ISSCC 2022

Intelligent Silicon for a Sustainable World

February 20-24, 2022 | San Francisco Marriott Marquis | San Francisco, California, USA

Plenary Talks

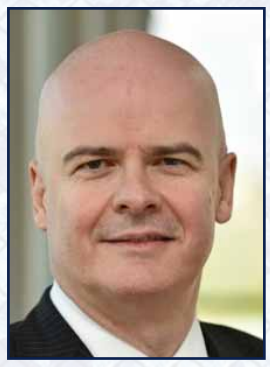
***Classic*Moore *to Sys*Moore, all we need is a 1000X…**

Aart de Geus
Founder, Chairman and co-Chief Executive Officer, Synopsys

The Future of the High Performance Semiconductor Industry and Design

Renée James
Founder, Chairman, and CEO, Ampere Computing

Intelligent Sensing: Enabling the Next "Automation Age"



Marco Cassis
President, Sales, Marketing, Communications and Strategy Development STMicroelectronics

Power, Energy, and the Si Saturation: Design What and How?

Inyup Kang
President and General Manager of System LSI Business at Samsung Electronics

Tutorials

Analog Circuit Design in Bipolar-CMOS-DMOS (BCD) Technologies
Marco Berkhout, *Goodix Technology, Nijmegen, The Netherlands*

Fundamentals of High Frequency DC-DC Converters
Kousuke Miyaji, *Shinshu University, Nagano, Japan*

Noise-Shaping SAR ADCs
Yun-Shiang Shu, *MediaTek, Hsinchu City, Taiwan*

Fundamentals of Self-Sensing Processing Systems
Shidhartha Das, *Arm, Cambridge, United Kingdom*

Fundamentals of Process Monitors for Signoff-Oriented Circuit Design
Eric J.-W. Fang, *MediaTek, Hsinchu City, Taiwan*

Wireless Power Transfer and Management for Medical Applications
Mehdi Kiani, *The Pennsylvania State University, University Park, PA*

HBM DRAM and 3D Stacked Memory
Dong Uk Lee, *SK hynix, Icheon, Korea*

Fundamentals of Mixed-mode RF Transceivers
Jeff Walling, *Virginia Tech, Blacksburg, VA*

Design Methodologies for Energy Harvesting Wireless Sensor Nodes
Sriram R. Vangal, *Intel, Hillsboro, OR*

Fundamentals of mm-Wave Phased-Arrays
Bodhisatwa Sadhu, *IBM T. J. Watson Research Center, Yorktown Heights, NY*

Basics of Equalization Techniques: Channels, Equalization, and Circuits
Byungsub Kim, *Pohang University of Science and Technology, Pohang, Korea*

Advances in Digital vs. Analog AI Accelerators
Jae-sun Seo, *Arizona State University, Tempe, AZ*

Forums

Compute-in-X (CiX): Overcoming the Data Bottleneck in AI Processing

Chip Design for Low-Power, Robust, and Secure IoT Devices

The Path to 6G: Architectures, Circuits, Technologies for Sub-THz Communications, Sensing and Imaging

Paving the Way to 200Gb/s Transceivers

How to Improve AI Efficiency Further: New Devices, Architectures and Algorithms

Computer Systems Under Attack – Paying the Performance Price for Protection

Paper Submission Deadline September 8, 2021

February 20-24, 2022

www.isscc.org

IEEE Member Authentication Required for ISSCC 2022. See isscc.org for details.

Student Activities

Student Research Preview (SRP): Short Presentations w/ Poster Session
Silkroad Award: Scholarships awarded for Far-East full-time students

Invited Industry Track

Two Invited Industry tracks will highlight recent hot-product releases and discuss innovative ways they solved product-level challenges. The focus this year is on Digital/ML, Systems and Quantum Computing.

Special Events

Next Gen Circuit Designer Workshop

The Next Gen Circuit Designer Workshop 2022 is an educational workshop for EE undergraduates and early graduate students (Master's students/1-2 years of PhD) who are interested in choosing a career in integrated circuit (IC) design. The workshop will include a "fireside chat" with invited renown speaker on diversity, bias in the tech industry and how do we overcome that over the course of our career. The selected participants will also hear from current rising stars in the industry, speakers who will motivate why IC design and share their unique paths through circuit design. The participants will also have a chance to present a poster of their work to the ISSCC audience. There will be additional networking events organized throughout the conference. See the ISSCC website for the application requirements and submission link.

The Semiconductor Supply Chain

The semiconductor supply chain is a highly specialized global complex system stretching from design houses to manufacturing fabs, to test and assembly units and integration factories which vary by the nature of the company, market and product. The COVID-19 pandemic with component shortages, along with the geopolitical trade conflicts, and the thread of counterfeiting have highlighted the challenges and need for a better orchestrated and diversified management chain. The speakers in this panel, drawn from leading manufacturers and governmental bodies, will address questions like how to ensure continued supply of critical materials and products and whether or not reaching out to diverse manufacturers is a necessity and not a luxury. This event will not go into political controversies but instead have an open discussion about existing bottlenecks, and identify changes that can be made in the semiconductor industry to both grow overall output and be more resilient to macroeconomic conditions.

The Next Trillion-Dollar Market for Chips

This panel assembles a collection of experts in various domains to give their view on what will be the next trillion-dollar market driver for chips. Will it be in IoT/IoE? Wireless/6G? Automotive? AI/machine learning? Quantum computing? Optics? Space exploration? The experts in the panel will discuss the challenges and opportunities for growth in multiple potentially large sectors for the semiconductor industry.

The Bright and Dark Side of AI

Hype aside, AI is clearly an emerging two-headed monster. This evening panel of AI experts could provide insights on both sides of the AI coin - the bright and dark sides. The goal is to help stimulate a multi-stakeholder AI dialog, gather views from panelists and reflect on transformative ideas with an eye on safety and risk management. What is the golden vision for futuristic AI platforms? What are compelling AI use cases and where are the risks? For instance, AI holds a lot of promise for cybersecurity and human-centric robots. However, these sectors also have some of the highest potential for fallout. AI's dark side capability is that it can be made to mimic human behavior. What are the consequences? The panel will also share forward-looking policy development and on ethical, legal and societal issues related to AI, including socio-economic challenges.

Shifting Tides of Innovation – Where is Cutting Edge Research Happening Today?

As research becomes more complex, multidisciplinary and system oriented, the focal point of innovation has begun to shift. Resource constraints such as people per project or the cost of working in the latest technology node also impact who can participate in cutting edge research. Industry does not have strong incentives to publish their most innovative and competitive work, leaving many in the dark as to what the state of the art is within companies. Even within industry, innovation can come from research divisions, production, or startups. On the academic side, funding bodies and trends can also impact the innovation process. How can we close this gap and who really has the edge? Is industry-guided academic research the way to get the best of both worlds? The traditional debate has been between academia and industry, but there are many more facets to the discussion. This panel explores all the possible sides of how innovation occurs across the industry.

Demonstration Sessions

Technical Sessions

Short Course

High Speed/High Performance Data Converters: Metrics, Architectures, and Emerging Topics

Introduction to ADCs/DACs: Metrics, Topologies, Trade Space, and Applications
Boris Murmann, Stanford University, Stanford, CA

Ultra High Data Rate ADCs and DACs: Architectures and Implementations
Gabriele Manganaro, MediaTek, Woburn, MA

High Precision and Low Power ADCs
Pieter Harpe, Eindhoven University of Technology, Eindhoven, The Netherlands

Emerging Data Converter Concepts
Nan Sun, Tsinghua University, Beijing, China