Special Interest Group on Design Automation
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SIGDA - The Resource for EDA Professionals

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SIGDA News

1. DARPA's Quantum Moment
US research agency DARPA has announced several projects to develop quantum computers. The first stage of the Quantum Benchmarking Initiative (QBI) aims to evaluate approaches to utility-scale quantum computing for cost-effective commercialisation by 2033.

2. Micron Restructures for AI
Micron Technology in the US is restructuring its business units to capitalize on the growth in demand for high-performance memory for AI. The new Automotive and Embedded Business Unit (AEBU) will focus on memory and storage solutions for the automotive, industrial, and consumer segments, which are most of the previous businesses. This will be led by Kris Baxter, Corporate Vice President and General Manager, who has led the Embedded Business Unit (EBU).

3. Intel Agrees to Sell 51% of Altera to Silver Lake
Struggling chip company Intel Corp. (Santa Clara, Calif.) has agreed to sell 51 percent of its Altera FPGA business to private equity firm Silver Lake for US$4.46 billion. The deal was expected and valued Altera at US$8.75 billion. Intel will continue to own the remaining 49 percent of Altera. Intel also announced that Raghib Hussain will replace Sandra Rivera as CEO of Altera, with effect from May 5, 2025.

4. Cadence Validates 12.8 Gbps Gen2 DDR5 MRDIMM IP System
Cadence has announced the first DDR5 12.8 Gbps MRDIMM Gen2 memory IP system on the TSMC N3 process, addressing the need for greater memory bandwidth for AI processing demands in enterprise and data centre applications, including AI in the cloud.

5. ARM Makes Fundamental Shift with Artisan Sale
ARM is selling off its Artisan foundation IP business, including its engineering team, in a fundamental shift. The designer of processor cores has always maintained that it needs to control the underlying physical IP to provide the best performance for

Message from the EiC

Dear Readers,

In this edition, we bring you the latest news and activities in our community, upcoming conferences, paper deadlines, an insightful article on What is RL for Hardware Security, 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

its chip designs. It bought Artisan back in 2004 for a whopping $913m. The Artisan foundation IP business consists of standard cell libraries, memory compilers, and general-purpose I/Os (GPIOs) optimized for advanced process nodes at the leading foundries.

6. ASML Targeted in Latest Round of US Tariffs
European and Japanese suppliers of semiconductor equipment are set to be targeted in the next round of tariffs by the US. The Bureau of Industry and Security at the US Department of Commerce is requesting public comments on a national security investigation on the import of semiconductors and semiconductor manufacturing equipment.

7. Steam Cooling Embedded in Hot Chips
Researchers in Japan have shown how microfluidic channels embedded in AI processors and GPUs can provide significant cooling using a dual-phase approach. The team at the Institute of Industrial Science at the University of Tokyo used microchannels embedded directly into the chip itself. These channels allow water to flow through, efficiently absorbing and transferring heat away from the source with dual-phase cooling.

8. HBM4 Standard Doubles Channel Count for AI Boost
JEDEC Solid State Technology Association has published its standard for HBM4 high-speed memory, doubling the channel count from 16 to 32 for higher performance. The JESD270-4 HBM4 brings higher bandwidth and larger stacks of higher capacity DRAM memory dies to AI chips in particular.

9. Multicolored Switching Opens Up Optical Computing
Opaque materials can transmit light when excited by a high-intensity laser beam. This process, known as optical bleaching, induces a nonlinear effect that temporarily alters the properties of a material. Remarkably, when the laser is switched on and off at ultrahigh speeds, the effect can be dynamically controlled, opening new possibilities for advanced optical technologies.

10. Advantech Launches AMD-based Edge AI Systems
For demanding Edge AI applications, these next-generation systems leverage AMD Ryzen™ and EPYC™ processors alongside Instinct™ MI210 accelerators and Radeon™ PRO GPU.

