-Package (SiP)**<br>*A. Rahman, Altera Corp. (USA)* |
| **14:00 A-1-2**<br>**Non-negligible Metal Ions Diffusion in Amorphous Oxygen-Deficient Metal-Oxide Based Resistive Switches: A First Principle Study**<br>*B. Xiao and S. Watanabe, Univ. of Tokyo (Japan)* | **14:00 B-1-2**<br>**Impact of Post-Growth Annealing for Thin-Film Ge Photodiodes on Si**<br>*S. Nagatomo[1], Y. Kawamata[1], Y. Izawa[2], S. Hoshino[3] and Y. Ishikawa[1], [1]Univ. of Tokyo, [2]Tokyo Electron Miyagi Ltd. and [3]Tokyo Electron Ltd. (Japan)* | | **14:00 D-1-2**<br>**High Density Horizontal-aligned Carbon Nanotube Thin Film with Oxygen Plasma Treatment as pH Sensing Membrane of Extended-Gate Field-Effect Transistor**<br>*K.Y. Wang, W.L. Tsai, C.H. Chou, Y.R. Li, C.Y. Liao and H.C. Cheng, NCTU (Taiwan)* | **14:00 E-1-2**<br>**Combined PEALD Gate-Dielectric and In-Situ SiN Cap-Layer for Reduced $V_{th}$ Shift and $R_{DS-ON}$ Dispersion of AlGaN/GaN HEMTs on 200 mm Si Wafer**<br>*N. Ronchi[1], B. De Jaeger[1], M. Van Hove[1], R. Roelofs[2], T.L. Wu[1,3], J. Hu[1,3], X. Kang[1] and S. Decoutere[1], [1]imec, [2]ASM and [3]KU Leuven (Belgium)* | **14:00 F-1-2**<br>**Operations of CMOS Inverter and Ring Oscillator Composed of Ultra-Thin Body Poly-Ge p- and n-MISFETs for Stacked Channel 3D-IC**<br>*Y. Kamata[1], M. Koike[1], E. Kurosawa[1], M. Kurosawa[2], H. Ota[1], O. Nakatsuka[2], S. Zaima[2] and T. Tezuka[1], [1]Green Nanoelectronics Center (GNC), AIST and [2]Nagoya Univ. (Japan)* | **14:00 G-1-2**<br>**Improvement of Motional Resistance through Concave TSV Design and Modification for Static Capacitance of TSV-Based Resonator**<br>*J.Y. Shih[1], Y.C. Chen[2], C.H. Chiu[2], C.L. Lo[2] and K.N. Chen[1], [1]NCTU and [2]TXC Corp. (Taiwan)* |

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## Opening & Plenary Sessions (Main Convention Hall)

## Lunch

| 4F 404 | 1F 101 | 2F 202B | 3F 304 | 4F 401 | 4F 402 |
|---|---|---|---|---|---|
| **H-1: 2D Materials (1)**<br>(13:30-15:15)<br>Chairs: T. Machida (Univ. of Tokyo)<br>K. Matsuda (Kyoto Univ.) | **J-1: Tunnel FET**<br>(13:30-15:20)<br>Chairs: M. Masahara (AIST)<br>M. Goto (Toshiba) | **K-1: Flexible Electronics and Thin-film Devices**<br>(13:30-15:15)<br>Chairs: T. Someya (Univ. of Tokyo)<br>T. Hayashi (NTT) | **M-1: Spin Dynamics**<br>(13:30-15:15)<br>Chairs: H. Munekata (Tokyo Tech)<br>H. Shimizu (Tokyo Univ. of Agri. & Tech.) | **N-1: Processing and Growth**<br>(13:30-14:45)<br>Chairs: M. Kato (Nagoya Inst. of Tech.)<br>S. Harada (Nagoya Univ.) | |
| **13:30 H-1-1 (Invited)**<br>**Spin-valley physics in 2D crystals**<br>*Y. Iwasa, Univ. of Tokyo and RIKEN (Japan)* | **13:30 J-1-1 (Invited)**<br>**Tunnel-FET Transistors for 13nm Gate-Length and Beyond**<br>*U.E. Avci, D.H. Morris and I.A. Young, Intel Corp. (USA)* | **13:30 K-1-1 (Invited)**<br>**Polymeric Optical Devices with Printable and Flexible Electrode**<br>*Y. Ohmori, T. Yamamoto, K. Hiraoka and H. Kajii, Osaka Univ. (Japan)* | **13:30 M-1-1 (Invited)**<br>**Engineering materials for all-optical helicity-dependent magnetic switching**<br>*M. Cinchetti[1], S. Alebrand[1], M. Gottwald[2], C.-H. Lambert[2,3], D. Steil[1], L. Pang[4], M. Hehn[3], M.G. Malinowski[3,5], Y. Fainman[4], M. Aeschlimann[1], S. Mangin[2,3] and E.E. Fullerton[2,4], [1]Univ. of Kaiserslautern, [2] Center for Magnetic Recording Research, Univ. of California San Diego, [3] Univ. de Lorraine, [4] Dept. of Electrical and Computer Engineering, Univ. of California San Diego and [5]Univ. Paris-Sud (Germany)* | **13:30 N-1-1**<br>**Nitrogen doping of 4H-SiC by excimer laser irradiation in liquid nitrogen**<br>*A. Ikeda, D. Marui, H. Ikenoue and T. Asano, Kyushu Univ. (Japan)* | |
