



## 1<sup>st</sup> CALL FOR PAPERS

**IPFA 2021** is devoted to the fundamental understanding of the electrical and physical characterization techniques and associated technologies that assist in probing the nature of wear-out and failure in conventional and new CMOS devices. This will, in turn, result in improved know-how of the physics of device / circuit / module failure that serves as a critical input for future design for reliability. The Technical Program Committee is inviting papers related, but not limited to, the following areas:

**Product Test and Diagnostics:** Embedded BIST and DFT test and diagnosis, Reliability testing, Silicon failure debug on test and yield engineering methodologies, Yield analysis and optimization, Defect-oriented testing, Protocol-aware testing, Test-to-Design Feedback, Mixed signal and analog tests.

**Sample Preparation, Metrology and Defect Characterization:** Device de-processing, Ion beam / TEM sample preparation, Metrology, Defect inspection, Test chips.

**Case Studies on Fault Isolation:** Die / Board / System-level electrical FA, Electrical characterization and nanoprobng.

**Case Studies on Physical Failure Analysis:** Die / Board / System-level physical FA, Design for manufacturing, Construction Analysis, Reverse engineering.

**Package-Level Failure Analysis:** 2.xD/3D/SiP Package FA, Magnetic/acoustic applications, 2.xD/3D X-ray, Lock-in thermography, FTIR, Non-destructive failure analysis, Workflows.

**Advanced Electrical Fault Isolation Techniques:** Advanced methodologies in photon and laser-based microscopy techniques, Dynamic techniques, Acoustic microscopy, Magnetic imaging, Nanoprobng, AFP, EBAC/EBIC.

**Advanced Physical Failure Analysis Techniques:** Advanced methodologies in PFA, Advanced optical/Ion beam approaches, Plasma/Laser FIB, Spectroscopy (EDX/EELS) techniques, Scanning probe microscopy, Circuit-edits, De-layering recipes and innovations, Tomography.

**ESD, Latchup and Reliability for Space Applications:** Component and system level ESD design: modeling and simulation, Neutron and alpha particle single event radiation, Multi-bit SER/SEU.

**(SPECIAL AI SESSION) Emerging Topics in Failure Analysis and Reliability:** New FA Techniques, FA for hardware security, Artificial intelligence (AI) for FA – fault detection, Visual / image analytics, Pattern recognition, Machine learning for prognosis and reliability. Exploring reliability assessment and quantification for new applications – neuromorphic devices, PUF circuits etc.

**Photonic Devices (Display, Lighting and Photovoltaic) Reliability and Failure Analysis:** Degradation studies on display modules, LED, Solar cells made of silicon, CdTe, CIGS, organic materials, multi-junction, perovskite etc., Infrared photodetectors, Waveguides.

**Transistor and NVM Reliability:** Gate oxide/High-k reliability, PBTI/NBTI, Hot carrier, Random telegraph noise and single dopant effects, Self Heating in sub-10 nm CMOS, GAA FET / RFSOI/HBM/stack DRAM device reliability, Process and stress-induced reliability issues and variability, Non-volatile memory reliability – retention, endurance and read disturb in PCRAM, RRAM, STT-MRAM, Reliability of ferroelectric devices.

**Interconnect and Packaging Reliability:** TDDB dielectrics, Electromigration, stress migration, cracking, corrosion, and fatigue in bond pads, Reliability of 3DIC/ TSV/ MEMS, Heterogeneous Integration in SiP, Thermo-mechanical stress, Power dissipation issues, Wafer warpage, Wire bonding, Die attach and encapsulation issues, Wafer bonding technology, yield & reliability.

**High Power Electronics / Wide Bandgap Device Reliability & Failure Analysis:** Reliability of devices based on GaAs, GaN, SiC and Ga<sub>2</sub>O<sub>3</sub> systems, Trap-related degradation, Materials-related defect characterization, Process variability, III-V/Si integration.

**2D Materials and Devices Reliability & Failure Analysis:** Tunnel FETs, Transistors with 2D materials (Graphene, MoS<sub>2</sub>, WSe<sub>2</sub>, h-BN), Ferroelectric and negative capacitance FETs, Quantum computing, Spintronics.

**Abstract Submission Deadline : 1 MAR 2021**

**Notification of Abstract Acceptance: 30 APRIL 2021**

- Submission format: Extended abstract (**minimum 2 pages**, including text and figures) of your original research work. Abstract submission at <https://www.softconf.com/ipfa2021/>. Template and other information are available at <http://www.ipfa-ieee.org/>
- High quality papers presented at IPFA 2021 will be invited to submit an extended version of their work for the **Special Issue of Microelectronics Reliability journal (Elsevier)**, expected to be published in early 2022, or as articles in **EDFA magazine**.

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