

# The Conference Theme

## *New Challenges for "Smart" World*

### Advanced Program

6/5 .....

#### Tutorials (in Japanese)

**9:30-10:30** Fundamentals of GaN Transistors  
Yasuo Ohno (e-Device Lab)

**Short Break (10:30-10:40)**

**10:40-11:40** Fundamentals of GaN Transistor Application Technology  
Wataru Saito (Toshiba Corporation)

#### Opening

**13:00-13:10** Opening Remarks by Yasuhisa Omura (Kansai University)

#### Keynote Speeches

**13:10-13:50**

**K-1** (p.18) Low Energy Silicon Solution toward Smart and Sustainable Society  
Toshiaki Masuhara (Low-power Electronics Association & Project)

**13:50-14:30**

**K-2** (p.20) Low-Power Ultrahigh-Speed Wireless Communication with  
Short-Millimeter-Wave CMOS Technology  
Minoru Fujishima (Hiroshima University)

**Short Break (14:30-14:40)**

## Session A (Si Devices & Circuits)

**14:40-15:00**

- A-1 (p.24)** Numerical Analysis of Light-Trapping Structure in Nanoimprinted-Textured Silicon Solar Cell  
Seiya Yoshinaga<sup>1</sup>, Yasuaki Ishikawa<sup>1,2</sup>, Shinji Araki<sup>1</sup> and Yukiharu Uraoka<sup>1,2</sup> (<sup>1</sup>NAIST, <sup>2</sup>JST-CREST)

**15:00-15:20**

- A-2 (p.26)** Distance Controlled Nanoparticles Using PEG-ferritin for New Functional Devices  
Chao He<sup>1,2</sup>, Ryoichi Honda<sup>1</sup>, Hiroki Kamitake<sup>1,2</sup>, Mutsunori Uenuma<sup>1,2</sup>, Yasuaki Ishikawa<sup>1,2</sup>, Ichiro Yamashita<sup>1</sup> and Yukiharu Uraoka<sup>1,2</sup> (<sup>1</sup>NAIST, <sup>2</sup>CREST)

**15:20-15:40**

- A-3 (p.28)** Influence of a Pocket Doping in a Schottky Tunneling FET  
Shilpi Guin, Avik Chattopadhyay, Anupam Karmakar and Abhijit Mallik (University of Calcutta, India)

**Short Break (15:40-15:50)**

**15:50-16:10**

- A-4 (p.30)** The Effect of Supply Voltage Reduction to 5.8GHz Differential Dual-Modulus Prescaler  
Takeshi Mitsunaka<sup>1,2</sup>, Masafumi Yamanoue<sup>1</sup>, Kunihiko Iizuka<sup>1</sup> and Minoru Fujishima<sup>2</sup> (<sup>1</sup>SHARP Corporation, <sup>2</sup>Hiroshima University)

**16:10-16:30**

- A-5 (p.32)** A CMOS Image Sensor with Low Fixed Pattern Noise Suitable for Lensless Observation System of Digital Enzyme-linked Immunosorbent Assay (ELISA)  
Hironari Takehara<sup>1</sup>, Kiyotaka Sasagawa<sup>1,3</sup>, Toshihiko Noda<sup>1,3</sup>, Takashi Tokuda<sup>1,3</sup>, Kazuya Miyazawa<sup>1</sup>, Soo Hyeon Kim<sup>2,3</sup>, Ryota Iino<sup>2,3</sup>, Hiroyuki Noji<sup>2,3</sup> and Jun Ohta<sup>1,3</sup> (<sup>1</sup>NAIST, <sup>2</sup>The University of Tokyo, <sup>3</sup>JST-CREST)

