Call for Papers

2008 INTERNATIONAL CONFERENCE ON SOLID STATE DEVICES AND MATERIALS

THE 40th ANNIVERSARY

Conference: September 24-26, 2008
Short Course (in Japanese): September 23, 2008
Special Events: September 23-26, 2008

The 2008 International Conference on Solid State Devices and Materials (SSDM2008) will be held from September 24 to September 26, 2008 at Tsukuba International Congress Center (Tsukuba, Ibaraki, Japan). Since 1969, the conference has provided an excellent opportunity to discuss key aspects of solid-state devices and materials. This year the SSDM, which is celebrating its 40th anniversary, is organized to have 13 program subcommittees covering circuits and systems, as well as devices and materials. A one-day short course and special events celebrating the 40th anniversary are also scheduled prior to the conference. More information about SSDM 2008 is available online at:

http://www. ssdm.jp

The 40th Anniversary Special Events

1. An extra DVD which includes past 40 years' SSD & SSDM all papers will be distributed for all participants.

2. A hardcover book entitled "40 years of SSDM, Past, Present and Future (Tentative)" will be also distributed for all participants.

3. Panels of past "SSDM Award" will be exhibited during the conference (September 24-26, 2008).

4. A technical seminar on "Research and Development Activities in Science City of Tsukuba" will be organized in the afternoon of September 23, 2008, prior to the conference. All presentations are given in English.

5. A welcome reception will be held in the evening of September 23, 2008, prior to the conference. Both the seminar and the reception are open to all participants without additional fees.

PLENARY SESSIONS

Plenary Speakers:

"CMOS Paradigm Change through Material Integration on a Chip"

M. Hirose (AIST, Japan)

"One Dimensional Electronics: Physics or Technology?"

M. Lundstrom (Purdue Univ., USA)

SCOPE OF CONFERENCE

The conference aims at providing a forum for synergistic interactions among research scientists and engineers working in the fields related to solid state devices and materials and encouraging them to discuss problems to be solved in these fields, new findings, new phenomena, and state-of-the-art technologies related to devices and materials. The conference also aims to facilitate mutual understanding among people in the device and material fields and those in the circuit, system and packaging fields. For the 2008 conference, thirteen program subcommittees have been organized in order to realize selection of higher quality papers and strengthen specific technology areas. The scope of each subcommittee is listed below.

Area 1

Advanced Gate Stack / Si Processing Science

(Chair: J. Yugami, Renesas Tech. Corp.)

This subcommittee covers all the innovative front-end-of-line process technologies and sciences for advanced silicon-based LSI devices. Not only the gate stack technology but all the new concepts on Si-based front-end process technologies are welcome. Papers are solicited in the following areas (but are not limited to these areas): (1) advanced gate stack technologies, such as a SiON gate insulator, high-k gate insulator, and metal gate technologies, including device integration technology; (2) front-end-of-line process technologies that break through the scaling limit, such as a low-temperature process, shallow junction formation, novel diffusion/oxidation, and high-precision etching; (3) reliability physics and analysis; and (4) characterization and modeling of a Si process.

Invited Speakers:
"Low Vt Metal-Gate/High-k CMOS from Understanding the Mechanism to Innovative Solution"
A. Chin (National Chiao Tung Univ., Taiwan)
"Stress-Induced Degradation of High-k/Metal Gate Stacks: Identifying "Weak Link" in the Multilayer Dielectric"
G. Bersuker (SEMATECH, USA)
"Material Engineering for High-k/Germanium MISFETs"
K. Kita (Univ. of Tokyo, Japan)
"Dopant and Potential Profiling with Atomic Resolution by Scanning Tunneling Microscopy"
T. Kanayama (MIRAI-ASRC and AIST, Japan)

Area 2

Characterization and Materials Engineering for Interconnect Integration

(Chair: Y. Hayashi, NEC Corp.)

Technologies and sciences that cover a Si back-end-of-line (BEOL) process are discussed, including package technology. Low-k materials have been in practical use; however, they brought new, difficult issues by scaling, especially in reliability and package areas. Innovations and new ideas are needed in the BEOL by introducing new materials with sophisticated characterization as well as novel BEOL process/structures with system integration points of view. Papers are solicited in the following areas: (1) characterization methodology for materials, mechanical and electrical properties in small geometry, metrology and yield improvement; (2) materials, process and packaging technologies for advanced Cu/Low-k interconnect; (3) reliability phenomena and physics, such as EM, SIV, TDDB, and modeling/prediction; (4) passive components for RF or High-speed operations; (5) new structures and materials on future interconnects, such as a 3-D structure, a CNT interconnect, an on-chip optical interconnect, and BEOL-based memory applications, i.e. MRAM, and PRAM.