| **14:00 H-1-2**<br>**In situ Tuning of Bandgap in Graphene Oxide Achieved by Solid State Ionics Device**<br>*T. Tsuchiya, K. Terabe and M. Aono, NIMS (Japan)* | **14:00 J-1-2**<br>**Novel Device Architecture Proposal of Source Junctionless Tunneling Field-Effect Transistor (SJL-TFET)**<br>*Y. Kondo[1], M. Goto[1], Y. Morita[2], T. Mori[2], S. Migita[2], A. Hokazono[1], H. Ota[2], M. Masahara[2] and S. Kawanaka[1], [1]Toshiba Corp. and [2]AIST (Japan)* | **14:00 K-1-2**<br>**Flip-Flop Circuits using Fully Solution Processed Pseudo-CMOS Circuits**<br>*Y. Takeda[1,2], Y. Yoshimura[1,2], F.A. Ezarudin Binn Adib[3], K. Fukuda[1,2], D. Kumaki[1,2] and S. Tokito[1,2], [1]Graduate School of Science and Engineering, Yamagata Univ., [2]ROEL, Yamagata Univ. and [3]SATO HOLDINGS Corp., Ltd (Japan)* | **14:00 M-1-2**<br>**Enhancement of Excitation Efficiency of Photo-Excited Precession of Magnetization in Co/Pd Multilayers with Oblique-Angle Excitation**<br>*K. Nishibayashi, T. Matsuda, J. Saeki, K. Yamamoto and H. Munekata, Tokyo Tech (Japan)* | **13:45 N-1-2**<br>**An experiment on the alleviation of wafer-bending for CVD grown heavily Al-doped 4H-SiC epi-wafer by co-doping of N**<br>*S.Y. Ji[1], K. Kojima[1], Y. Ishida[1], S. Saito[1], H. Yamaguchi[1], S. Yoshida[1], H. Tsuchida[2] and H. Okumura[1], [1]AIST and [2]CRIEPI (Japan)* | |

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| **A-1: ReRAM(I)** | **B-1: Group-IV Optical Devices** | | **D-1: Nano Devices for Chemical & Biosensing** | **E-1: GaN Devices & Characterization** | **F-1: Advanced Process and Reliability** | **G-1: 3D/TSV** |
| **14:20 A-1-3**<br>**Interface Engineering in Homogeneous Barrier Modulation RRAM for 3D Vertical Memory Applications**<br>*W.L. Lai[1], C.T. Chou[1], C.W. Hsu[1], J.C. Liu[1], B. Hudec[1], C.H. Ho[2], W.Y. Jang[2], C.H. Lin[2] and T.H. Hou[1], [1]NCTU and [2]Winbond Electronics Corp. (Taiwan)* | **14:15 B-1-3**<br>**Electroluminescence from Multiply-Stack of Doped Si Quantum Dots**<br>*T. Yamada[1], K. Makihara[1], M. Ikeda[2] and S. Miyazaki[1], [1]Nagoya Univ. and [2]Hiroshima Univ. (Japan)* | | **14:15 D-1-3**<br>**pH and pK Sensing Modification by Cosputtered TiSiON/ $SiO_2$/Si Electrolyte-Insulator-Semiconductor Structure**<br>*C.Y. Hsu[1], T.C. Chen[1], H. Yang[1], H.C. Wang[1], W.T. Lin[1], P.C. Juan[2], C.M. Yang[1,3,4,5] and C.S. Lai[1,4,5], [1]Department of Electronic Eng, Chang Gung Univ, [2]Department of Materials Eng and Center for Thin Film Technologies and Applications, Ming Chi Univ, [3]Institute of Electro-Optical Eng, Chang Gung Univ, [4]Healthy Aging Research Center, Chang Gung Univ and [5]Center for Biomedical Eng, Chang Gung Univ (Taiwan)* | **14:15 E-1-3**<br>**Novel Overlaid Field-Plate for Improvement of Drain I-V Characteristics of AlGaN/GaN HEMTs**<br>*S. Mase, T. Egawa and A. Wakejima, Nagoya Inst. of Tech. (Japan)* | **14:20 F-1-3**<br>**Atomically Flattening of Si Surface of SOI and Isolation-patterned Wafers**<br>*T. Goto[1], R. Kuroda[2], N. Akagawa[2], T. Suwa[1], A. Teramoto[1], X. Li[2], S. Sugawa[1,2], T. Ohmi[1], Y. Kumagai[3], Y. Kamata[3] and K. Sibusawa[3], [1]NICHe, Tohoku Univ., [2]Graduate School of Engineering, Tohoku Univ. and [3]LAPIS Semiconductor Miyagi Co., Ltd. (Japan)* | **14:20 G-1-3**<br>**Ultrawideband Ultralow PDN Impedance of Decoupling Capacitor Embedded Interposers Using Narrow Gap Chip Parts Mounting Technology for 3-D Integrated LSI System**<br>*K. Kikuchi[1], M. Ujiie[2], M. Aoyagi[1] and S. Takayama[2], [1]AIST and [2]Arena Co., Ltd. (Japan)* |