**Short Break (16:30-16:40)**

## Poster Session

### Short Presentation – 2min. each (6/5, 16:40-18:00)

- PA-01 (p.36)** Monte Carlo Simulation of Seebeck Coefficient of Si Nanostructure with Barrier Layers  
Indra Nur Adisusilo<sup>1</sup>, Kentaro Kukita<sup>1</sup> and Yoshinari Kamakura<sup>1,2</sup>  
(<sup>1</sup>Osaka University, <sup>2</sup>CREST)
- PA-02 (p.38)** Scaling Scheme Prospect of XCT-SOI MOSFET Aiming at Medical Implant Applications Showing a Long Lifetime with a Small Battery  
Daiki Sato and Yasuhisa Omura (Kansai University)
- PA-03 (p.40)** Novel Solar Cell with MOS Diode for Improvement of Conversion Efficiency  
Takahiro Kobayashi, Naoto Matsuo and Akira Heya  
(University of Hyogo)
- PA-04 (p.42)** Threshold voltage model for double gate p-IMOS  
Heming Yao (Beihang University)
- PA-05 (p.44)** Low Voltage High Linearity CMOS Up Conversion Mixer for LTE Applications  
Yuan-Hao Shu and Jeng-Rern Yang (Yuan Ze University)
- PB-01 (p.46)** Growth of a sputtered Ta<sub>2</sub>O<sub>5</sub>/ZnO film and its application to an ion-sensitive field-effect transistor  
Kazuya Mukai<sup>1</sup>, Takayuki Onaka<sup>1</sup>, Kazuto Koike<sup>1</sup>, Toshihiko Maemoto<sup>1</sup>, Shigehiko Sasa<sup>1</sup>, Mitsuaki Yano<sup>1</sup>, Sadao Kadokura<sup>2</sup> and Yutaka Nakamitsu<sup>2</sup>  
(<sup>1</sup>Osaka Institute of Technology, <sup>2</sup>FTS Corporation)
- PB-02 (p.48)** Type II band lineup in SAB-Based GaAs/Si Heterojunctions  
Masashi Morimoto, Jianbo Liang, Shota Nishida, Tatsuya Miyazaki and Naoteru Shigekawa (Osaka City University)
- PB-03 (p.50)** V/Al-based ohmic contact formation to n-GaN using low temperature annealing  
Kouhei Tone, Hirokuni Tokuda and Masaaki Kuzuhara  
(University of Fukui)

- PB-04 (p.52)** Effect of Non-Parabolic Band Structure on Quantum Confined Electronic States in 4H-SiC Inversion Layers  
Ryuta Watanabe and Yoshinari Kamakura (Osaka University  
Japan Science and Technology Agency, CREST)
- PB-05 (p.54)** I-V characteristics of  $\text{Al}_x\text{Ti}_y\text{O}/\text{GaAs}(001)$  metal-insulator-semiconductor structures  
Toshimasa Ui, Masahiro Kudo and Toshi-Kazu Suzuki (JAIST)
- PB-06 (p.56)** Formation of low ohmic contacts to AlGaN/GaN heterostructures using Ti/Al-based metal stacks  
Ryo Maeta, Hirokuni Tokuda and Masaaki Kuzuhara  
(University of Fukui)
- PB-07 (p.58)** Electrical characterization of AlGaN/GaN HEMTs fabricated on  $\text{CF}_4$ -plasma-treated AlGaN surface  
Yoshiki Sakaida, Hirokuni Tokuda and Masaaki Kuzuhara  
(University of Fukui)
- PB-08 (p.60)** Flexible ZnO thin-film transistors on plastic substrates produced at room temperature  
Yi Sun, Yuta Kimura, Toshihiko Maemoto and Shigehiko Sasa  
(Osaka Institute of Technology)
- PB-09 (p.62)** Fabrication of Zinc Oxide Thin Film Transistors Using a Facing-Target Sputtering Method  
Yusuke Okada, Ryuji Morita, Kenichi Ogata, Kazuto Koike,  
Toshihiko Maemoto, Mitsuaki Yano and Shigehiko Sasa  
(Osaka Institute of Technology)
- PB-10 (p.64)** Electrical characterization of lateral tunnel junctions fabricated on AlGaN/GaN heterostructures  
Yohei Kobayashi, Takeshi Saito, Hirokuni Tokuda and Masaaki Kuzuhara (University of Fukui)
- PB-11 (p.66)** Role of Aluminum oxide cladding layers in heat conduction of a semiconductor slab with photonic crystal  
Takashi Okabe, Masato Morifuji and Masahiko Kondow  
(Osaka University)