Invited Speakers:
"High-Frequency Magnetic Shielding Technology for Electronic Devices"
M. Yamaguchi (Tohoku Univ., Japan)

"Aberration Corrected Microscopy and Spectroscopy for Pico-Meter Characterization of Device Materials"

K. Takayanagi (Tokyo Tech., Japn)

"Plasma Physics for Reducing PID in Nano-Structure Patternings"

T. Makabe (Keio Univ., Japan)

"Interconnect and Packaging Technology for CMOS Image Sensors"

J. Gambino (IBM, USA)

"Plastic Material Solutions for Advanced Thin Packages"

H. Tanaka (Sumitomo Bakelite Co., Ltd., Japan)

"Metal Resistivity in Narrow Interconnects Lines"

S. Maitrejean (CEA-LETI, France)

Area 3

CMOS Devices /Device Physics

(Chair: M. Hane, NEC Corp.)

The aim of this area is to discuss advanced silicon device technologies and physics. Papers are solicited in the following areas: (1) sub-100-nm silicon CMOS devices and their integration technologies; (2) performance enhancement technologies, such as a strained-silicon channel or any high-mobility channels; (3) post-bulk-planar silicon device structures, including planar SOI, FinFET, multi-channels, or nano-wires; (4) device physics of advanced CMOS, including simulation and modeling on carrier transport and reliability; and (5) manufacturing and yield science in conjunction with the increasing variability of device parameters, fluctuations of fabrication parameters or the intrinsic atomistic nature.

Invited Speakers:

"III-V CMOS: Challenges and Opportunities"

J. A. del Alamo (Massachusetts Inst. of Tech., USA)

"Simulation of Material and Strain Engineering of Tunneling Field Effect Transistor with Subthreshold Swing Below 60mV/dec"

G. S. Samudra (National Univ. of Singapore, Singapore)

"Recent Progress in Carbon Nanotube Electronics - Materials, Devices, Circuits, and Modeling"

H. S. Philip Wong (Stanford Univ., USA)

Area 4

Advanced Memory Technology

(Chair: A. Nitayama, Toshiba Corp.)

Advanced memory technologies are very much expected to explosively evolve SoC devices and digital information technologies toward ‘‘high speed and high density, broadband and mobile.’’ Papers are solicited in the area of all advanced volatile or nonvolatile memory devices, such as DRAM, flash (including SONOS and nanocrystal devices), FeRAM, MRAM, phase change RAM, resistance RAM, one time programming memory, 3-D memory, and others. Topics include cell device physics and characterization, process integration and materials, tunneling dielectrics, ferroelectric and ferromagnetic materials, reliability, failure analysis, quality assurance and testing, modeling and simulation, process control and yield enhancement, integrated circuits, new concept memories, and new applications and systems (solid state disks, memory cards, programmable logic, etc.).

Invited Speakers:

"Overview and Future Challenge of DRAM Technologies"
G. Jeong (Samsung Electronics Co., Ltd., Korea)

"Impact of Random Telegraph Noise (RTN) on Future Memory"
H. Miki (Hitachi, Ltd., Japan)

"Overview and Future Challenges of 3D Flash Technologies"
H. Aochi (Toshiba Corp., Japan)

"Overview and Future Challenges of Advanced Material for FeRAM"
H. Funakubo (Tokyo Tech., Japan)

"Current Development Status and Future Challenge of Spin Torque Transfer MRAM Technology"
K. Ito (Hitachi, Ltd., Japan)

"Interpretation of Resistive Switching in NiO Thin Films"
I. K. Yoo (Samsung Electronics Co., Ltd., Korea)

Area 5

Advanced Circuits and Systems

(Chair: S. Kawahito, Shizuoka Univ.)

