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SIGDA - The Resource for EDA Professionals

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SIGDA News

1. IBM Expands Quantum Data Center to Advance Algorithm Discovery
IBM has completed the expansion of its Quantum Data Center in Poughkeepsie, New York, which operates the highest number of available utility-scale quantum computers at a single location in the world. These systems are a part of the more than a dozen quantum computers offered to global clients via the IBM cloud.

2. Samsung to Ship First 2Tbyte Automotive SSD
Samsung Electronics has developed the industry's first PCIe 4.0 automotive solid state disk (SSD) based on eighth-generation vertical NAND (V-NAND) with a 2Tbyte version shipping in early 2025.

3. Synopsys, TSMC Look to 1.6nm Backside Routing for Trillion Transistor AI and Multi-die Chips
Synopsys has disclosed 1.6nm projects for backside power routing that will be key for trillion transistor chips.

4. Altera Details Agilex 3 Embedded AI FPGA
Altera has shown details of its upcoming Agilex 3 AI FPGA and 11 development kits for its Agilex 5 family.

5. Nvidia One of Few Firms Growing in 2Q24's Record Chip Market
The global chip market was worth US$162.1 billion in 2Q24, according to Omdia. This was up 6.7 percent sequentially and beat the previous record set in 4Q21 by US$500 million, the market analyst said.

6. US to Ban Chinese Connected and Self-Driving Vehicles
The US government is looking to ban connected and self-driving vehicles made in China in a major escalation of the trade war.

Message from the EiC

Dear Readers,

In the October edition, we bring you the latest news and activities in our community, upcoming conferences, paper deadlines, an insightful article on Silicon Lifecycle Management (SLM), and job openings worldwide.

Please do not hesitate to write to us if you want to contribute articles and announcements or share your thoughts and feedback.

Sandeep Chandran,
Editor-in-Chief,
SIGDA e-Newsletter

7. Brainchip brings ultra-low power NPU to market

Brainchip has announced Akida™ Pico, an NPU that significantly cuts power and size requirements down. It targets products operating in the µW to mW range and always on battery powered devices with use cases that require long operational lifetimes.

SIGDA Awards

1. Best Paper Award @ SBCCI 2024

https://www.linkedin.com/in/folivera1984/recent-activity/all/

EAVREF: An Evolutionary Algorithm Based Tool for Low-Power CMOS Voltage Reference Designs

Ana Italiano*, Luciana Almeida†, Thiago Brito‡, Mariane Petraglia*, Fabian Olivera†

**Federal University of Rio de Janeiro (UFRJ) | †Federal Center for Technological Education of Rio de Janeiro (CEFET/RJ) | ‡Federal University of Amazonas (UFAM)*

2. Best Paper Award @ MLCAD 2024

https://sharclab.ece.gatech.edu/

HLSFactory: A Framework Empowering High-Level Synthesis Datasets for Machine Learning and Beyond

Stefan Abi-Karam*, Rishov Sarkar*, Allison Seigler†, Sean Lowe‡, Zhigang Wei†, Hanqiu Chen*, Nanditha Rao#, Lizy Kurian John†, Aman Arora‡, Callie Hao*

**Georgia Institute of Technology | †The University of Texas at Austin | ‡Arizona State University | #International Institute of Information Technology Bangalore*

What is

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SIGDA E-News Editorial Board

What is Silicon Lifecycle Management (SLM)?

Mehdi Tahoori, Karlsruhe Institute of Technology (KIT),
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The semiconductor industry is grappling with increased complexity due to higher transistor densities and reduced feature sizes, which bring advanced capabilities but also pose significant challenges. These include increased manufacturing variability, sensitivity to runtime and workload effects, higher current and power densities, and difficulties in maintaining voltage supply and managing heat dissipation. This complexity raises the risk of physical failure and necessitates continuous testing throughout a product's lifecycle to ensure reliability and minimize faults. Achieving efficient designs is crucial to manage costs.