- PB-12 (p.68)** High-voltage AlGaIn/GaN HEMTs fabricated on free-standing GaN substrates  
Kousuke Akira, Takashi Asano, Hirokuni Tokuda and Masaaki Kuzuhara (University of Fukui)
- PB-13 (p.70)** Enhancement of photoluminescence due to one-dimensional photonic crystal  
Kohei Shobudani, Masato Morifuji (Osaka University)
- PB-14 (p.72)** Low Resistance Ohmic Contacts to n-InSb Employing Sn-Alloys  
Kosuke Hosotani, Taihei Ito, Yuichiro Yasui, Koji Nakayama, Azusa Kdoda, Masayuki Mori and Koichi Maezawa (University of Toyama)
- PC-01 (p.74)** Retinal Prosthesis of Frequency Modulation using Thin-Film Photo Transistors  
Takayuki Kadonome, Atsushi Matsumura, Tsuyoshi Higashiyama, Shohei Oyama and Mutsumi Kimura (Ryukoku University)
- PC-02 (p.76)** Fabrication of zinc oxide transparent thin film transistors on glass substrates by sol-gel method  
Satoru Sasaki, Shigehiko Sasa, Ken-Ichi Ogata and Toshihiko Maemoto (Osaka Institute of Technology)
- PC-03 (p.78)** Artificial Neural Network using Thin-Film Transistors — Working Confirmation of Asymmetric Circuit —  
Yuki Yamaguchi, Ryohei Morita, Yusuke Fujita, Tomoaki Miyatani, Tomohiro Kasakawa and Mutsumi Kimura (Ryukoku University)
- PC-04 (p.80)** Leakage Current Characteristics of New SrBi<sub>4</sub>Ti<sub>4</sub>O<sub>15</sub>/Ca Bi<sub>4</sub>Ti<sub>4</sub>O<sub>15</sub> Thin-Film Capacitor with Excellent Electric Stability  
Hideaki Kawahara<sup>1</sup>, Naoya Tahara<sup>1</sup>, Shuhei Nomura<sup>1</sup>, Hiroshi Uchida<sup>2</sup>, Kaoru Yamashita<sup>1</sup>, Hiroshi Funakubo<sup>3</sup> and Minoru Noda<sup>1</sup>  
(<sup>1</sup>Kyoto Institute of Technology, <sup>2</sup>Sophia University, <sup>3</sup>Tokyo Institute of Technology)

- PC-05 (p.82)** A Dielectric Dispersion Analysis Using Microwave Bio-Microsensor for Droplet of Liposome Suspension with Target Biomolecules  
Keisuke Takada, Takashi Fujimoto, Kaoru Yamashita and Minoru Noda (Kyoto Institute of Technology)
- PC-06 (p.84)** Impact of Electrode Architecture on Bio-Impedance Measurement  
Leo Kawamura, Takahiro Ohnishi and Yasuhisa Omura (Kansai University)
- PC-07 (p.86)** Temperature dependence of resistance of conductive filament formed in NiO layer in resistive switching memory  
Yoshifumi Hamada, Takashi Kato, Shintaro Otuka, Tomohiro Shimizu and Shoso Shingubara (Kansai University)
- PC-08 (p.88)** Research on Pt/TiO<sub>2</sub>/Pt Memristor Array with Different Feature Sizes  
Zhensen Tang, An Yan, Xun Yi, Rulin Liu and Liang Fang (National University of Defense Technology)
- PC-09 (p.90)** Curvature Controlled Microstructures for Improved Triaxial Sensitivity in Piezoelectric Vibratory Cantilever-Type Tactile Sensors Based on Resonant Frequency Shift  
Hikaru Tanaka, Hiroto Kii, Yi Yang, Kaoru Yamashita and Minoru Noda (Kyoto Institute of Technology)
- PC-10 (p.92)** Synthesis of High-Transmittance Zinc Oxide by Oxidation of Evaporated Zinc Films  
Jiesheng Zhang, Koji Iwamaru and Kazuhiro Nakamura (Kansai Univ.)
- PC-11 (p.94)** A Flexible Macromolecular Memory Device Array using Fullerene and Perfluorinated Polymer  
Huyen T. Pham<sup>1</sup> and Toan T. Dao<sup>1,2</sup> (<sup>1</sup>University of Transport and Communications, <sup>2</sup>JAIST)
- PC-12 (p.96)** MEMS Microphones on InP Substrates for High Performance Digital Ultrasonic Sensors  
Shunya Fujino, Yuta Mizuno, Kazuhiro Takaoka, Masayuki Mori, and Koichi Maezawa (University of Toyama)

