

***The 2022 IEEE VLSI Symposium on Technology & Circuits,
Now Merged as a Single Event with the Theme:
“Technology & Circuits for the Critical Infrastructure of the Future”***

HONOLULU, HI (APRIL 22, 2022) – Now in its 42nd year of delivering a unique convergence of technology and circuits for the microelectronics industry, the [Symposia on VLSI Technology & Circuits](https://www.vlsisymposium.org/) will be merged into one Symposium to maximize the synergy across both domains. The newly merged 2022 IEEE VLSI Symposium on Technology & Circuits is organized around the theme: “Technology & Circuits for the Critical Infrastructure of the Future.” The five-day hybrid event, combining both live sessions onsite at the Hilton Hawaiian Village, as well as on-demand access to selected presentations, is scheduled from June 12 – 17, 2022 in Honolulu, HI. The Symposium will feature advanced VLSI technology developments, innovative circuit design, and the applications they enable, such as artificial intelligence, machine learning, IoT, wearable/implantable biomedical applications, big data, cloud / edge computing, virtual reality (VR) / augmented reality (AR), robotics, and autonomous vehicles.

The weeklong Symposium will continue its reputation as the microelectronics industry’s premiere international conference integrating technology, circuits, and systems with a range and scope unlike any other conference. In addition to the technical presentations, the Symposium program will feature a demonstration session, evening panel discussions, joint focus sessions, short courses, workshops, and a special forum session that provides a focused discussion on a specific topic relevant to the Symposium theme.

[**Plenary Sessions**](https://www.vlsisymposium.org/program/plenary-session/)

• **“Holistic Patterning to Advance Semiconductor Manufacturing for the 2020s and Beyond,” by Martin Van den Brink, President & CTO, ASML** – The convergence of 5G, artificial intelligence and billions of connected devices will start a new wave of innovation, bringing advanced computing power to massive amounts of data. The key enabler continues to be affordable scaling, driven by advanced lithography, computational capabilities, fast metrology and inspection.

• **“Semiconductor Innovations, from Device to System,” by Yuh-Jier Mii, Senior Vice President for R&D TSMC** – This year marks the 75th anniversary since the invention of the transistor and the beginning of the semiconductor industry with its profound impact on the world and society at large. Technology scaling has been the key driving force behind the numerous innovations that usher in the Information Age. As the fast-expanding new applications in 5G, AI, ADAS, AR/VR and robotics continue to propel demand for data-centric products and services, future generations of semiconductor technology will require innovations across the entire stack – from material and device to design infrastructure, architecture and system.

**• “From System-on-Chip (SoC) to System-on Multichip (SoMC) Architectures: Scaling Integrated Systems Beyond the Limitations of Deep-Submicron Single Chip Technologies,” by Chris Patrick, Senior Vice-President and General Manager, Mobile Handsets, Qualcomm Technologies, Inc.** – The mobile wireless revolution has relied on IP integration platforms and processes that allow rapid innovation and integration of new IP such as 5G, while achieving low power and low cost by quickly leveraging new technology nodes. Complex systems have been integrated in SoCs and enhanced every year as technology shrinks. However, current trends in SOCs for diverse markets like mobile, compute, automotive and AI servers will lead to impractical die sizes due to diminishing percentage area shrinkage with future deep sub-micron technology nodes. Partitioning the SoC into multiple die (also called Chiplets) in a multichip configuration may help, but this also brings new challenges.

**• “The Rise of Memory in the Ever-Changing AI Era – From Memory to More-Than-Memory,” by Seok-Hee Lee, President & CEO, SK Hynix –**Innovation in the field of semiconductor memory has provided one of the key solutions to address the challenges of ever-changing, data-driven computing. It is no longer only important that memory technologies deliver their traditional metrics such as high performance, lower power, lower cost, and higher capacity. They also have to deliver smarter and more functionality in or near memory to minimize data movement.

**Focus Sessions:** As part of the Symposium’s program integration, a series of joint focus sessions will be held to present papers with both circuits and technology novelty & interest from from BEOL processes, new concepts for transistor scaling. 6G, compute-in-memory, biomedical technology, to 3D heterogeneous integration.