SIGDA Awards

1. EDAA Achievement Award 2025 @ DATE 2025
https://www.date-conference.com/awards

Subhasish Mitra,
Stanford University, US

2. IEEE Fellow @ DATE 2025
https://www.date-conference.com/awards

Wenjian Yu
Tsinghua University, CN

SIGDA E-News Editorial Board

3. IEEE CEDA Service Award @ DATE 2025
https://www.date-conference.com/awards

Andy Pimentel
University of Amsterdam, NL

4. IEEE CS TTTC Outstanding Contribution Award @ DATE 2025
https://www.date-conference.com/awards

Aida Todri-Sanial
Eindhoven University of Technology, NL

5. EDAA Outstanding Dissertations Award @ DATE 2025
https://www.date-conference.com/awards

Topic 1 – New directions in systems design methods and tools, simulation and validation, embedded software design and optimization for embedded, cyber physical, secure and learning systems

Deterministic Reactive Programming for Cyber Physical Systems

Christian Menard
TU Dresden, DE

Advisor: Jerónimo Castrillón Mazo (*TU Dresden, DE)*

Topic 2 – New directions in SoC platforms co-design, novel architectures for future computing in design flows, and power management

Computation In Memory based Edge AI for Healthcare A Cross Layer Approach

Sumit Diware
TU Delft, NL

Advisor: Rajendra Bishnoi (*TU Delft, NL*)

Topic 3 – New directions in logic, physical design and CAD for analog/mixed signal, nano-scale and emerging technologies

Design Automation Tools and Software for Quantum Computing

Lukas Burgholzer,
JKU Linz, AT

Advisor: Robert Wille (*TUM, DE*)

Topic 4 – New directions in safety, reliability and security-aware hardware design, validation and test

Preventing IP Theft in Heterogeneous 2.5D/3D Integrated Circuits

Jonti Talukdar

Paper Deadlines

ICCD'25 – IEEE Int'l Conference on Computer Design
Dallas, TX, USA
Abstracts due: May 4, 2025
Deadline: May 11, 2025
Nov. 10-12, 2025
http://www.iccd-conf.com

OSCAR'25 - Fourth Workshop on Open-Source Computer Architecture Research
Tokyo, Japan (co-located with ISCA 2025)
Abstracts due: May 5, 2025
June 21, 2025
https://oscar-workshop.github.io/

MLCAD'25 - ACM/IEEE International Symposium on Machine Learning for CAD
Chaminade Resort, Santa Cruz, CA, USA
Abstract due: May 16, 2025
Deadline: May 23, 2025
Sep. 8-10, 2025
https://mlcad.org/symposium/2025/

iSES'25 – IEEE Int'l Symposium on Smart Electronic Systems
Hyderabad, India
Abstracts due: June 18, 2025
Deadline: June 25, 2025
Dec. 17-20, 2025
http://www.ieee-ises.org

ASP-DAC'26 - Asia and South Pacific Design Automation Conference
Hong Kong, China
Abstracts due: July 4, 2025
Deadline: July 11, 2025
()
Jan. 19-22, 2026
http://www.aspdac.com

FPT'24 - Int'l Conference on Field-Programmable Technology
Shanghai, China
Abstracts due: July 14, 2025
Deadline: July 23, 2025
Dec. 2-5, 2025

Duke University, US

Advisor: Krishnendu Chakrabarty (*Duke University, US*)

6. DATE Fellow Award @ DATE 2025
https://www.date-conference.com/awards

Yervant Zorian
Synopsys, US

Andy Pimentel
University of Amsterdam, NL

7. Best Paper Awards @ DATE 2025
https://www.date-conference.com/awards

D-Track

Timing Driven Global Placement by Efficient Critical Path Extraction

Yunqi Shi[1], Siyuan Xu[2], Shixiong Kai[2], Xi Lin[1], Ke Xue[1], Mingxuan Yuan[3] and Chao Qian[1]
[1] Nanjing University, CN | [2] Huawei Noah's Ark Lab, CN | [3] Huawei Noah's Ark Lab, HK

A-Track

A Lightweight CNN for Real Time Pre Impact Fall Detection

Cristian Turetta[1], Muhammed Toqeer Ali[1], Florenc Demrozi[2] and Graziano Pravadelli[1]

[1] Università di Verona, IT | [2] University of Stavanger, NO

T-Track

A Soft Error Tolerant Flip Flop for eFPGA Configuration Hardening in 22nm FinFET Process