- PS-01 (p.98)** Multiple-Cell-Upset Hardened 6T SRAM Using NMOS-Centered Layout  
Shusuke Yoshimoto<sup>1</sup>, Koji Nii<sup>2</sup>, Hiroshi Kawaguchi<sup>1</sup> and Masahiko Yoshimoto<sup>1,3</sup> (<sup>1</sup>Kobe University, <sup>2</sup>Renesas Electronics Corporation, <sup>3</sup>JST CREST)
- PS-02 (p.100)** Evaluation for Temperature Dependence and Lifetime of 79GHz Power Amplifier  
Chen Yang Li, Takeshi Yoshida, Kosuke Katayama, Mizuki Motoyoshi, Kyoya Takano, Shuhei Amakawa and Minoru Fujishima (Hiroshima University)
- PS-03 (p.102)** Power-Noise Measurements of Small-Scale Inverter Chains  
Yuji Harada<sup>1</sup>, Kumpei Yoshikawa<sup>1</sup>, Noriyuki Miura<sup>1</sup>, Makoto Nagata<sup>1</sup>, Akitaka Murata<sup>2</sup>, Syuuji Agatsuma<sup>2</sup> and Kouji Ichikawa<sup>2</sup> (<sup>1</sup>Kobe University, <sup>2</sup>DENSO CORPORATION)
- PS-04 (p.104)** Expansion of SRAM Operation Margin by Adaptive Voltage Supply  
Kyohei Kishida<sup>1</sup>, Tomohiro Tsujii<sup>1</sup>, Hiroshi Makino<sup>1</sup>, Tsutomu Yoshimura<sup>1</sup>, Shuhei Iwade<sup>1</sup> and Yoshio Matsuda<sup>2</sup> (<sup>1</sup>Osaka Institute of Technology, <sup>2</sup>Kanazawa University)
- PS-05 (p.106)** Impact of Skin Effect on Loss Modeling of On-Chip Transmission-Line for Terahertz Integrated Circuits  
Akira Tsuchiya and Hidetoshi Onodera (Kyoto University)
- PS-06 (p.108)** A Study of Optimization for Efficiency and Power Control in an Electromagnetic WPT System  
Giichi Sakemi, Tsutomu Yoshimura and Naoyuki Fukuda (Osaka Institute of Technology)

## Session B (Compound Semiconductor Devices)

**9:30-10:10 – Invited –**

- B-1** (p.112) Evolution of Power Amplifier for mobile applications  
Satoshi Tanaka (Murata Manufacturing Co., Ltd.)

**Short Break (10:10-10:20)**

**10:20-10:40**

- B-2** (p.114) A Compact Isolated Gate Driver using GaN HFETs on Sapphire Substrate Integrated with a 5.8GHz Electro-Magnetic Resonant Coupler  
Yasufumi Kawai, Shuichi Nagai, Noboru Negoro, Takeshi Fukuda, Tetsuzo Ueda, Nobuyuki Otsuka and Daisuke Ueda (Panasonic Corporation)

**10:40-11:00**

- B-3** (p.116) Development of SiC Power Devices and Modules for Automotive Motor Drive Use  
Tristan Evans, Toshio Hanada, Yuki Nakano and Takashi Nakamura (ROHM Co., Ltd.)

