

Call For Papers



IEEE
Advancing Technology
for Humanity

11th - 14th
DECEMBER
2022

6th International Conference on Emerging Electronics

Bangalore, India



Hilton Bangalore, Embassy Manyata Business Park

Welcome to the 6th edition of IEEE's flagship electron devices and circuits conference (IEEE-ICEE), which is being organized in-person at Hilton Bangalore. We invite papers on a diverse and comprehensive range of topics that span materials, processes, devices, circuits, systems, modelling, and reliability. The exciting technical program is curated by an international team of academic and industry leaders. This edition of ICEE is especially important, given the ambitions of major economies around the world (such as USA, EU, India, etc.) in semiconductor manufacturing. This focus is reflected in the composition of ICEE's technical program and organizing committee, with top industry leaders on board. See website for more details.

Conference Highlights

- 3 Plenary Talks
- 5 Keynote Talks
- 300+ Invited Talks
- 120+ Platform/Oral Talks
- 100+ Posters
- 40% Industry Participation
- 1000+ International Audience
- 8 Tutorial Sessions
- 8 Evening Industry Sessions
- 8 Evening Rump Sessions
- Job Fair by Leading Industries
- Policy and Panel Discussions
- Industry Exhibits

Key Dates

- July 7th : Call for Papers
- Sep. 7th : Submission Deadline
- Oct. 7th : Acceptance Notification
- Oct. 25th : Speaker Registration

Materials, Process & Device Technologies

- Advanced Logic Technologies (ALT)
- Advanced Memory Technologies (AMT)
- Neuromorphic Device Technology, Circuits and Systems (NDTCS)
- 2D Material Based Technologies (2DT)
- Other Emerging Devices & Compute Technology (EDCT)
- Quantum Device Technologies (QDT)
- Solar Cells & Photodetectors: Physics, Device, & Modules (SP)
- LED & semiconductor Lasers: Device, Physics & Modules (LL)
- Macro-electronics & Displays: Devices, Circuits & Systems (DIS)
- Integrated Photonics & Fibre Lasers (IPFL)
- Sensors and Bio-Electronics (SBE)
- MEMS/NEMS and Heterogeneously Integrated Devices (NEMS)
- Advanced Power Device Technology (APDT)
- Wide Bandgap Power Semiconductor Technologies (WPSD)
- Energy Storage and Batteries (ESB)

Circuits and Systems

- Quantum Control & Cryogenic Electronics (QCCE)
- Neuromorphic Device Technology, Circuits and Systems (NDTCS)
- RF, Millimetre and THz Technologies, Circuits and Systems (RF-THz)
- Wide Bandgap Device Based Circuits and Systems (WDSCS)
- ULSI Circuits/System-on-Chip/Power SoC (SoC)

Modeling, Simulation & Reliability

- Reliability Physics of Semiconductor Devices (RPSD)
- Electrostatic Discharge Reliability (ESD)
- Modelling and Simulations (MS)

General Chair: Prof. Mayank Shrivastava (IISc Bangalore)
Technical Chair: Prof. Sushobhan Avasthi (IISc Bangalore)

Web: <https://ieee-icee.org/>
E-mail: icee.ieee@iisc.ac.in

Papers are Solicited in the Following Areas

ADVANCED LOGIC TECHNOLOGY (ALT): Papers are solicited in the areas of CMOS platform technologies & opportunities; Logic device performance and circuit design challenges; Advanced, novel process integration schemes and (applications-driven) scaling approaches; Process module innovations and progresses in process control & process metrology; Device technology co-optimization; New or Trending Areas; SiGe channels, GAA (vertically stacked) nanowires and nanosheets based devices and circuits; monolithic 3D integration, 2.5/3D integration; Interconnects (TSV, BEOL, Frontside and Backside connectivity) and BEOL compatible transistors.

ADVANCED MEMORY TECHNOLOGIES (AMT): Papers are solicited in the areas of Conventional memories; Emerging memories; 3D memory technologies; Computing-in-memory; New or Trending Areas; Emerging memories for neural networks; Memory-enabled artificial intelligence applications; Memory for bio-inspired computing; System-technology co-optimization; New Memory hierarchy.