Prashanth Mohan[1], Siddharth Das[1], Oguz Aatli[1], Josh Joffrion[2] and Ken Mai[1]

[1] Carnegie Mellon University, US | [2] Sandia National Laboratories, US

E-Track

Cocktail: Chunk Adaptive Mixed Precision Quantization for Long Context LLM Inference

Wei Tao[1], Bin Zhang[1], Xiaoyang Qu[2], Jiguang Wan[1] and Jianzong Wang[2]

[1] Huazhong University of Science & Technology, CN | [2] Ping An Technology (shenzhen) Co., Ltd, CN

http://icfpt.org

Upcoming Conferences

FCCM' 25 - IEEE International Symposium On Field-Programmable Custom Computing Machines
Fayetteville, AR, USA
May 4-7, 2025
https://www.fccm.org/

HOST'25 – IEEE Int'l Symposium on Hardware-Oriented Security and Trust
San Jose, CA, USA
May 5-8, 2025
http://www.hostsymposium.org

RTAS'25 - IEEE Real-Time and Embedded Technology and Applications Symposium
Irvine, CA, USA
May 6-9, 2025
http://2025.rtas.org

MDTS'25 – IEEE Microelectronics Design & Test Symposium
Albany, NY, USA
May 19-21, 2025
http://natw.ieee.org

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

IWLS'25 - International Workshop on Logic & Synthesis
Verona, Italy
June 12-13, 2025
https://www.iwls.org

DAC'25 – Design Automation Conference
San Francisco, CA, USA
June 22-25, 2025
http://www.dac.com/

GLSVLSI'25 – ACM Great Lakes Symposium on VLSI

8. Outstanding Reviewer Awards @ DATE 2025
https://www.date-conference.com/awards

D-Track

- Chang Meng *(EPFL, Lausanne, CH)*
- Bonan Yan (*Peking University, CN)*
- Yangdi Lyu *(Hong Kong Univ. of Science and Technology, CN)*
- Alan Hu *(University of British Columbia, CA)*

A-Track

- Mirjana Stojilovic *(EPFL, Lausanne, CH)*
- Geoff Merrett *(University of Southampton, UK)*

T-Track

- Soundes Marzougui *(STMicroelectronics, Diegem, BE)*
- Sarah Azimi *(Politecnico di Torino, IT)*

E-Track

- Frank Hannig *(Friedrich Alexander Universität Erlangen Nürnberg, DE)*
- Anup Kumar Das *(Drexel University, US)*

9. University Fair Award @ DATE 2025
https://www.date-conference.com/awards

ARBoard, the future of PCB debug

Giorgio Insinga, Pietro Bella and Paolo Bernardi, Politecnico di Torino, IT

10. Young People Programme Hack @ DATE 2025
https://www.date-conference.com/awards

HASS Lab Team

Hao Lyu, Zhiqing Rui, Chengjie Wang, Zhiyuan Li, Xiang Ling, Jingzheng Wu

University of Chinese Academy of Sciences, CN

In recognition of outstanding performance in hardware security threat detection

11. ASD Outstanding Paper Award @ DATE 2025
https://www.date-conference.com/awards

Modeling the SL LET paradigm in AUTOSAR Adaptive

Davide Bellassai [1,2], Gerlando Sciangula [1,3], Claudio Scordino [3], Daniel Casini [1], Alessandro Biondi [1]

[1] Scuola Superiore Sant'Anna, Pisa, IT | [2]Evidence S.r.l., Pisa, IT | [3]Huawei

New Orleans, LA, USA
June 30 - July 2, 2025
http://www.glsvlsi.org

ICECET'25 - IEEE International Conference on Electrical, Computer and Energy Technologies
Paris, France
July 3-6, 2025
www.icecet.com

ISVLSI'25 – IEEE Computer Society Annual Symposium on VLSI
Kalamata, Greece
July 6-9, 2025
http://www.ieee-isvlsi.org

ISLPED'25 – ACM/IEEE Int'l Symposium on Low Power Electronics and Design
University of Iceland, Iceland
Aug. 6-8, 2025
http://www.islped.org

ESWEEK'25 - Embedded Systems Week
Taipei, Taiwan
Sept. 28 - Oct. 3, 2025
http://www.esweek.org

ICCAD'25 – IEEE/ACM Int'l Conference on Computer-Aided Design
Munich, Germany
Oct 26-30, 2025
https://iccad.com/

What is

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What is RL for Hardware Security?