Original papers bridging the gap between materials, devices, circuits, and systems in Si-ULSI, including SiGe, are solicited in subject areas that include, but not limited to the following; (1) advanced digital, analog, and mixed-signal circuits as well as memory; (2) high-speed and high-frequency circuits; (3) wireless, wireline, and optical communication circuits; (4) power devices and circuits as well as power management technology; (5) interconnection design for communication inside a chip as well as among chips; (6) technologies for systems on a chip (SoC) and system in a package (SiP); (7) LSI testing technology; (8) three-dimensional IC technology; (9) MEMS (passive) devices as well as circuits, RF MEMS; (10) sensor devices and circuits; (11) thin film transistors and circuits; and (12) organic devices and circuits.

Invited Speakers:
"Process and Circuit Technologies for MEMS Sensors"
K. Maenaka (Univ. of Hyogo, Japan)
"Low-Power Millimeter-Wave CMOS Pulse Transceiver"
M. Fujishima (Univ. of Tokyo, Japan)
"Nano CMOS Characterization and Device Modeling for Advanced Memory Design"
J. H. Lee (Kyungpook National Univ., Korea)
"The Dynamic-Range Enhancement Technologies for CMOS Image Sensors"
S. Sugawa (Tohoku Univ., Japan)
"Power Device Evolution Challenging to Silicon Material Limit"
A. Nakagawa (Toshiba Corp., Japan)
"Modeling of High Voltage MOSFETs for Device/Circuit Optimization"
M. Miura (Hiroshima Univ., Japan)

Area 6

Compound Semiconductor Circuits, Electron Devices and Device Physics

(Chair: T. Hashizume, Hokkaido Univ.)

This session covers all aspects of advanced electron device and IC technologies based on compound semiconductors, including III-V, III-N, SiC, and other materials. Papers are

solicited in the following areas: (1) FETs, HFETs, HBTs, and other novel device structures; (2) high-voltage or high-temperature electron devices and circuits; (3) microwave and millimeter-wave amplifiers, oscillators, switches, and other ICs; (4) high-speed digital ICs and mixed-signal ICs; (5) theory and physics of electron devices; (6) characterization techniques for devices and ICs; (7) innovative device processing and packaging; (8) reliability issues; and (9) novel applications utilizing compound semiconductor devices and circuits. Contributions related to other interesting topics are also welcome.

Invited Speakers:
"GaN on Silicon RF Devices: Current Status and Future Directions"
I. Kizilyalli (Nitronex Corp., USA)
"GaN HEMTs: Present Status and Future Prospect"
T. Kikkawa[1] and S. Nakajima[2]
([1]Fujitsu Labs. Ltd. and [2]Eudyna Devices Inc., Japan)
"Development of InP/GaAsSb Terahertz Bandwidth DHBTs"
C. R. Bolognesi (Swiss Federal Inst. of Tech., Switzerland)
"Failure Mechanisms of GaN-Based Transistors in On- and Off- State"
E. Zanoni (Univ. of Padova, Italy)

Area 7
Photonic Devices and Device Physics
(Chair: H. Yamada, Tohoku Univ.)

The scope of this subcommittee covers all aspects of emerging technologies in active, passive, and integrated optoelectronic and photonic devices as well as device physics, which include: (1) laser diodes, LEDs, photodetectors, SOAs, and OEICs; (2) quantum nanostructure optical devices including quantum wells, quantum wires, or quantum dots; (3) photonic crystal materials and novel functional devices; (4) optical switches, modulators, and MEMS; (5) optical wavelength converters, nonlinear optical devices, and all-optical switches; (6) waveguide components, PLCs and integrated photonic circuits; (7) material and device processing and

characterization techniques; (8) hybrid and monolithic integration, packaging and moduling; (9) optical communication, interconnection and signal processing applications of optoelectronic and photonic devices; (10)linear and nonlinear optical properties, electronic band structures, and the relaxation mechanism of quantum nanostructures; and (11) novel phenomena and applications including slow light, fast light, optical memory, and optoelectronic tweezers, etc.

Invited Speakers:
"Photonic/Electronic Integration for On-Chip Interconnects"
W. Green (IBM, USA)
"High-Performance InAs Quantum-Dot Lasers with Temperature-Stable Lasing Waevlength"
D. Mowbray (Univ. of Sheffield, UK)
"Hybrid AlGaInAs-Silicon Evanescent Racetrack Laser"
A. W. Fang (Univ. of California, Santa Barbara, USA)
"Recent Progress of Self-Organized Quantum Dots for Solar Cell Applications"
Y. Okada (Univ. of Tsukuba, Japan)

Area 8
Advanced Material Synthesis and Crystal Growth Technology

(Chair: A. Yamada, Tokyo Tech.)