Silicon Lifecycle Management (SLM) is an emerging paradigm focused on improving the health of silicon-based devices by monitoring, analyzing, and optimizing semiconductor performance throughout various stages, including design, manufacturing, testing, and deployment in end-user systems. This approach is increasingly necessary due to the rising complexities in chip and system design, coupled with growing demands for performance and reliability, which create a need for continuous maintenance and optimization throughout the semiconductor's lifecycle.

SLM employs a sensor-rich architecture, incorporating environmental process, voltage, and temperature (PVT) monitors, design-for-test (DFT) methods, built-in self-test (BIST) resources, and structural monitors to assess path margins and functional performance. It also uses learning-based analysis of sensor data, which can be processed on-sensor, on-chip, within the system, or in the cloud, enabling real-time insights and adjustments to ensure the optimal functioning of semiconductor devices.

SLM's significance has grown due to increasing system complexity and the demand for improved performance and sustainability. It provides better diagnostic and debugging capabilities, ensuring higher quality throughout a product's life. Unlike traditional hardware management approaches, which focus on individual lifecycle stages, SLM integrates these stages for overall optimization.

During manufacturing, SLM assists with process control, yield management, and quality assurance, employing advanced analytics to improve yield rates and minimize variations. It also aims to reduce the environmental impact by extending the lifespan of silicon systems. In the deployment phase, SLM ensures efficient integration of silicon devices into larger systems, addressing compatibility, interoperability, and scalability challenges through standardized interfaces and system-level testing.

Operationally, SLM maximizes system performance and reliability through proactive monitoring, diagnostics, and maintenance. Real-time monitoring allows for dynamic adjustments and optimizations, while SLM facilitates firmware updates, security patches, and performance enhancements to extend device life. Maintenance and support services, including warranty coverage and repairs, are tailored to different application domains, ensuring minimal downtime and maximum device availability.

End-of-life management in SLM focuses on responsible disposal, recycling, and repurposing of silicon devices, promoting environmentally friendly practices and compliance with regulatory requirements. SLM supports secure data erasure and authentication protocols to protect sensitive information on retired devices and

Paper Deadlines

ISCAS'25 – IEEE Int'l Symposium on Circuits and Systems
London, United Kingdom
Deadline: Oct. 14, 2024
May 25-28, 2025
https://2025.ieee-iscas.org/

RTAS'25 - IEEE Real-Time and Embedded Technology and Applications Symposium
Deadline: Nov. 14, 2024
May 6-9, 2025
http://2025.rtas.org

DAC'25 – Design Automation Conference
San Francisco, CA
Research Paper Deadline: Nov. 19, 2024 (Abstracts due: Nov. 12, 2024)
Engineering Tracks Deadline: Jan. 16, 2025
June 22-25, 2025
http://www.dac.com/

MDTS'25 – IEEE Microelectronics Design & Test Symposium
Albany, NY
Deadline: Dec. 15, 2024
Tentative Date: May 19-21, 2025
http://natw.ieee.org

HOST'25 – IEEE Int'l Symposium on Hardware-Oriented Security and Trust
San Jose
Deadline (winter submission): Dec. 16, 2024 ((Abstracts due: Dec. 9, 2024)
May 5-8, 2025
http://www.hostsymposium.org

encourages the development of circular economy models to minimize resource consumption.

SIGDA Partner Journal

ACM Transactions on Design Automation of Electronic Systems, TODAES, publishes innovative work documenting significant research and development advances on the specification, design, analysis, simulation, testing, and evaluation of electronic systems, emphasizing a computer science/engineering orientation. Design automation for machine learning/AI and machine learning/AI for design automation are very much welcomed.

If you are an active researcher in the design and design automation field and would like to be part of the TODAES review board, please fill out the following reviewer form. TODAES recognizes those reviewers that provide timely and high-quality reviews through the Distinguished Review Board. TODAES also recognizes papers and outstanding junior researchers through best paper and rookie of the year award. Authors can send their paper submissions on the manuscript portal.