NEUROMORPHIC DEVICE TECHNOLOGY, CIRCUITS AND SYSTEMS (NDTCS): Papers are solicited on Resistive RAMs using metal Oxides (and materials other than 2D TMDs); analog memories, analog and digital implementations of neurons, device, circuit, and architecture approaches to enhance bio-mimetic features; device-system integration; advances in neuromorphic hardware approaches; novel architectures; etc.

2D MATERIAL BASED TECHNOLOGIES (2DT): Papers are solicited in the areas related to Growth related issues, heterostructures, 2D Electronics, 2D Optoelectronics, Sensing Devices, Neuromorphic Devices, 2D Quantum Devices, Other Fundamental engineering, technological and scientific topics related to 2D materials, etc.

OTHER EMERGING DEVICES & COMPUTE TECHNOLOGY (EDCT): Papers are solicited in the areas of Spintronic and magnetic devices; Steep-slope devices; Topological materials and devices; phase transitions transistors; Emerging state machines; Continuous time dynamical systems; Novel LT/Cryogenic Devices.

QUANTUM DEVICE TECHNOLOGIES (QDT): Papers are solicited on Superconducting Qubit technologies; Semiconductor Qubits (SiGe, Graphene, etc.); Superconductivity; Single Photon Detectors, Single Photon Emitters; Quantum Photonics, On-chip Photonics; other quantum devices and quantum enhanced technologies, etc.

QUANTUM CONTROL & CRYOGENIC ELECTRONICS (QCCE): Papers are solicited in the areas of On chip Control electronics for Quantum Computing; FPGA implementation of Quantum control electronics, Cryogenic RF devices; Cryogenic RF modules, analog and RF front ends, Cryogenic digital processors and controls; Quantum device and Cryogenic electronics integration strategies; thermal management at Cryogenic temperatures; ultra-low power circuit design for on chip Cryogenic quantum control electronics, etc.

RF, MILLIMETER AND THZ TECHNOLOGIES, CIRCUITS AND SYSTEMS (RF-THz): Papers are solicited on High Performance III-V, III-Nitride and SiGe devices for mm-wave to THz applications; Power device technologies for micro and mm-wave; mm-wave and THz analog front ends, PAs, LNAs and mixers; RF energy harvesting devices and circuits; Packaging of high-frequency devices; Tunable high-Q passives for mmW applications, SAW/BAW devices, device and circuits for 6G applications; onchip antenna arrays and beam forming for mmW and THz applications.

SOLAR CELLS & PHOTODETECTORS: PHYSICS, DEVICE, & MODULES (SP): Papers are solicited in all areas of Materials for solar cells, and photodetectors, including Si, III-V, III-N, quantum dots, and hybrid perovskites; Defects; Integration with novel functional substrates; semi-transparent solar cells; tandem solar cells; Functional solar cells like agrivoltaics & building integrated photovoltaics; Photo-physics and advanced characterization; Reliability and packaging of devices; hyperspectral detectors; detectors with unconventional spectral bandwidth, high sensitivity, or high time-resolution; uncooled IR detectors; Topological optoelectronics and photonics; Scale-up; module design and manufacturing; recycling or disposal of solar modules; field studies of solar panels.

LED & SEMICONDUCTOR LASERS: DEVICE, PHYSICS & MODULES (LL): Papers are solicited in the areas of Materials for emission including, III-V, III-N, quantum dots, organics semiconductors, and hybrid perovskites; defects and fundamental physics; single-photon emitters; semiconductor lasers; printable LED; large-area LED; high-power LED; multi-band emitters; emitters in unconventional wavelengths like UV and IR; new designs for FPA.

MACROELECTRONICS & DISPLAYS: DEVICES, CIRCUITS & SYSTEMS (DIS): Papers are solicited in the areas of Large-area electronics; Flexible electronics; Printable electronics; Wearable electronics; Hybrid organic/inorganic microfabrication and devices; Printing for high-resolution or large-area; Flexible displays; devices and circuits for active and passive display drivers; ultra-high resolution displays; low-power displays; Displays and imagers for augmented or virtual reality; Holographic devices and displays; Displays with unconventional form or size; Imagers with new materials or flexible platform and printed electronics; Intelligent Image Sensors; In-display Sensors; Scale-up

INTEGRATED PHOTONICS & FIBRE LASERS (IPFL): Papers are solicited in the areas of All types of heterogeneous integrated optoelectronics including sources, modulators or detectors; Optoelectronic integration for neuromorphic computing; SiNx platform; Non-telecom integrated photonics e.g. mid-IR or visible; Fibre lasers and modules with high-power, unconventional wavelengths, or new physics.