Satwik Patnaik
University of Delaware

Security of hardware is fundamental to ensuring trust in modern computing systems. From cloud servers and smartphones to embedded systems in autonomous vehicles and medical devices, today's digital infrastructure depends on the correct and secure operation of integrated circuits (ICs). As the design and manufacturing of hardware become globally distributed, the risk of security vulnerabilities has grown significantly. These threats range from malicious modifications during fabrication, to side-channel attacks, fault injection, intellectual property (IP) theft, and even adversarial manipulation of machine learning models. Defending against a wide spectrum of attacks requires moving beyond traditional rule-based or exhaustive validation approaches. In recent years, data-driven methods—particularly reinforcement learning—have shown promise for automating complex decision-making in hardware security tasks, where manual design space exploration is often infeasible.

Reinforcement learning (RL) is a machine learning paradigm where an agent interacts with an environment to learn decision-making strategies that maximize long-term reward. It has been widely adopted in domains such as robotics [1], autonomous systems [2], and game-playing [3], where exploration, adaptability, and feedback-driven learning are key. These properties make RL particularly attractive for hardware security problems, where threats are often deeply embedded, the solution space is vast, and the optimal defensive or offensive strategy may not be obvious. Recent work has applied RL to discover vulnerabilities—such as stealthy hardware Trojans or exploitable fault models—and to develop automated defenses that learn to detect or mitigate such threats over time.

One of the earliest and most explored applications of RL in hardware security is test generation for detecting hardware Trojans. Traditional simulation-based approaches often struggle to activate rare trigger conditions, especially in large circuits. RL-based methods like TGRL [4] and AdaTest [5] learn to generate targeted input patterns by leveraging feedback from controllability and observability analyses, significantly improving coverage and efficiency. On the offensive side, RL has been used to design stealthy Trojans that evade Trojan detection techniques, as demonstrated by ATTRITION [6]. RL has also been applied to fault attacks, where agents learn how and where to inject faults to compromise cryptographic implementations, uncovering previously unknown vulnerabilities in widely used ciphers [7].

More recently, RL has been applied to evaluate the robustness of machine learning models used within hardware security pipelines. As graph neural networks become popular for tasks like Trojan detection and IP piracy

prevention, their vulnerability to adversarial manipulation becomes a critical concern. AttackGNN [8] uses RL to subtly perturb circuits in ways that mislead GNN-based detectors while preserving circuit functionality, effectively red-teaming learning-based security tools. On the defensive front, RL agents have been used to adaptively generate test patterns [9] enabling systems to respond to evolving attack surfaces without manual reconfiguration. These techniques highlight the promise of RL for automating traditional hardware analysis and expose the limits of emerging ML-based defenses and attack strategies [8].

In summary, RL offers a promising and versatile framework for tackling complex problems in hardware security, ranging from automated test generation to adversarial analysis and attack synthesis. Its adaptability and ability to explore large design spaces make it well-suited for scenarios where traditional methods fall short. However, practical challenges remain — RL techniques can be computationally intensive, sensitive to reward formulation, and may require significant tuning to generalize across hardware families. As hardware systems continue to grow in complexity, RL is poised to play a growing role in building scalable, intelligent, and resilient hardware security solutions.

References:

[1] J. Kober, J. A. Bagnell, and J. Peters, “Reinforcement learning in robotics: A survey,” The International Journal of Robotics Research, vol. 32, no. 11, Sep. 2013.

[2] B. R. Kiran, I. Sobh, V. Talpaert, P. Mannion, A. A. Al Sallab, S. Yogamani, and P. Pérez, “Deep reinforcement learning for autonomous driving: A survey,” IEEE Transactions on Intelligent Transportation Systems, vol. 23, no. 6, Jun. 2021.