| **14:40 A-1-4**<br>**Novel Non-Precious Metal Electrode Material for ReRAM Device**<br>*N. Fukuda, Y. Nishioka and K. Suu, ULVAC, Inc. (Japan)* | **14:30 B-1-4**<br>**Observation of Stimulated Raman Scattering in Silica-Cladded Silicon Photonic Crystal Waveguides with Modified Holes**<br>*Y.H. Hsiao, S. Iwamoto and Y. Arakawa, Univ. of Tokyo (Japan)* | | **14:30 D-1-4**<br>**Self-Powered Solar Diode Gas Sensors**<br>*A.E. Gad[1,5,6], M.W.G. Hoffmann[1,6], J.D. Prades[3], F. Ramirez[3,4], R. Fiz[2], H. Shen[1,6], S. Mathur[2] and A. Waag[1,6], [1]Braunschweig Univ. of Technology, [2]Univ. of Cologne, [3]Univ. of Barcelona, [4]Catalonia Institute for Energy Research, [5]National Research Center and [6]Laboratory of Nanometrology (Germany)* | **14:30 E-1-4**<br>**Temperature Dependence of TiN-Anode GaN Schottky Barrier Diode Characteristics for Microwave Power Rectification**<br>*R. Fujihara[1], Y. Itai[1], L. Li[1], Q. Liu[1], Y. Ohno[2] and J.P. Ao[1], [1]Univ. of Tokushima and [2]e-Device Inc. (Japan)* | **14:40 F-1-4**<br>**Large Size InGaAs-o-I Substrates Fabricated by Direct Wafer Bonding on Si**<br>*E. Uccelli[1], N. Daix[1], L. Czornomaz[1], D. Caimi[1], C. Rossel[1], M. Sousa[1], H. Siegwart[1], C. Marchiori[1], J.M. Hartmann[2], K.T. Shiu[3], C.W. Weng[3], M. Krishnan[3], M. Lofaro[3], M. Kobayashi[3], D. Sadana[3] and J. Fompeyrine[1], [1]IBM Zurich Research Laboratory, [2]CEA, LETI and [3]IBM T. J. Watson Research Center (Switzerland)* | **14:40 G-1-4**<br>**Characterization of Vapor Deposited Polyimides and Process Integration with the Polymeric Liner for Via-Last/Backside-Via Cu-TSV Formation**<br>*T. Fukushima, M. Mariappan, J.C. Bea, K.W. Lee and M. Koyanagi, Tohoku Univ. (Japan)* |
| | **14:45 B-1-5**<br>**A 0.94-THz Detector in 180-nm Standard CMOS Process**<br>*Z. Liu, L. Liu, Z. Zhang, J. Liu and N. Wu, Chinese Academy of Sci. (China)* | | **14:45 D-1-5**<br>**Organic Field-Effect Transistor with Organic Acceptors for Ammonia Gas Sensor**<br>*H.H. Lyu and H.M. Chen, NCTU (Taiwan)* | **14:45 E-1-5**<br>**Low-frequency Noise of Intrinsic Gated Region in AlN/AlGaN/GaN Metal-insulator-semiconductor Heterojunction Field-effect Transistors**<br>*S.P. Le, T.Q. Nguyen, H. Shih, M. Kudo and T. Suzuki, JAIST (Japan)* | **15:00 F-1-5**<br>**A New Method to Effectively Separate PBTI-induced Shallow and Deep Energy Traps in a 28nm High-k Metal-Gate MOSFET**<br>*E. Hsieh[1], P. Wu[1], S. Chung[1], J. Ke[2], C. Yang[2] and C. Tsai[2], [1]NCTU and [2]UMC (Taiwan)* | **15:00 G-1-5 (Late News)**<br>**Improved Leakage Current for $TiO_2$-Based MIM Capacitors by Embedding Ge Nanocrystals**<br>*Y.-H. Chen, M.-T. Yu, C.-C. Lin and Y. -H. Wu, Natl. Tsing Hua Univ. (Taiwan)* |
| | | | **15:00 D-1-6**<br>**Ultra-High Selective Gas Sensors: novel approaches and future developments**<br>*M.W.G. Hoffmann[1,3,5], J.D. Prades[3], L. Mayrhofer[2], F. Ramirez[3,4], T.T. Jaervi[2], M. Moseler[2], A. Waag[1,5] and H. Shen[1,5], [1]Braunschweig Univ. of Technology, [2]Fraunhofer Institute for Mechanics of Materials, [3]Univ. of Barcelona, [4]Catalonia Institute for Energy Research and [5]Laboratory of Nanometrology (Germany)* | **15:00 E-1-6 (Late News)**<br>**Record-Low Contact Resistance for InAlN/AlN/GaN HEMTs on Si with Non-Gold Metal**<br>*S. Arulkumaran[1], G.I.. Ng,[1,2], K. Ranjan[1], C.M. Manoj Kumar[1], S.C. Foo[1], K.S. Ang[1] and S. Vicknesh.[1], [1]Temasek Laboratories@NTU, Nanyang Technological Univ. and [2]School of EEE, Nanyang Technological Univ. (Singapore)* | | |

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| **H-1: 2D Materials (1)** | **J-1: Tunnel FET** | **K-1: Flexible Electronics and Thin-film Devices** | **M-1: Spin Dynamics** | **N-1: Processing and Growth** | |
| **14:15 H-1-3**<br>**Exfoliated-graphene/$MoS_2$/metal Vertical Field Effect Transistor with Large Current Modulation and On Current Density**<br>*R. Moriya[1], T. Yamaguchi[1], Y. Inoue[1], Y. Sata[1], N. Yabuki[1], S. Morikawa[1], S. Masubuchi[1,2] and T. Machida[1,2], [1]IIS, Univ. of Tokyo and [2]INQIE, Univ. of Tokyo (Japan)* | **14:20 J-1-3**<br>**Self-aligned Bottom Source Tunnel Field-Effect Transistor (Btm-S TFET) with Si:C and Si:P Epitaxial Process**<br>*T. Miyata, S. Mori, E. Sugizaki, M. Goto, Y. Kondo, A. Hokazono, T. Ohguro and S. Kawanaka, Toshiba Corp. (Japan)* | **14:15 K-1-3**<br>**Fabricating Very Short