2018 IEDM Conference Theme

Device Breakthroughs from Quantum to 5G and Beyond

Topics

IEDM encourages submissions in all areas (details in next page) with special emphasis on:

- Neuromorphic computing / AI
- Quantum computing devices and links
- Devices for RF, 5G, THz and mm-wave
- Advanced memory technologies
- More than Moore devices and integrations
- Technologies for advanced logic nodes
- Non-charge-based devices and systems
- Sensors and MEMS devices
- Package-device level interactions
- Electron device simulation and modeling
- Advanced characterization, reliability and noise
- Optoelectronics, displays and imaging systems

Meeting Highlights

- Three plenary presentations by prominent experts
- Special focus sessions covering topics in:
  - 5G and beyond
  - Interconnects beyond Cu
  - Quantum Computing
  - Wide Bandgap Devices
- Talk show style evening panel discussions
- Six tutorial sessions on Saturday afternoon, December 1st
- Two short courses will be held on Sunday, December 2nd
- Exhibits on December 3rd – 5th

For More Information

IEDM Online: ieee-iedm.org
Social Networks: ieee-iedm.org/social-media
Papers in the Following Areas Are Requested

CIRCUIT and DEVICE INTERACTION (CDI): Papers are solicited in the areas of CMOS platform technology, circuit design challenges at advanced nodes, and device technology co-optimization solutions. Platform technologies include beyond Si channel such as SiGe/Ge, and advanced device technologies such as Gate-all-around Nanowire and Stacked Nanosheet CMOS technologies are of strong interest. Topics also include digital and analog device and circuit performance and scaling issues, power-performance-area analysis, and advanced nodes. Submission of papers discussing interactions between advanced device technology and design issues such as variability, aging, power constraints, physical layout effects and design is encouraged. Papers addressing stacked and monolithic 3D integration addressing interconnect bottleneck and design challenges are solicited. Emerging circuit design and technology concepts supporting new computing models such as processing-in-memory, machine learning acceleration, neuromorphic computing, and other non-von Neumann computing approaches are of interest.

CHARACTERIZATION, RELIABILITY and YIELD (CRY): Papers are solicited in all areas of electrical and physical characterization, reliability evaluation and yield analysis of transistors, interconnects and circuits. Specific reliability topics include, for FEOL: transistor degradation due to hot carriers and bias temperature instabilities; dielectric wear-out and breakdown; self-heating effects; process charging damage; layout and ESD; soft error mechanisms in logic and memories and error correction techniques; noise and mismatch behavior. For BEOL topics include: electromigration, failure of contacts, intermetallics, intermetallics; failure mechanisms and reliability of interconnects; reliability models and benchmarking; interconnect failure mechanisms and reliability; thermal management; chip-package interaction. Of particular interest are investigations of degradation mechanisms for: resistive devices; emerging memories; III-V power devices, and More-than-Moore applications. Also solicited are papers discussing variability / reliability interactions and failure analysis techniques.

COMPOUND SEMICONDUCTOR AND HIGH SPEED DEVICES (CHS): Papers are solicited in the areas of compound semiconductor electronic devices and high-speed device technologies based on GaAs, InGaAs, InP, GaN, InAlN, Si, SiGe, Antimonides and their related alloys. Devices of interest include III-V MOSFETs, ballistic devices, HBTs (III-V and group IV) and HEMTs, RF/microwave/millimeter-wave/THz devices, SAW/BAW devices, low noise amplifiers, RF power amplifiers, RF and millimeter-wave switches and filters, and active and passive electronic devices for analog applications. Topics include device physics, design, modeling, reliability and manufacturing processes.

MEMORY TECHNOLOGY (MT): Papers are solicited covering all memory technology topics, including storage-class and embedded memories, as well as in-memory and neuromorphic computing architectures. Topics span from novel cell concepts to fully integrated prototypes, from prototyping to manufacturing issues and performance. Specific areas of interest include both conventional and novel memory technologies including ReRAM, STT-MRAM, PCRAM, FeRAM, 3D NAND, crosspoint and selectors, organic memory, and NEMS-based devices. Contributions include: fundamental understanding and modeling; novel concept exploration of dielectric and metallic, spin, magnetic, mechanical stress-related mechanisms; thermal management; chip-package interaction. Of particular interest are novel approaches to degradation mechanisms for: resistive devices; emerging memories; III-V power devices, and More-than-Moore applications. Also solicited are papers discussing variability / reliability interactions and failure analysis techniques.