Papers are Solicited in the Following Areas

SENSORS AND BIO-ELECTRONICS (SBE): Papers are solicited on Sensors includes chemical, molecular and biological detection based on acoustic, electrical, electrochemical, magnetic, mechanical and optical principles; sensors for environmental monitoring e.g. agri-sensors and gas-sensors; sensors for process monitoring; Physical and biochemical integrated sensors; Multi-sensors on a chip for wearable and IoT applications; sensors integrated with energy harvesting; Bio-electronic interfaces and implantable devices; Intelligent sensors with embedded AI; point-of-care biomedical devices; integrated biomedical sensing and implantable neural interfaces; Sensors and devices for human-machine interface; Sensors and motors for haptics.

MEMS/NEMS AND HETEROGENEOUSLY INTEGRATED DEVICES (NEMS): Micro/nano electromechanical systems (MEMS and NEMS), MEMS for Internet of Things; Microfluidics and BioMEMS (organic-inorganic hybrid devices), CMOS-on-MEMS; MEMs Actuators, resonators and integrated inertial measurement units; TFTs, RF MEMS; micro-optical and optomechanical devices; micro-power generators; MEMs devices for energy harvesting as well as on-chip energy storage.

ADVANCED POWER DEVICE TECHNOLOGY (APDT): Papers are solicited in the areas of High voltage silicon based discrete devices ($>200V$) such as super junction MOSFETs, IGBTs, thyristors, GTOs and pn-diodes; Low voltage silicon based discrete power devices ($\leq 200V$) and power devices for power ICs of all voltage ranges; Other power devices, modules and systems; System-level impact of power devices; manufacturing processes, device design, modeling, physics, and reliability of power devices; Fundamental studies on doping, traps, interface states and device reliability for power switching devices; Power device for applications for automotive and aviation to smart grid; Power devices or circuits and its reliability.

WIDE BANDGAP POWER SEMICONDUCTOR TECHNOLOGIES (WPSD): Papers are solicited on Wide bandgap and ultra-wide bandgap semiconductors; GaN and compound materials (e.g. AlN, Ga₂O₃, GaAs) based power devices, technology and integration; materials and processing issues; Lateral heterojunction devices; Vertical GaN transistors and diodes; AlN based power devices; Special circuits and application for GaN and nitride based power devices; GaN and nitride based power IC technology; Reliability physics and failure analysis of GaN based power devices; New process integration for GaN power IC; Related simulation or measurement technology; SiC and other material (e.g. Ga₂O₃, diamond) based power devices, technology and integration; materials and processing issues, device design, novel device architectures, device reliability, etc.

RELIABILITY PHYSICS OF SEMICONDUCTOR DEVICES (RPSD): Reliability of FEOL/MEOL/BEOL, Design for reliability and variability-aware design, variability in advance and emerging device technologies; Robustness and security of electronic circuits and systems; Reliability of devices and systems for biomedical, automotive and aerospace; Reliable systems with unreliable devices; Reliability of cryogenic devices for future quantum computing applications; Noise characterization; Degradation mechanisms of emerging memories; Reliability of devices, circuits and systems for more-than-Moore; Reliability of biomedical devices, circuits and systems; Reliability of automotive and aerospace devices circuits and systems.

ELECTROSTATIC DISCHARGE (ESD) RELIABILITY (ESD): Papers are solicited on ESD reliability in advanced CMOS and beyond CMOS technology nodes, ESD behaviour of emerging technologies; ESD device physics; latch-up issues in advanced CMOS nodes; ESD issues and protection methodology in GaN based circuits/systems; ESD behaviour and physics in 2D materials; ESD device modelling approaches; Full chip verification methodology; System level ESD and SEED.