Channels in Organic Field Effect Transistors by Dielectrophoresis Technique**<br>*R. Negishi[1], T. Murata[1], J. Takeya[2] and Y. Kobayashi[1], [1]Osaka Univ. and [2]Univ. of Tokyo (Japan)* | **14:15 M-1-3**<br>**Laser Induced Sub-Terahertz Coherent Spin Dynamics in Ferrimagnetic $D0_{22}$ $Mn_3Ga$ Films**<br>*S. Mizukami, A. Sugihara and K.Z. Suzuki, Tohoku. Univ. (Japan)* | **14:00 N-1-3**<br>**Structure of basal plane defects formed by the conversion of threading screw dislocation during solution growth of SiC**<br>*S. Harada, S.Y. Xiao, M. Tagawa, Y. Yamamoto, S. Arai, N. Tanaka and T. Ujihara, Nagoya Univ. (Japan)* | |
| **14:30 H-1-4**<br>**Fabrication and Characterization of $MoS_2$ FET structure with Nano-Sheets $Ca_2Nb_3O_{10}$ Gate Insulator**<br>*T. Kobayashi[1], S. Hirose[1], H. Uchida[2], T. Kawae[1] and A. Morimoto[1], [1]Kanazawa Univ. and [2]Sophia Univ. (Japan)* | **14:40 J-1-4**<br>**Fabrication Process and Thermal Stability of Isoelectronic Traps for High ON-current Si-based Tunnel Field-Effect Transistors**<br>*T. Mori, Y. Morita, N. Miyata, S. Migita, K. Fukuda, T. Yasuda, M. Masahara and H. Ota, AIST (Japan)* | **14:30 K-1-4**<br>**Annealing Effect on Field-Effect Mobilities in Bottom-Contact Alkylated Dinaphthothienothiophene Transistors**<br>*M. Kitamura[1,2], Y. Kuzumoto[3] and Y. Arakawa[2], [1]Kobe Univ., [2]Univ. of Tokyo and [3]Sharp Corp. (Japan)* | **14:30 M-1-4**<br>**Excitation of Electric-Field-induced Spin Wave in the Strained Garnet Ferrite Thin Films Using Sub-Picosecond Pulsed Wave**<br>*M. Adachi, H. Yamahara, M. Seki, H. Matsui and H. Tabata, Univ. of Tokyo (Japan)* | **14:15 N-1-4**<br>**Heteroepitaxial growth of diamond films on 3C-SiC(001)/Si substrates by antenna-edge microwave plasma CVD**<br>*J. Yaita[1, 2], T. Iwasaki[1, 2, 3], M. Natal[4], S.E. Saddow[4] and M. Hatano[1, 2, 3], [1]Tokyo Tech, [2]JST-CREST, [3]JST-ALCA and [4]Univ. of South Florida (Japan)* | |
| **14:45 H-1-5 (Invited)**<br>**Band nesting in semiconducting transition metal dichalcognide**<br>*G. Eda, Dept. of Physics/Chemistry, NUS and Graphene Research Centre, NUS (Singapore)* | **15:00 J-1-5**<br>**Design Guidelines of Steep Subthreshold TFET to Minimize Energy of Logic Circuits**<br>*H. Fuketa[1], K. Yoshioka[1], K. Fukuda[2], T. Mori[2], H. Ota[2], M. Takamiya[1] and T. Sakurai[1], [1]Univ. of Tokyo and [2]AIST (Japan)* | **14:45 K-1-5**<br>**High-Mobility n-Channel Organic Transistor of Solution Processed Perylene-diimide Derivative Single Crystals on PS/$SiO_2$ Dielectric**<br>*S. Mondal, W.H. Lin, Y.C. Chen, B.H. Chen, T.F. Yang and M.Y. Kuo, National Chi Nan Univ. (Taiwan)*<br><br>**15:00 K-1-6**<br>**Heat Protection Circuit with Polymer PTC for Flexible Electronics**<br>*T. Yokota[1,2], Y. Terakawa[1], J. Reeder[1,3], M. Kaltenbrunner[1,2], T. Ware[3], W. Voit[3], T. Sekitani[2,4] and T. Someya[1,2], [1]Univ. of Tokyo, [2]JST ERATO, [3]Univ. of Texas and [4]Univ. of Osaka (Japan)* | **14:45 M-1-5**<br>**Snell's law of the magnetostatic surface wave in ferromagnetic films**<br>*K. Tanabe[1], R. Matsumoto[2], J. Ohe[3], S. Murakami[2], T. Moriyama[4], D. Chiba[5], K. Kobayashi[1] and T. Ono[4], [1]Osaka Univ., [2]Tokyo Tech, [3]Toho Univ., [4]Kyoto Univ. and [5]Univ. of Tokyo (Japan)*<br><br>**15:00 M-1-6**<br>**Spin Wave-Assisted Magnetization Switching in Nanometer-Scaled Bilayer Elements**<br>*T. Seki, W. Zhou and K. Takanashi, IMR, Tohoku Univ. (Japan)* | **14:30 N-1-5 (Late News)**<br>**α-$Ga_2O_3$ Schottky barrier diodes fabricated by mist epitaxy technique**<br>*M. Oda[1,2], A. Takatsuka[1], T. Hitora[1], J. Kikawa[3], K. Kaneko[2] and S. Fujita[2], [1]FLOSFIA, INC., [2]Kyoto Univ. and [3]Ritsumeikan Univ. (Japan)* | |

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|---|---|---|---|---|---|---|