TODAES welcomes special issue proposals from leading researchers and practitioners. Such proposals should be emailed to Joerg Henkel, Senior Associate Editor, at joerg.henkel@kit.edu.

Technical Activities

1. **The Evolution of Photonic Integrated Circuits and Silicon Photonics**
Photonic integrated circuits (PICs) are optical microchip systems with optical components utilizing light (or photons) for data transmission instead of electrons, which are the basis of traditional integrated circuits (ICs), also known as electronic integrated circuits (EICs). The rise of AI and the growing demands of data centers have significantly attracted attention toward PICs and silicon photonics…

2. **Memristors Driving AV Evolution**
Memristors, a groundbreaking technology in chip design, could potentially revolutionize the development of autonomous vehicles (AVs) by enhancing their processing power and efficiency. Neuromorphic circuits can seamlessly integrate memristors, enabling vehicles to process vast amounts of data more efficiently, mimicking the functioning of the human brain. This unique capability allows for real-time perception, decision-making and action, which are essential for the smooth functioning of self-driving systems. As the backbone of neuromorphic processing, memristors improve the overall performance of autonomous systems, making them more adaptive, intelligent and capable of handling the complex demands of modern transportation…

FCCM' 25 - IEEE International Symposium On Field-Programmable Custom Computing Machines
Fayetteville, AR
Deadline: Jan. 17, 2025 (Abstracts due: Jan. 10, 2025)
May 4-7, 2025
https://www.fccm.org/

Upcoming Conferences

VLSI-SoC'24 – IFIP/IEEE Int'l Conference on Very Large Scale Integration
Tanger, Morocco
Oct. 6-9, 2024
http://www.vlsi-soc.com

PACT'24 - Int'l Conference on Parallel Architectures and Compilation Techniques
Long Beach, CA
Oct. 13-16, 2024
http://www.pactconf.org

ICCAD'24 – IEEE/ACM Int'l Conference on Computer-Aided Design
New Jersey
Oct 27-31, 2024
https://iccad.com/

MICRO'24 – IEEE/ACM Int'l Symposium on Microarchitecture
Austin, Texas
Nov. 2-6, 2024
http://www.microarch.org/micro57

ICCD'24 – IEEE Int'l Conference on Computer Design
Milan, Italy

3. **Quantum-Proof Your Systems: A Deep Dive into NIST's PQC Standards**
The US National Institute of Standards and Technology (NIST) released the eagerly awaited Post-Quantum Cryptography (PQC) standards. These standards introduce three new encryption algorithms designed to secure systems against both classical and future quantum computer attacks, providing a necessary evolution from RSA and ECC asymmetric encryption algorithms. In this blog, we outline the impact of these standards and the essential steps for system designers to transition to PQC…

Job Positions

University of Toronto, Canada

Job Title: Assistant Professor of Computer Science

Description: The Department of Computer and Mathematical Sciences at the University of Toronto Scarborough (UTSC) invites applications for a full-time teaching stream position in Computer Science. The appointment will be at the rank of Assistant Professor, Teaching Stream with an anticipated start date of July 1, 2025. Applicants must have earned a PhD degree in Computer Science or a closely related area by the time of appointment, or shortly thereafter, with a demonstrated record of excellence in teaching. We seek candidates whose teaching interests complement and enhance our existing departmental strengths. Candidates must have teaching excellence in a degree-granting program at the undergraduate level, including lecture preparation and delivery, curriculum development, and development of online material/lectures. Additionally, candidates must possess a demonstrated commitment to excellent pedagogical inquiry and a demonstrated interest in teaching-related scholarly activities. We are interested in applicants from any area of computer science. For more information, please refer to https://facultyvacancies.com/assistant-professor-of-computer-science,i40139.html.