MODELLING and SIMULATION (MS): Papers are solicited in the areas of analytical, numerical, and statistical approaches to model electronic, optical, hybrid devices including sensors, and their isolation and interconnects. Topics include physical and compact models for logic and memory devices (e.g. steep-slope devices, RRAM, CBROM) and interconnects, modeling and emulation of fabrication processes and equipment, material modeling, parameter extraction, compact models for advanced technologies and novel devices, performance evaluation, reliability, variability, and benchmarking methodologies. Other topics include novel computing approaches (e.g. neuromorphic computing) and modeling of interactions between process, device, circuit, and packaging. Submissions should advance the art of modeling and simulation or apply existing techniques to gain new device insights.

NANO DEVICE TECHNOLOGY (NDT): Papers are solicited on novel or emerging solid state nanoelectronic devices and concepts. This includes devices based on novel transport mechanisms such as tunnel FETs, negative capacitance FETs, topological insulators, phase transitions, quantum effects, and non-von Neumann devices. Non-charge-based logics, magnetic logic, spintronics, plasmonics and quantum computing are also of interest. Furthermore, nanoelectronic devices based on low-dimensional systems are encouraged, including 2D materials, nanowires, nanotubes and quantum dots. Subsets of key topics include electron device physics, new device applications, technology scaling and integration issues, as well as innovative transistor structures. Papers in NDT focus primarily on device physics and unique concepts; more mature “platform candidate” papers should be submitted to CDI.

OPTOELECTRONICS, DISPLAYS, and IMAGERS (ODI): Papers are solicited on devices, structures, and integration for optoelectronic, displays, and imaging systems. Optoelectronics include photonic bandgap structures, light sources, polarization and wavelength manipulators, high speed photodetectors, as well as large scale heterogeneous integration of electronic and photonic circuits and optical interconnects. Papers on quantum photons for computation, sensing and encryption are also of interest. Displays and imagers include OLEDs, QLEDs, IGZO, and organic imaging devices, as well as emissive and reflective displays. Papers addressing flexible and/or stretchable electronics, printed electronics, stacked image sensors with Si or other photosensitive materials, organic and inorganic displays, and covering new technology trends in imagers and displays are encouraged.

POWER DEVICES (PD): Papers are solicited on discrete and integrated power devices and modules using Si, diamond, and compound semiconductors. Papers exploring the system-level impact of power devices are also of interest. Topics of interest include power devices (FETs, superjunction devices, IGBTs, etc.), and materials (Si, SiC, GaN, Diamond, GaAs, AlN, GaO3, etc.), integrated passives (high Q inductors), manufacturing processes, device design, modeling, physics, and reliability. Devices targeting the full range of power and power conversion applications, including hybrid and electric vehicles, power supplies for computer and telecom and data centers, motor drives, utility and grid control, and wireless power transfer, are of interest besides fundamental studies on doping, interface state densities and device reliability for power switches.

PROCESS and MANUFACTURING TECHNOLOGY (PMT): Papers are requested on innovations in individual process modules, process integration schemes and process control techniques that improve device or circuit performance or enable new functionality. Examples of process topics include substrate and isolation technologies; integration of heterogeneous channel materials; EUV lithography, deposition, etch and self-assembly techniques; novel dielectrics and metal electrodes for transistor gate stacks; shallow junctions; advanced metals, barriers and dielectrics for interconnections; contact and via processes; integration considerations for multi-level interconnects and for enhanced scaling techniques; additive manufacturing for microelectronics and emerging process modules. Further requested topics include photonics, 3D and advanced packaging integration; BEOL compatible transistors and memory devices. Examples of process control topics include defect detection as well as novel techniques for variability reduction and for enhancing process control and stability.

SENSORS, MEMS, and BioMEMS (SMB): Papers are solicited in the area of sensors, micro/nano-electromechanical systems (MEMS and NEMS), microfluidics and BioMEMS, with particular emphasis on new device concepts, integrated implementations, CMOS co-integration, flexible and multi-sensors on a chip for wearable and IoT applications. Sensors area includes chemical, molecular and biological detection based on electrical, electrochemical, mechanical and optical principles. Topics of interest in the MEMS area include actuators, physical sensors, resonators, integrated inertial measurement units, RF MEMS, micro-optical and optomechanical devices, micro power generators, devices for energy harvesting and on-chip energy storage as well as micro/nanofluidics for thermal management. BioMEMS area covers organic-inorganic hybrid devices, bio-electronic interface, integrated biomedical sensing and implantable MEMS.
Papers must be submitted electronically. Deadline for submission of papers is August 1st, 2018. PRIOR to preparing your paper for electronic submission, please read the paper preparation and submission guidelines below. A paper template and sample paper are available on the website at: ieee-iedm.org/preparation-of-papers

Papers Must Clearly State
- The purpose of the work
- The manner and degree to which it advances the art
- Specific new results that have been obtained and their significance

The degree to which the paper deals with these issues will strongly affect whether the paper is accepted. The most common cause of rejection of submitted papers is a lack of specific results. Only work that has not been previously published at the time of the conference will be considered. Paper acceptance will be based solely on the information provided on the four page paper submitted. Promises of upcoming results will be ignored.