| **A-2: ReRAM(II)**<br>(15:40-17:15)<br>Chairs: T. Sakamoto (LEAP)<br>M. -H. Lee<br>(Macronix) | **B-2: Si Photonics**<br>(15:40-17:10)<br>Chairs: T. Shimizu (PETRA)<br>H. Fukuda (NTT) | | **D-2: Microfluidics**<br>(15:40-17:10)<br>Chairs: C. -H. Liu<br>(National Tsing Hua Univ.)<br>T. Sakata<br>(Univ. of Tokyo) | **E-2: High-Frequency Devices & Circuits**<br>(15:40-17:10)<br>Chairs: E. Lind (Lund Univ.)<br>K. Maezawa<br>(Univ. of Toyama) | **F-2: Gate Stack Characterization**<br>(15:40-17:25)<br>Chairs: K. Kita<br>(Univ. of Tokyo)<br>P. D. Ye<br>(Purdue Univ.) | **G-2: Reliability**<br>(15:40-17:20)<br>Chairs: T. Fukushima<br>(Tohoku Univ.)<br>N. Sugiyama<br>(Toray Res. Center) |
| **15:40 A-2-1**<br>**Growth and Shrinkage of Conductive Filament in Cu/$MoO_x$ ReRAMs Observed by Means of In-Situ TEM**<br>*M. Arita, Y. Ohno, M. Kudo and Y. Takahashi, Hokkaido Univ. (Japan)* | **15:40 B-2-1 (Invited)**<br>**Hybrid III-V on Silicon Lasers**<br>*B. Ben Bakir[1], C. Sciancalepore[1], A. Descos[1], H. Duprez[1], T. Ferrotti[1, 2], C. Jany[1], J. Harduin[1], D. Bordel[1], K. Hassan[1], A. Chantre[2] and S. Menezo[1], [1]CEA, Leti, Minatec Campus and [2]STMicroelectronics (France)* | | **15:40 D-2-1 (Invited)**<br>**Device Technologies for Cell and Tissue Analysis**<br>*T. Fujii, IIS, Univ. of Tokyo (Japan)* | **15:40 E-2-1 (Invited)**<br>**Room-Temperature Resonant-Tunneling-Diode Terahertz Oscillator**<br>*S. Suzuki and M. Asada, Tokyo Tech (Japan)* | **15:40 F-2-1 (Invited)**<br>**Band Offsets at High-k Oxide/Semiconductor Interfaces: From Silicon to High-Mobility Channel Materials**<br>*V.V. Afanas'ev, H.-Y. Chou, M. Houssa and A. Stesmans, Univ. of Leuven (Belgium)* | **15:40 G-2-1**<br>**Stress Distribution Pattern in Cross-Sectional 3D-LSI Examined by u-XRD**<br>*M. Mariappan, J.C. Bea, T. Fukushima, K.W. Lee and M. Koyanagi, Tohoku Univ. (Japan)* |
| **16:00 A-2-2**<br>**Dual-Mode Bipolar Resistance Switching in the $HfO_2$ RRAM Device**<br>*H.Z. Zhang[1], K.S. Yew[1], D.S. Ang[1], C.J. Gu[1] and X.P. Wang[2], [1]Nanyang Tech. Univ. and [2]Inst. of Microelectronics, A*STAR (Singapore)* | **16:10 B-2-2**<br>**High Efficiency Apodized Grating Couplers with Metal Mirrors between a-Si:H Multilayer Waveguides toward 3D Optical Interconnection**<br>*Y. Kuno, J. Kang, Y. Hayashi, J. Suzuki, T. Amemiya, N. Nishiyama and S. Arai, Tokyo Tech (Japan)* | | **16:10 D-2-2 (Invited)**<br>**Microfluidic biochip technology for biological cell research**<br>*M.-H. Wu, Chang Gung Univ. (Taiwan)* | **16:10 E-2-2**<br>**F-band Bidirectional Transceiver using 75-nm InP HEMTs**<br>*S. Shiba[1], M. Sato[1], H. Matsumura[1], Y. Kawano[1], T. Suzuki[1], Y. Nakasha[1], T. Takahashi[1], K. Makiyama[1], T. Iwai[2] and N. Hara[1], [1]Fujitsu Ltd. and [2]Fujitsu Laboratories Ltd. (Japan)* | **16:10 F-2-2**<br>**Quantitative Evaluation of Slow Traps near Ge MOS Interfaces by Using Time Response of MOS Capacitance**<br>*K. Tanaka[1,2], R. Zhang[1,2], M. Takenaka[1,2] and S. Takagi[1,2], [1]Univ. of Tokyo and [2]JST-CREST (Japan)* | **16:00 G-2-2**<br>**Investigation of the Plasma Damage by Etching Process for TSV Formation in Via-last Backside-via 3D IC**<br>*Y. Sugawara[1], H. Hashiguchi[1], S. Tanikawa[1], H. Kino[2], K. Lee[3], T. Fukusima[3], M. Koyanagi[3] and T. Tanaka[1,2], [1]Dept. of Bioengineering and Robotics, Tohoku Univ., [2]Dept. of Biomedical Engineering, Tohoku Univ. and [3]NICHe, Tohoku Univ. (Japan)* |