[3] D. Silver, J. Schrittwieser, K. Simonyan, I. Antonoglou, A. Huang, A. Guez, T. Hubert et al., “Mastering the game of Go without human knowledge,” Nature, vol. 550, no. 7676, pp. 354–359, Oct. 2017.

[4] Z. Pan and P. Mishra, “Automated Test Generation for Hardware Trojan Detection using Reinforcement Learning,” in Proc. 26th Asia and South Pacific Design Automation Conference (ASPDAC), Tokyo, Japan, Jan. 2021, pp. 408–413.

[5] H. Chen, X. Zhang, K. Huang, and F. Koushanfar, “AdaTest: Reinforcement Learning and Adaptive Sampling for On-chip Hardware Trojan Detection,” ACM Transactions on Embedded Computing Systems, vol. 22, no. 2, pp. 1–23, Jan. 2023.

[6] V. Gohil, H. Guo, S. Patnaik, and J. Rajendran, “ATTRITION: Attacking Static Hardware Trojan Detection Techniques Using Reinforcement Learning,” in Proc. 2022 ACM SIGSAC Conference on Computer and Communications Security (CCS), Los Angeles, CA, USA, Nov. 2022, pp. 1275–1289.

[7] H. Guo, S. Saha, V. Gohil, S. Patnaik, D. Mukhopadhyay, and J. Rajendran, “ExploreFault: Identifying Exploitable Fault Models in Block Ciphers with Reinforcement Learning,” in Proc. 60th ACM/IEEE Design Automation Conference (DAC), San Francisco, CA, USA, Jul. 2023, pp. 1–6.

[8] V. Gohil, S. Patnaik, D. Kalathil, and J. Rajendran, “AttackGNN: Red-Teaming GNNs in Hardware Security Using Reinforcement Learning,” in Proc. 33rd USENIX Security Symposium, Philadelphia, PA, USA, Aug. 2024, pp. 73–90.

[9] V. Gohil, S. Patnaik, H. Guo, D. Kalathil, and J. Rajendran, “Deterrent: Detecting Trojans Using Reinforcement Learning,” in Proc. 59th ACM/IEEE Design Automation Conference (DAC), San Francisco, CA, USA, Jul. 2022, pp. 697–702.

SIGDA Partner Journal

ACM Transactions on Design Automation of Electronic Systems (TODAES) features groundbreaking research and development in the specification, design, analysis, simulation, testing, and evaluation of electronic systems, with a focus on computer science and engineering. The journal's impact factor rose to 2.2 in 2023, more than doubling its 2020 value. Additionally, each issue highlights a notable contribution as the Editor's Pick for special recognition.

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.

EDITOR'S PICK FROM ACM TODAES ISSUE 2, 2025

Harnessing Machine Learning in Dynamic Thermal Management in Embedded CPU-GPU Platforms

Srijeeta Maity, Anirban Majumder, Rudrajyoti Roy, Ashish Hota, and Soumyajit Dey

Indian Institute of Technology Kharagpur, Kharagpur, India

Abstract: This article proposes a novel Reinforcement Learning based resource manager for modern heterogeneous embedded processors, which intelligently adjusts core frequencies and task mappings to optimize thermal and latency performance, addressing the limitations of existing thermal management techniques that compromise QoS and struggle with complex, evolving multi-core systems. The framework employs a data-driven system modeling technique using Gaussian Process Regression to enable efficient offline training of this learning-based resource manager to avoid challenges associated with initial online training. The approach is evaluated on a heterogeneous embedded CPU-GPU platform (Odroid XU4) with real workloads (CNN inferencing pipelines) and observes a significant reduction in peak operating temperature when compared to the default onboard frequency governor as well as other learning-based state-of-the-art approaches.

Continue reading more on ACM DL.