Electronic Submission
Only electronic submissions will be accepted. Do not email files or mail hard copies to the conference office. In order for your paper to receive a full review, the following information MUST be entered on the website along with your submission:
- Title of paper
- Name, complete mailing address and phone, and email of first author
- Names, affiliations, city, state, country of additional authors
- Person to whom correspondence should be sent, if other than the first author
- Identification as invited or student paper and student travel request, if applicable
- Suggested area (as listed in this announcement) into which the paper fits
- 50 word abstract

Papers Must Include
- Title of paper
- Name, complete mailing address, phone, and email of first author and name, affiliation, city, state and country of additional authors
- Up to two pages of text and up to two additional pages of figures and drawings (no text, captions only) in 8-1/2” x 11” format describing the planned 20-minute paper and emphasizing the findings. The font size for the body of the text and in figures and captions must be at least 10 point.
- Excessive photo reduction of figures and poor legibility will negatively impact acceptance
- Papers with more than 2 pages of text or figures shall be grounds for immediate rejection
- Please avoid the use of special international fonts

50 Word Web Page Abstract
This abstract is a brief synopsis (50 words) of your paper. Accepted 50-word abstracts will be used in preparing the IEDM web pages. The abstract should be prepared and inserted into the appropriate text box marked Summary for the 50-word abstract on the submission web site. DO NOT INCLUDE the 50-word abstract as a separate page with your submission.

For questions contact the conference office:
Phyllis Mahoney
IEDM, 19803 Laurel Valley Place
Montgomery Village, MD 20886 USA
Tel: 301/527-0900 ext. 2
Email: info@ieee-iedm.org

Notification of Acceptance
Authors of accepted papers will be notified by the end of September. The accepted paper will be published as-is in the Technical Digest of the 2018 IEDM. Publication in the digest in no way precludes later publication of a fuller account of the work in another journal, but NO PUBLICATION is acceptable before the conference. The paper must be presented at the conference by one of the listed authors.
Student Presentation of Papers Encouraged

Papers presented by students and based on their own work will be considered for the Best Student Paper Award. The paper must be identified as a student paper at the time of submission. The award is based on both the paper and the presentation which must be given by the student. The award will be announced and presented at the 2019 IEDM.

Student Speaker Financial and Travel Assistance

Financial assistance for travel and registration is available to students presenting papers. This applies also for overseas students. Assistance must be requested when the paper is submitted by choosing this option on the submission website (under "Type"). Further information on travel assistance will be included in the student’s author kit. Late News Papers are not eligible for travel assistance or the student paper award.

Pre-Conference Publicity

The accepted 4-page papers and supporting information will be used by IEDM for publicity and portions of these papers may be quoted in pre-conference magazine articles and also via the Web. If this is not acceptable, authors must indicate this on the web site when submitting the papers for review. Questions regarding pre-conference publicity should be addressed to the conference public relations manager, Chris Burke at (email: cburke@btbmarketing.com and tel. 1-919-872-8172).

Agreement Not to Pre-Publish

Submission of a paper for review and subsequent acceptance is considered by the committee as an agreement that the work will not be placed in the public domain by the author prior to the conference. Accepted papers or significant portions of the work may not be placed in the public domain (conference with or without proceedings) prior to the conference. Violation will be grounds for automatic withdrawal of the paper by the conference committee.

Late News Papers

Deadline for receipt of papers is September 10th, 2018.

A very limited number of Late News Papers will be accepted. Late News Papers are not eligible for travel assistance or the student paper award.

Authors are asked to submit late news papers announcing only very recent developments. Papers should be in the same format as a regular paper and should be submitted through the submission web site in the same way as for regular submissions. Authors of accepted papers will be notified by the end of September.

For Further Information

All questions or inquiries for further information regarding this meeting should be directed to the Conference Office at:

19803 Laurel Valley Place
Montgomery Village, MD 20886 USA
Tel: 301-527-0900, ext. 2
Fax: 301-527-0994
Email: info@ieee-iedm.org

Local European Contact
Jan Hoentschel,
GlobalFoundries

Local Asian Contact
Su Jin Ahn
Samsung

2018 Conference Chair
Ken Rim
Qualcomm

Technical Program Chair
Mariko Takayanagi
Toshiba