| **16:20 A-2-3**<br>**Electro-thermal driven nano-scale IMT characteristics of $SmNiO_3$ for selector application of cross-point memory array**<br>*S.H. Misha, N. Tamanna, A. Prakash, J. Song, D. Lee, E. Cha and H. Hwang, Pohang Univ. of Sci. and Tech. (Korea)* | **16:25 B-2-3**<br>**A High Extinction Ratio Silicon Nitride Polarizing Beam Splitter**<br>*J. Feng and R. Akimoto, AIST (Japan)* | | **16:40 D-2-3**<br>**In Vitro Reconstruction of Tumor Microenvironment for Studying Angiogenesis**<br>*K.W. Chang[1], Y.Y. Hsu[1], T.H. Punde[1], Y.F. Chan[2], L.W. Kuo[2], K.Y. Lee[2] and C.H. Liu[1], [1]National Tsing Hua Univ. and [2]Shuang Ho Hospital (Taiwan)* | **16:25 E-2-3**<br>**Experimental Demonstration of Resonant Tunneling Super Regenerative Detectors Detecting High Order Harmonic Signals**<br>*J. Pan, Y. Kakutani, T. Nakayama, M. Mori and K. Maezawa, Univ.of Toyama (Japan)* | **16:30 F-2-3**<br>**Validity of Direct-gap Photoluminescence Analysis for Non-destructive Characterization of Oxide/Germanium Interface**<br>*S. Kabuyanagi[1, 2], T. Nishimura[1, 2], T. Yajima[1,2], K. Nagashio[1, 2] and A. Toriumi[1, 2], [1]Univ. of Tokyo and [2]JST-CREST (Japan)* | **16:20 G-2-3**<br>**Dominant Factors of Stress-Induced Migration in Electroplated Copper Thin Films Used for Through Silicon Via (TSV) Interconnections**<br>*K. Suzuki, R. Furuya and H. Miura, Tohoku Univ. (Japan)* |
| **16:40 A-2-4**<br>**Self-Rectifying Ta/$TaO_x$/$TiO_2$/Ti Cell for High-Density Flexible RRAM**<br>*C.T. Chou, C.W. Hsu, C.C. Chang and T.H. Hou, NCTU (Taiwan)* | **16:40 B-2-4**<br>**Humidity Tolerance for Athermal Si-Slot Wavelength Filters using Amorphous Fluoride Polymer and $SiO_2$ Protection Layer**<br>*Y. Atsumi, J. Kang, J. Suzuki, Y. Hayashi, N. Nishiyama and S. Arai, Tokyo Tech (Japan)* | | **16:55 D-2-4**<br>**High-Efficiency Cellular Separation Method Utilizing Optically-Induced Dielectrophoretic (ODEP) Force-based Microfluidic Platform**<br>*S.B. Huang[1], S.L. Liu[1], T.K. Chiu[1], C.H. Hsieh[2] and M.H. Wu[1], [1]Chang Gung Univ. and [2]Hosp. of Chang Gung Memorial (Taiwan)* | **16:40 E-2-4**<br>**Non-destructive Mapping of Doping and Structural Composition of High Current Density Resonant Tunnelling Diodes Grown by Metal-Organic Vapour Phase Epitaxy Through Photoluminescence Spectroscopy**<br>*K.J.P. Jacobs[1], B.J. Stevens[2], T. Mukai[3], D. Ohnishi[3] and R.A. Hogg[1], [1]Univ. of Sheffield, [2]EPSRC National Centre for III-V Technologies and [3]Rohm Co. Ltd. (UK)* | **16:50 F-2-4**<br>**Spatial Variation of the Work Function in Nano-crystalline TiN Films Measured by Dual-Mode Scanning Tunneling Microscopy**<br>*L. Bolotov, K. Fukuda, T. Tada, T. Matsukawa and M. Masahara, AIST (Japan)* | **16:40 G-2-4**<br>**Suppression of Cu Ion Drift by Metal-Cap on Cu lines, Improving Interconnect Dielectric Reliability**<br>*M. Ueki, N. Furutake, N. Inoue and Y. Hayashi, Renesas Electronics Corp. (Japan)* |
| **17:00 A-2-5 (Late News)**<br>**Modeling of Read Disturbance Mechanism due to Carrier Trapping in Sub-20nm NAND Flash Memory**<br>*D. Kang[1], K. Lee[1], S. Kwon[2], S. Kim[2], Y. Hwang[2] and H. Shin[1], [1]Seoul Natioanl Univ. and [2]Samsung Electronics Corp., Ltd. (Korea)* | **16:55 B-2-5 (Late News)**<br>**High-quality thin-film-like multifold Ge/Si/Ge composite quantum-dot hetero-structures for visible to near-infrared photodetection**<br>*M.-H. Kuo[1], W.-T. Lai[1], H.-T. Chang[2], S.-W. Lee[2] and P.-W. Li[1], [1]Dept. of Electrical Engineering and Center for Nano Science and Technology, National Central Univ. and [2]Institute of Materials Science and Engineering, National Central Univ. (Taiwan)* | | | **16:55 E-2-5 (Late News)**<br>**Impact of $In_{1-x}Ga_xAs$ Capping Layer on Characteristic of III-V Trigate MOSFET Devices**<br>*C.-H. Huang[1,2] and Y. Li[1, 2, 3], [1]Parallel and Scientific Computing Lab., NCTU, [2]Institute of Communications Engineering, NCTU and [3]Dept. of Electrical and Computer Engineering, NCTU (Taiwan)* | **17:10 F-2-5 (Late News)**<br>**Sub-300ºC Fabrication of Poly-GeSn Junctionless Tri-Gate p-FETs Enabling Sequential 3D Integration of CMOS Circuits**<br>*M. Kurosawa[1,2], Y. Kamata[3], H. Ikenoue[4], N. Taoka[1], O. Nakatsuka[1], T. Tezuka[3] and S. Zaima[1], [1]Nagoya Univ., [2]JSPS, [3]AIST/GNC and [4]Kyushu Univ. (Japan)* | **17:00 G-2-5**<br>**Analysis of the Breakdown Voltage of an Area Surrounded by the Multi-trench Gaps in a 4kV Monolithic Isolator for a Communication Network Interface**<br>*Y. Takeuchi, R. Kuroda and S. Sugawa, Graduate School of Engineering, Tohoku Univ. (Japan)* |