Technical Activities

1. TSMC Announces World-Leading A14 Node to Power AI
TSMC has announced its new world-leading process technology, A14, designed to drive advances in AI data centers while improving their power efficiency…

2. OKI's 124-Layer PCB Tech Targeted at Next-Gen AI Semiconductor Testing Equipment

OKI Circuit Technology (OCT), OKI Group's printed circuit board (PCB) company, has successfully developed a 124-layer PCB technology for wafer inspection equipment designed for next-generation high bandwidth memory, such as HBM mounted on AI semiconductors. This is a roughly 15% increase in the number of layers over conventional 108-layer designs…

3. Nextchip Taps Ceva NPU IP for Next-Gen ADAS Solutions

Nextchip has licensed Ceva Inc.'s NeuPro-M Edge AI Neural Processing Unit (NPU) IP for its next-generation advanced driver assistance systems (ADAS) solutions…

4. Footprintku Redefines Design Workflows with DFM-oriented ECAD Library Platform

Footprintku AI has debuted its groundbreaking DFM-oriented ECAD Library cloud platform. During its launch, Co-founder YT Chen unveiled how Footprintku's proprietary AI technologies are transforming traditional ECAD library workflows…

Job Positions

Prince Mohammad Bin Fahd University, Saudi Arabia

Job Title: Assistant/Associate/Full Professor in Software Engineering

Description: Highly qualified candidates are required for the Departments of Software Engineering, Artificial Intelligence and Cybersecurity in the College of Computer Engineering and Sciences at Prince Mohammad Bin Fahd University. The quality of educational training and academic careers obtained by the Faculty Applicant in Western university is vital to PMU. Qualifications & Experience: A Ph.D. in Software Engineering, Artificial Intelligence, Cybersecurity or related field from an accredited, reputable Western university. A Master's degree with good teaching experience may be considered especially in teaching freshman and sophomore courses and laboratory modules. Candidates should have a minimum 2-3 years teaching experience after the terminal degree with good research experience, including publications in international Journals and Conferences. Industrial experience is a Plus. Candidates are expected to have excellent command of the English Language. Candidates should be familiar with technology infused academic environments. Previous experience in the Middle East or GCC countries is a plus. For more information, please refer to https://engineeroxy.com/assistantassociatefull-professor-in-software-engineering,i14461.html.

University of Manchester, UK

Job Title: Researcher in Computer Science

Description: This role is within the Research Platforms Team, around 25 technical IT specialists — and growing — many with a research background themselves. We develop and support e-infrastructure platforms for the University research community including: high-throughput (HTCondor) and high-performance (HPC) computing; a dedicated research VM platform; data management and storage;

edge computing; and highly-secure platforms for hosting/processing sensitive data. Provision is via both on-site hardware and use of off-site, commercial cloud resources (e.g., AWS). The successful candidate will focus on the development and support of the research VM platform, our edge compute service and potentially HTCondor. In particular: provisioning of mainly Linux, but also some MS Windows, VMs and template creation; operational maintenance and security of VMs, and user support; design, build and operational support of dedicated, computational and data storage edge compute platforms for individual research groups; development and operational support of our HTCondor service. For more information, please refer to https://facultyvacancies.com/researcher-in-computer-science,i41807.html

VinUniversity, Viet Nam

Job Title: Faculty Position in Engineering and Computer Science

Description: VinUni presents a distinctive opportunity within an entrepreneurial environment, offering robust support for research faculty. As a cornerstone of the University's ambition is to become the first world-class institution in Vietnam, we are committed to fostering an intellectually vibrant community that drives pioneering research and academic excellence. Join us if you have: A deep passion for educating future talents, advancing science and technology with a robust pipeline of innovative projects. Proven track record of high-impact research with publications in top-tier journals in the respective field. A clear vision to make a meaningful impact on both your field and society driven by a commitment to forward-thinking research and innovation. Adaptability and eagerness to tackle new challenges, particularly those addressing global and local issues, with a focus on research-driven solutions for Vietnam and the world. A doctorate from a prestigious institution recognized globally. Exceptional written and verbal communication skills in English. Respect and appreciation for the core values of VinUni: EXCEL (E: Empathy, X: Exceptional Capability, C: Creativity, E: Entrepreneurial Spirit, and L: Leadership Mindset). For more information, please refer to https://computeroxy.com/faculty-position-in-engineering-and-computer-science,i15641.html.

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