The scope of this subcommittee covers all kinds of synthesis, growth, and fabrication techniques of not only semiconducting but also novel functional materials and structures, nitride compounds, CNT, nanowires and nanoparticles, etc. The principle idea is to enhance mutual communication among people in different committees to share knowledge of commonly important key technologies in fabrication processes. Specific scopes are, but not limited to, the following: (1) novel material systems and structures; (2) nitride-related compound semiconductors; (3) novel synthesis, growth, and fabrication techniques; (4) carbon nanotubes; (5) nanowires and nanoparticles; (6) microscale and nanoscale 3-D structures; (7) characterization of fundamental properties.

Invited Speakers:
"InAs/InP Quantum Dots, Dashes, and Ordered Arrays"
N. Sritirawisarn (Eindhoven Univ. of Tech., Netherlands)
"Metalorganic Vapor Phase Epitaxy of III-Mn-V Epitaxial Thin Films for Spintronics"
B. Wessels (Northwestern Univ., USA)
"Advanced Synthesis for Si and ZnO Nanowires and Their Applications"
D. L. Kwong, S. J. Lee, X. W. Sun, G. Q. Lo, J. D. Ye and S. T. Tam (IME, NTU and NUS, Singapore)
"Low Temperature Epitaxial Growth of Semiconductors on Metal Substrates"
H. Fujioka (Univ. of Tokyo, Japan)

Area 9

Physics and Applications of Novel Functional Materials and Devices

(Chair: T. Fujisawa, NTT Corp.)

This session covers physics, applications and fabrication techniques of novel functional devices and quantum nanostructures. We strongly encourage novel, pioneering, and fundamental research works that would be influential in various solid state devices of various materials (semiconductors, metals, superconductors, magnetic and organic materials, etc.). Specific topics are (1) quantum phenomena in nanostructures; (2) quantum dots and single-electron devices; (3) resonant tunneling devices, (4) solid-state quantum computing and communications; (5) nanometer-scale characterization with spanning probe techniques; (6) nanofabrication techniques and self-organized phenomena; and (7) other novel devices, but are not limited to these subjects.

Invited Speakers:
"Spin Blockade and Lifetime-Enhanced Transport in Si/SiGe Quantum Dots"
M. A. Eriksson (Univ. of Wisconsin-Madison, USA)
"Spin Transport in a Single InAs Quantum Dot Attached to Ferromagnetic Electrodes"
T. Machida (Univ. of Tokyo, Japan)
"Single Artificial Atom Lasing"
J. S. Tsai (NEC Corp., Japan)

"Nanowire Impact Ionization Transistors (I-FETs)"
Y. C. Yeo (National Univ. of Singapore, Singapore)

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Area 10
Organic Materials Science, Device Physics, and Applications

(Chair: T. Kamata, AIST)

This field covers organic materials, device physics, characterization, and applications to organic devices. Papers are solicited in the following areas (but are not limited to these areas): (1) organic transistors; (2) organic light emitting devices; (3) organic diodes, photodetectors, and photovoltaic devices; (4) chemical sensors and gas sensors; (5) molecular electronics; (6) fabrication and characterization of organic thin films; (7) electrical and optical properties of organic thin film and materials; (8) organic-inorganic hybrid systems; and (9) interfacial phenomena, LC devices, etc.

Invited Speakers:
"To be announced"
B. Batlogg (ETH Zurich, Switzerland)
"Recent Progress in Organic TFT for Active Matrix Display"
S. Lee (Samsung AIT, Korea)
"Material Studies for Organic FET"
T. Tsutsui (Kyushu Univ., Japan)
"A Novel Image Sensor with Organic Photoconductive Films"
S. Aihara (NHK, Japan)

Area 11
Micro/Nano Electromechanical and Bio-Systems (Devices)

(Chair: H. Tabata, Univ. of Tokyo)

This session focuses on micro/nano electromechanical systems(MEMS/NEMS) and their applications, such as biosensors. Bio-M/NEMS devices and bio-sensors are

widely applied to biochemical, medical, and environmental fields in which many devices are studied, such as biochips, micro-TAS, lab on a chip, etc. Interdisciplinary research of microelectronic devices with materials and technique in the chemical, biological, and medical fields is expected to open the door to new scientific and business fields. Papers are solicited in the following areas (but are not limited to these areas): (1) micro/nano electromechanical systems(M/NEMS) for RF, optical, power and biomaterial fields, and others; (2) micro-TAS and lab on a chip; (3) various biochips and sensors; (4) fabrication technologies and surface/interface modification techniques, such as SAM for micro-TAS and/or biochips; and (5) new integrated micro/nanosystems for biochemical and medical applications; (6) molecular imaging and spectroscopy for bio devices.