# Tuesday, September 9

| 4F 404 | 1F 101 | 2F 202B | 3F 304 | 4F 401 | 4F 402 |
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| **H-2: 2D Materials (2)**<br>(15:40-17:25)<br>Chairs: T. Suemasu<br>(Univ. of Tsukuba)<br>T. Nagata (NIMS) | **J-2: Characterization**<br>(15:40-17:25)<br>Chairs: T. Hiramoto<br>(Univ. of Tokyo)<br>K. Sukegawa (Fujitsu Semicon.) | **K-2: Organic Photovoltaics I**<br>(15:40-16:55)<br>Chairs: M. Ikegami<br>(Toin Univ. of Yokohama)<br>K. Tajima (RIKEN) | **M-2: Spin Transport**<br>(15:40-17:25)<br>Chairs: H. Shimizu<br>(Tokyo Univ. of Agri. & Tech.)<br>K. Hamaya<br>(Osaka Univ.) | **N-2: Power Devices and Modules**<br>(15:40-17:25)<br>Chairs: S. Matsumoto<br>(Kyushu Inst. of Tech.)<br>H. Tadano<br>(Univ. of Tsukuba) | |
| **15:40 H-2-1 (Invited)**<br>**Growth, characterization, and functionalization of graphene and hexagonal boron nitride**<br>*H. Hibino, S. Wang, C.M. Orofeo and S. Suzuki, NTT Corp. (Japan)* | **15:40 J-2-1 (Invited)**<br>**Comprehensive Investigation of Self-Heating Effect (SHE) in Nanoscale Planar and Fin FETs: Impacts of Device Parameters on SHE and Analog Performance Optimization**<br>*T. Takahashi[1,2], T. Matsuki[3], T. Shinada[3], Y. Inoue[3] and K. Uchida[1,2], [1]Keio Univ., [2]JST-CREST and [3]AIST (Japan)* | **15:40 K-2-1 (Invited)**<br>**Design and Characterizations of Perovskite Solar Cells**<br>*H.-Y. Hsu and E.W.-G. Diau, NCTU (Taiwan)* | **15:40 M-2-1 (Invited)**<br>**Magneto-reprogrammable semiconductor logic at room temperature**<br>*J. Hong[1], S. Joo[2], J.D. Song[3], J. Chang[4] and M. Johnson[5], [1]Korea Univ, [2]KRISS, [3]Center for Opto-Electronic Convergence Systems, KIST, [4]Spin Convergence Research Center, KIST and [5]Naval Research Lab (Korea)* | **15:40 N-2-1 (Invited)**<br>**Challenges to the silicon IGBT limit with PNM structure**<br>*M. Sumitomo, H. Sakane, K. Arakawa, Y. Higuchi and M. Matsui, DENSO Corp. (Japan)* | |
| **16:10 H-2-2**<br>**Chemical Vapor Deposition of Hexagonal Boron Nitride Films on c-plane Sapphire Substrates**<br>*N. Umehara, I. Kuwahara, T. Kouno, H. Kominami, Y. Nakanishi and K. Hara, Shizuoka Univ. (Japan)* | **16:10 J-2-2**<br>**Improvement of S-factor Method for Evaluation of MOS Interface State Density**<br>*W.–L. Cai[1,2], M. Takenaka[1,2] and S. Takagi[1,2], [1]Univ. of Tokyo and [2]JST-CREST (Japan)* | **16:10 K-2-2**<br>**Dye-sensitized Solar Cells Using Scattering Layer with Micron-sized Pores for Indoor Light Energy Harvesting**<br>*M. Suzuka, H. Yabe, N. Hayashi, T. Kitagaki and T. Sekiguchi, Panasonic Corp. (Japan)* | **16:10 M-2-2**<br>**Anisotropic spin dynamics of drifting electrons with coexistence of Rashba and Dresselhaus spin-orbit interactions**<br>*Y. Kunihashi[1], H. Sanada[1], H. Gotoh[1], K. Onomitsu[1], M. Kohda[2], J. Nitta[2] and T. Sogawa[1], [1]NTT BRL and [2]Tohoku Univ. (Japan)* | **16:10 N-2-2**<br>**Current filamentation caused by dynamic avalanche during turn-off transient under short-circuit operation of IGBTs**<br>*T. Kobayashi[1], T. Suwa[1], T. Matsudai[2] and T. Ogura[2], [1]Toshiba I.S. Corp. and [2]Toshiba Corp. (Japan)* | |