**11:00-11:20**

- B-4** (p.118) Size and Geometric Effects on Conduction Band Structure of GaAs Nanowires  
Hajime Tanaka, Naoya Morioka, Seigo Mori, Jun Suda, and Tsunenobu Kimoto (Kyoto University)

**11:20-11:40**

- B-5** (p.120) A 13.56 MHz Wireless Power Transmission Systems with Enhancement-Mode GaN High Electron Mobility Transistors  
Yusuke Nakakohara, Junichi Kashiwagi, Tetsuya Fujiwara, Minoru Akutsu, Norikazu Ito, Kentaro Chikamatsu, Astushi Yamaguchi, and Ken Nakahara (ROHM Co., Ltd.)



## Lunch (11:40-13:00)

### Session C (Emerging Devices)

#### 13:00-13:40 – Invited –

- C-1** (p.124) Atmospheric Pressure Processed InGaZnO Thin-Film Transistors  
Mamoru Furuta, Toshiyuki Kawaharamura  
(Kochi University of Technology)

#### 13:40-14:00

- C-2** (p.126) Forming of SiO<sub>2</sub> Film by Spin-On Glass and CO<sub>2</sub> Laser Annealing for Gate Insulator of Polycrystalline Silicon Thin Film Transistors  
Daisuke Hishitani<sup>1</sup>, Masahiro Horita<sup>1,2</sup>, Hiroshi Ikenoue<sup>3</sup>, Yosuke Watanabe<sup>4</sup> and Yukiharu Uraoka<sup>1,2</sup>  
(<sup>1</sup>NAIST, <sup>2</sup>CREST, <sup>3</sup>Kyushu Univ., <sup>4</sup>GIGAPHOTON INC.)

#### 14:00-14:20

- C-3** (p.128) Femtosecond Laser Irradiation to ZnS Phosphor for Inorganic Electroluminescent Displays  
Kyohei Nabesaka<sup>1</sup>, Yasuaki Ishikawa<sup>1,3</sup>, Takahiro Doe<sup>1</sup>, Nobuyoshi Taguchi<sup>2</sup>, Yoichiroh Hosokawa<sup>1</sup> and Yukiharu Uraoka<sup>1,3</sup>  
(<sup>1</sup>NAIST, <sup>2</sup>Image Tech Inc., <sup>3</sup>CREST)

#### 14:20-14:40

- C-4** (p.130) Evaluation of TaOx Nanoparticles for Resistive Random Access Memory  
Keisuke Kado<sup>1,2</sup>, Takahiro Ban<sup>1,2</sup>, Mutsunori Uenuma<sup>1,2</sup> and Yasuaki Ishikawa<sup>1,2</sup> (<sup>1</sup>NAIST, <sup>2</sup>CREST)

## Short Break (14:40-14:50)

**14:50-15:10**

- C-5** (p.132) Asymmetric AC Electrophoresis with Insulated Electrodes: Toward Positional Control of Micro- and Nanoscale Devices  
Akihide Shibata<sup>1</sup>, Kenji Komiya<sup>1</sup>, Keiji Watanabe<sup>1</sup>, Takuya Sato<sup>1</sup>, Takeshi Shiomi<sup>1</sup>, Hiroshi Kotaki<sup>1</sup>, Paul Schuele<sup>2</sup>, Mark Crowder<sup>2</sup>, Changqing Zhan<sup>2</sup> and John Hartzell<sup>2</sup> (<sup>1</sup>Sharp Corporation, <sup>2</sup>Sharp Laboratories of America)

**15:10-15:30**

- C-6** (p.134) Research on Discrete Bipolar Switching Effect in Memristor Device  
Zhensen Tang<sup>1</sup>, Liang Fang<sup>1</sup>, Rulin Liu<sup>1</sup>, An Yan<sup>1</sup>, Yaqing Chi<sup>2</sup> and Xun Yi<sup>1</sup> (<sup>1</sup>National University of Defense Technology, <sup>2</sup>National Key Laboratory of Science and Technology )

**15:30-15:50**

- C-7** (p.136) A Novel Discharge-Induced Airflow Device with Low Voltage Operation  
Tomoshige Furuhi, Manabu Inoue, Kiyoshi Takagi and Akira Ando  
(Murata Manufacturing Co., Ltd.)

## Poster Viewing Session

**16:00-18:00** at Poster Room

## Closing

**18:10-18:30** Award and Closing: Akira Takahashi (Sharp Corporation)