University of Cambridge, UK

Job Title: Assistant Professor of Computer Science

Description: The Department of Computer Science and Technology is seeking to recruit a new faculty member at the Assistant Professor/Associate Professor level who can contribute to research and teaching in the area of Wearable Computing. We are looking for a candidate with outstanding research credentials in the general area of wearable computing and sensing, machine learning for wearable signals and on-device computation. The ideal candidate will be an expert on the systems/device aspects of wearables as well as the related machine learning challenges and techniques. They will have a strong international

Nov. 18-20, 2024
http://www.iccd-conf.com

FPT'24 - Int'l Conference on Field-Programmable Technology
Sydney, Australia
Dec. 10-12, 2024
http://icfpt.org

iSES'24 – IEEE Int'l Symposium on Smart Electronic Systems
Ahmedabad, India
Dec. 16-18, 2024
http://www.ieee-ises.org

HiPC'24 – IEEE Int'l Conference on High Performance Computing, Data, And Analytics
Bengaluru, India
Dec. 18-21, 2024
http://www.hipc.org

ISED'24 – Int'l Conference on Intelligent Systems and Embedded Design
NIT Rourkela, Odisha
Dec. 20-22, 2024
http://isedconf.org

VLSID'25 – International Conference on VLSI Design & International Conference on Embedded Systems
Bengaluru, India
Jan. 4 - 8, 2025
https://vlsid.org/

HiPEAC'25: Int'l Conference on High Performance Embedded Architectures & Compilers
Barcelona, Spain
Jan. 20-22, 2025
https://www.hipeac.net/2025/barcelona

ASP-DAC'25 - Asia and South Pacific Design Automation Conference
Tokyo Odaiba Miraikan, Japan
Jan. 20-23, 2025

track record of publication with focus on topics generally covered by ACM SIGMOBILE venues, as well as international visibility and evidence of community service and impact commensurate with their research area and experience. In addition, the ability, or potential, to secure research funding to support their research vision and build a world-class team of researchers is paramount. For more information, please refer to https://facultyvacancies.com/assistant-professor-of-computer-science,i40015.html.

Bristol University, UK

Job Title: Associate Professor of Electrical Engineering

Description: The School of Electrical, Electronic, and Mechanical Engineering (EEME) at the University of Bristol is excited to announce an opening for an Associate Professor / Professor of Optical and Quantum Networks. This is a rare opportunity to drive innovation at the forefront of telecommunications, supported by world-class facilities and a team of leading experts in the field. The successful candidate will be appointed at either the Associate Professor or Professor level, based on their skills, qualifications, and experience. The remuneration package will be dependent on the skills, experience and qualifications you are able to bring to this role. As a key member of our team, your primary research focus will be on Optical and Quantum Networks, utilising mathematical models, state-of-the-art laboratory facilities at Smart Internet Lab, and digital twinning infrastructure available at BDFI. Your goal will be to advance the design and solutions of classical optical and quantum networks, including co-existence, in line with our research vision. Areas of interest include high-capacity Optical switched networks, quantum entangled networks, advanced network control and management, AI/ML for future optical/quantum networks, security, resilience, sustainability and computing and network co-design. For more information, please refer to https://facultyvacancies.com/associate-professor-of-electrical-engineering,i40017.html.

http://www.aspdac.com

ISSCC'25 – IEEE Int'l Solid-State Circuits Conference
San Francisco, CA
Feb. 16-20, 2025
http://isscc.org

ISPD'25 – ACM Int'l Symposium on Physical Design
Austin, Texas
Mar. 16-19, 2025
http://www.ispd.cc

DATE'25 - Design Automation and Test in Europe
Lyon, France
Mar. 31 - April. 2, 2025
http://www.date-conference.com

ISQED'25 - Int'l Symposium on Quality Electronic Design
San Francisco, CA
Apr. 9-11, 2025
http://www.isqed.org

Notice to authors