MODELLING AND SIMULATIONS (MS): Technology CAD and benchmarking for novel/emerging technologies; atomistic process and device simulations; Compact models for emerging/novel devices (supported by experiments); Modelling of alternative computing devices; material and interconnect modeling; advanced packaging and 3D integration modeling; device modeling for photonic, quantum, neuromorphic devices; modeling of power and RF devices; fundamental and physical insights into fundamental processes or technological showstoppers in different device types, etc.

WIDE BANDGAP DEVICE BASED CIRCUITS AND SYSTEMS (WDCS): Power electronic systems based on Wide bandgap devices, system level reliability issues in WBG power electronic systems; Gate driver IC design including WBG power device applications; Circuit design for SiC and GaN based IC; New circuit and layout design enhancing power IC performance; Single chip inverters and converters; New signal isolation technology on power IC such as magnetic coupling.

ULSI CIRCUITS/SYSTEM-ON-CHIP/POWER SoC (SoC): Analog and mixed signal design in advanced nodes; High speed interfaces; mmW Circuits in Si technology nodes; Radar on Chip; AI accelerators, edge computing, on-chip power management circuits; automotive chip modules; ultra-low power and low noise circuits; on-chip RF amplifiers for 5G applications; SoC challenges in sub-7nm CMOS nodes; RF design challenges in sub-7nm nodes; high-voltage design challenges in sub-7nm nodes; new chip architectures; chip package co-design; Power IC, Power SoC, and Automotive Chip modules, etc.

ENERGY STORAGE AND BATTERIES (ESB): Papers are solicited in the areas of Materials and physics for electrode and electrolytes used in batteries including metal-oxides, nitrides, polymers, hybrid perovskites; advanced characterization; Reliability; photo-rechargeable batteries; batteries for niche application like grid-storage, electric vehicles and IoT; Novel chemistries like flow battery, earth-abundant elements and Na-ion battery; polymer batteries; device-integrated batteries; ultra-capacitors; scale-up and integration challenges.



Preparation of Abstract

Abstract must be submitted electronically in IEEE Xplore-compatible pdf format. The deadline for submission of papers is September 7th, 2022. Before preparing your paper/abstract for submission, please read the paper/abstract preparation and submission guidelines below and on the website. A paper template is available at the conference website: <https://iee-icee.org/call-for-papers/>

Your Abstract/Paper Must Clearly State

- The purpose of your work
- The manner and degree to which it advances the state-of-the-art justified by prior-art references
- Explanation of new results and findings and their significance while clearly stating experimental and computational conditions

The degree to which your abstract/paper deals with these issues will strongly affect whether the paper is accepted. The most common cause of rejection of submitted papers can be lack of specific results or clear explanation. 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 abstract submitted. Promises of upcoming results will be ignored. All submissions will be checked for plagiarism.

Electronic Submission

Only electronic submissions through the paper submission system (EDAS) linked to the conference website will be accepted. Please do not email abstract files to the conference office or conference chairs. In order for your abstract/paper to receive a full review, the following information MUST be entered on the website along with your submission:

- Title of your final 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 regular or student paper
- Suggested track (from the list of ICEE tracks) into which the paper fits
- 50-word abstract for abstract booklet

Notification of Acceptance

Authors of accepted papers will be notified by Oct. 7th 2022. The accepted abstracts will be published after some revisions (based on reviewer remarks) in IEEE Xplore. However, authors will have option to not have their paper published in IEEE Xplore Proceedings. In any case for getting your work accepted for platform presentation or poster presentation, high quality abstract submission is a must. The paper must be presented at the conference by one of the listed authors. For every paper / poster, a unique registration is mandatory.

4 Page Abstract/Paper Must Include

- Title of your final 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 other than captions) in 8-1/2" x 11" format describing the planned 15-minute presentation. The font size for the body of the text and in figures/captions must be 10 points and 9 points, respectively, in Times New Roman font.
- Excessive figure size reduction and poor presentation will negatively impact acceptance
- Abstract with more than 2 pages of text or figures shall negatively impact acceptance
- Please avoid the use of special international fonts

Student Presentation of Papers Encouraged

Papers presented by students, which are 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 2022 IEEE ICEE.

Student Speaker Financial and Travel Assistance

There is no financial assistance except a significantly subsidized registration fees.