**Short Courses on Key VLSI topics**

Three full-day short courses will be featured:

* The Technology Short Course *“Monolithic & Heterogeneous Integration”* focuses on advanced monolithic and heterogeneous integration with coverage of logic and memory scaling in monolithic 3D integration, chiplet-based technologies and systems, and silicon photonics.
* The Joint Short Course *“Advances in Application-Specific Computing Systems & Technologies”* explores advances in application-specific computing systems and technologies, examining the latest developments in augmented reality, quantum and photonic computing, in- and near-memory computing, and computing in stretchable electronics.
* Finally, the Circuits Short Course *“Electronics That Drive the Next Generation Smart Car”* examines the electronics that will enable the next-generation smart vehicle with presentations spanning hardware and software architecture, auto computing and infotainment systems, connectivity, sensors, and battery management.

**Forum Session**: The Symposium program also features a multi-speaker full day Forum Session on “VLSI for Infrastucture and Infrastructure for VLSI.”

* The VLSI Forum is devoted to a single topic, extending the scope of the Symposia by suggesting the future direction of VLSI Symposium, or by showing the emerging cutting-edge applications of VLSI. Top expert speakers are invited from all over the world to contribute to this forum. This year we focus on green mobility and smart semiconductor manufacturing, covering energy efficiency, security, communication and big data, as well as technologies serving our infrastructure.

In addition, three **Evening Panel Sessions** have been announced:

• *“What Will It Take To Bring New Material From Lab To Manufacturing?”*

* How can we make sure the thousands of newly explored materials in academic, government, and industry labs are relevant to manufacturing technologies? What are the fundamental factors to convert a success story to a technology transfer? Is there anything to be learned from history? Robert Clark from Tokyo Electronß will moderate a panel of distinguished guests from across industry and academia to offer their valuable insights and thoughts, and share their experience on this important and interesting topic.

• *“Building The 2030 WorkForce: How to Attract Great Students And What to Teach Them”*

* With declining university enrollment in the semiconductor fields, and a shortage of skilled engineers across the industry, what can universities do to reverse the trend and ensure a robust workforce heading into 2030?  What should the students learn to best prepare them for the industry’s emerging needs?  Prof. Boris Murmann from Stanford University will moderate a panel of distinguished guests from across the industry and academia to offer their valuable insights, and explore this important topic.

• *“Supply…Unchained? Will the Chip Shortage Continue?”*

* How did the semiconductor industry land in the current supply shortage? What would it take to return to a healthy supply chain, or is the shortage here to stay? This panel, moderated by Joe Macri from AMD, brings together industry experts representing view points from leading foundries/IDMs, OSATs, fabless designers, materials suppliers, and equipment makers for an exciting look into (and debate on) where the issues lie, and how the industry can come together to overcome the supply chain shortage.

**Demonstration Session:**

After two years of virtual demonstration, the popular in-person demonstration session will again be part of the Symposium program, providing participants an opportunity for in-depth interaction with authors of selected papers from both Technology and Circuits sessions. These demonstrations through table-top presentations will show device characterization, chip operational results, and potential applications for circuit-level innovations.

**Workshops**

A series of workshop sessions will be held during the Symposium program to provide additional learning opportunites for participants. This year, we are pleased to announce six exciting workshops:

**Technology Workshops**

• Heterogeneous Integration – The Next Scaling Frontier: Material & Process Challenges

• Machine Learning Applications in Semiconductor Processes and Equipment Development

**Circuit Workshops**

• The Emerging Ecosystem of Open-Source Chip Design

• Analog/RF Circuits for IoT

• Recent Advances in Radar, mmWave, and Sub-THz: Technology, Packaging, & Circuits

**Joint Workshop**

• Cryogenic Electronics for Quantum Computing: covering scalable and reliable cryogenic electronics for quantum computing using large number of qubits.

**Special events** at the Symposium include mentoring events for Women in Engineering and Young Professionals, sponsored by the IEEE Electron Devices Society and the Solid State Circuits Society.

**Best Student Paper Awards** for each track Symposium are chosen based on the quality of the papers and presentations. The recipients will receive a monetary award, travel cost support, and a certificate. For a paper to be reviewed for this award, the lead author and presenter of the paper must be enrolled as a full-time student at the time of submission, and must indicate on the web submission form that the paper is a student paper.

Further information about the Symposium is available at: <http://www.vlsisymposium.org>.

# Sponsoring Organizations

The IEEE VLSI Symposium on Technology & Circuits is sponsored by the the IEEE Electron Devices Society, in cooperation with the IEEE Solid State Circuits Society and Japan Society of Applied Physics, in cooperation with the Institute of Electronics, Information and Communication Engineers.

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