| **16:25 H-2-3**<br>**Quantum Interference in a Ballistic Graphene n-p-n Junction: Fabry-Perot Interference and a Novel Magnetoresistance Oscillation**<br>*S. Morikawa[1], S. Masubuchi[1], R. Moriya[1], K. Watanabe[2], T. Taniguchi[2] and T. Machida[1], [1]Univ. of Tokyo and [2]NIMS (Japan)* | **16:30 J-2-3**<br>**Effective Work Function Shift Induced by TiN Sacrificial Metal Gates as a Function of Their Thickness and Composition in 14 nm NMOS devices**<br>*C. Suarez-Segovia[1,2], P. Caubet[1], V. Joseph[1], O. Gourhant[1], G. Romano[1], F. Domengie[1] and G. Ghibaudo[2], [1]STMicroelectronics and [2]IMEP-LAHC (France)* | **16:25 K-2-3**<br>**Development of Integrated Tandem Dye Sensitized Solar Cells**<br>*S. Kosar[1], Y. Struk[1], Y. Pihosh[2], K. Matsubara[3], M. Kondo[3] and I. Turkevych[3], [1]Chernitsy National Univ., [2]Univ. of Tokyo and [3]AIST (Ukraine)* | **16:25 M-2-3**<br>**Large Spin Accumulation Signals in Epitaxial Mn5Ge3 Contacts on Ge without Oxide Tunnel Barrier**<br>*A. Spiesser, H. Saito, R. Jansen, S. Yuasa and K. Ando, Spintronics Res. Center, AIST (Japan)* | **16:25 N-2-3**<br>**Design for EMI suppression during reverse recovery by 600V lateral SOI PiN diode with traps**<br>*M. Tsukuda[1], H. Imaki[2] and I. Omura[2], [1]The International Centre for the Study of East Asian Development and [2]Kyusyu Inst. of Tech. (Japan)* | |
| **16:40 H-2-4**<br>**Fabrication of Two-Dimensional 10 nm Graphene Dot Array and Optical Characterization**<br>*T. Okada[1], K. Igarashi[1], P. Han[2], T. Hitosugi[2], C.H. Huang[3], C.Y. Su[4] and S. Samukawa[1,2], [1]IFS, Tohoku Univ., [2]WPI-AIMR, Tohoku Univ., [3]Ming Chi Univ. of Tech. and [4]National Central Univ. (Japan)* | **16:50 J-2-4**<br>**Radiation Hardness Evaluations of 65 nm FD-SOI and Bulk Processes by Measuring SET Pulse Widths and SEU Rates**<br>*E. Sonezaki, J. Furuta and K. Kobayashi, Kyoto Inst. of Tech. (Japan)* | **16:40 K-2-4**<br>**Improvement of Electrical Conductivity by Low-temperature Solvent Annealing Method for High Performance Organic Solar Cells**<br>*S.J. Park, K.Y. Lee, D.H. Kim and Y.J. Kim, Yonsei Univ. (Korea)* | **16:40 M-2-4**<br>**Effect of Insertion Layers on Schottky Barrier Height of Fe/n-type Ge Junctions**<br>*H. Saito, Y. Sato, T. Takada, R. Jansen and S. Yuasa, AIST (Japan)* | **16:40 N-2-4**<br>**An 800V-class lateral NMOS structure with a reduced parasitic capacitance for a level-shift circuit integrated in a high voltage gate driver IC**<br>*M. Yamaji[1], A. Jonishi[1], H. Sumida[1] and Y. Hashimoto[2], [1]Fuji Electric Corp. Ltd. and [2]Shinshu Univ. (Japan)* | |
| **16:55 H-2-5**<br>**Influence of Rhenium on the Structural and Optical Properties of Molybdenum Disulfide**<br>*M. Sigiro[1], Y.S. Huang[1], C.H. Ho[2], Y.C. Lin[3], K. Suenaga[3] and K.K. Tiong[4], [1]Department of Electronic and Computer Eng. National Taiwan Univ. of Sci. and Tech., [2]Graduate Inst. of Applied Sci. and Tech. National Taiwan Univ. of Sci. and Tech., [3]AIST and [4]National Taiwan Ocean Univ. (Taiwan)* | **17:10 J-2-5 (Late News)**<br>**Charge Pumping Current from Single Si/$SiO_2$ Interface Traps: Direct Observation of $P_b$ Centers and Fundamental Trap-Counting by the Charge Pumping Method**<br>*T. Tsuchiya[1] and Y. Ono[2], [1]Shimane Univ. and [2]Univ. of Toyama (Japan)* | | **16:55 M-2-5**<br>**Layer Thickness Dependence of Spin Orbit Torques and Fields in Pt/Co/AlO Trilayer Structures.**<br>*T. Yang[1], M. Kohda[1], T. Seki[2], K. Takanashi[2] and J. Nitta[1], [1]Department of Materials Science, Tohoku Univ. and [2]Institute for Materials Research, Tohoku Univ. (Japan)* | **16:55 N-2-5**<br>**250°C Switching Behavior of All SiC Power Module with Sandwich Structure**<br>*F. Kato[1,2], R. Simanjorang[2], F. Lang[2], H. Nakagawa[1,2], H. Yamaguchi[1,2] and H. Sato[1,2], [1]AIST and [2]R&D Partnership for Future Power Electronics Tech. (Japan)* | |
| **17:10 H-2-6**<br>**Withdrawn** | | | **17:10 M-2-6**<br>**Magnetic Sensors Based on MgO-Magnetic Tunnel Junctions with Perpendicularly Magnetized CoFeB Sensing Layers**<br>*T. Nakano[1], M. Oogane[1], H. Naganuma[1], T. Yano[2], K. Ao[2] and Y. Ando[1], [1]Tohoku Univ. and [2]DENSO Corp. (Japan)* | **17:10 N-2-6**<br>**High speed real-time temperature monitoring system inside power devices package using infrared radiation**<br>*N. Hirata, A. Watanabe and I. Omura, Kyushu Inst. of Tech. (Japan)* | |