Invited Speakers:
"Compound Nanoimprint Processes and Their Applications for Functional Nanodevices"
J. Mizuno (Waseda Univ., Japan)
"Bio-Manipulation Based on Microfabricated Structures"
M. Washizu (Univ. of Tokyo, Japan)
"THz-Wave Generation and Applications"
K. Kawase[1,2], T. Shibuya[1,2] and K. Suizu[1]
([1]Nagoya Univ. and [2]RIKEN, Japan)
"FET-Based Biosensor for Detection of Biomolecules"
J. K. Shin (Kyungpook National Univ., Korea)

Area 12
Spintronic Materials and Devices
(Chair: M. Tanaka, Univ. of Tokyo)

This field covers spintronic materials (metals, semiconductors, insulators, hybrid structures, and nanostructures), spin-related phenomena, and device applications. Papers are solicited in the following areas (but are not limited to these areas): (1) ferromagnetic and/or half-metallic materials; (2) hybrid structures and nanostructures in which spin effects are apparent and important; (3) spin-dependent optical and transport phenomena; (4) spin dynamics; (5) spintronics devices

and systems including magnetic tunnel junctions and TMR devices, nonvolatile memory, magnetic sensors, spin-transistors, optical isolators, optical switches etc; (6) quantum information processing using spin states.

Invited Speakers:
"Beyond CMOS and Future Spin Devices"
G. Bourianoff (Intel Corp., USA)
"Spin Injection and Transport in Silicon"
B. T. Jonker (Naval Res. Lab., USA)
"Spin Dynamics and Microwave Related Devices"
H. Kubota (AIST, Japan)
"Magnetic Domain Wall Dynamics in GaMnAs"
F. Matsukura (Tohoku Univ., Japan)
"Spin Transport in III-V Ferromagnetic Semiconductor Heterostructures"
S. Ohya (Univ. of Tokyo, Japan)

Area 13

Applications of Nanotubes and Nanowires

(Chair: K. Matsumoto, Osaka Univ.)

All kinds of applications using nanotubes & nanowires are included in the scope of this sub-committee. Nanotubes & nanowires, e.g., carbon nanotube, BN nanotube, Si nanowire, compound semiconductor nanowire, layered nanowire, etc. are all included. Applications using nanotubes & nanowires in the scope are as follows; 1) Active electronic and optical devices, e.g., FET, HEMT, optical transistor, optical switch, and quantum devices including single electron transistor(SET), SET logics, resonant tunneling devices, quantum computing devices and so on. 2) All kinds of sensors, e.g., bio sensors, gas sensors, pressure sensors, acceleration sensors and so on. 3) Application for passive elements, e.g., wiring & via technology for future LSI and so on. 4) Nanomechanical application, e.g., probe applications for STM/AFM, tweezers, motors, oscillators and so on. 5) Fundamental research related to those applications of nanotube & nanowire, e.g., new growth technology, analysis of growth mechanism, new device fabrication process and so on. 6) New evaluation technology, e.g., TEM, SEM, Raman

scattering, photo luminescence and so on. 7) Theoretical analysis of device physics, new physics in the nanotube & nanowire, e.g., Tomonaga liquid, one dimensional quantum transport and so on.

Invited Speakers:

"Tunable Few Electron Double Dots in InAs Nanowires"

I. Shorubalko, A. Pfund, R Leturcq and K. Ensslin

(ETH, Switzerland)

"Si/SeGe Nanowire Technology Platforms and Device Applications Based on Top-Down Approach"

G. Q. Lo, N. Singh, K. B. Buddaharaju, J. Yu, J. Fu, S. C. Rustagi, N. Balasubramanian and D. L. Kwong

(IME, Singapore)