



Special Interest Group on Design Automation ACM/SIGDA E-NEWSLETTER, Vol. 54, No. 7

SIGDA - The Resource for EDA Professionals

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Circulation: 2,700

Online archive: <https://www.sigda.org/publications/newsletter>

SIGDA News

1. Chip manufacturing capacity expansion is set to continue

Chip manufacturing capacity is expected to increase by 6 percent in 2024 and 7 percent in 2025 to reach 33.7 million wafers per month (8-inch equivalent), according to industry body SEMI.

2. Samsung's Texas fab could start on 2nm in 2026, says report

Samsung is taking steps to set the beginning of production at its wafer fab in Taylor, Texas, in 2026 rather than 2024 and could start with a 2nm manufacturing process.

3. SiFive announces 4th generation of RISC-V Essential IP for embedded applications

SiFive is unveiling a major upgrade of its SiFive Essential product family at the RISC-V Summit Europe 2024. Developed over a decade, the field-proven Essential IP is already in use in billions of products including mobile phones, sensors, SSDs, FPGA platforms, surveillance cameras, smartwatches and more.

4. First RISC-V laptop gets performance boost and Ubuntu

The DC-ROMA RISC-V Laptop II is the world's first RISC-V laptop pre-installed and powered by Ubuntu, which is one of the most popular Linux distributions in the world, providing developers with an outstanding mix of usability and reliability, as well as a rich ecosystem with security and support.

Message from the EiC

Dear Readers,

I am truly honored and humbled to step into this role. I thank the past Editors-in-Chief for their dedication and unwavering commitment to bringing quality content to you all.

In the July edition, we bring you the latest news and activities in our community, upcoming conferences, paper deadlines, an insightful article on what DAG Generators are, 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

SIGDA EC

5. Semidynamics benchmarks 7bn parameter model on RISC-V AI IP

Spanish RISC-V IP developer Semidynamics has benchmarked the performance of its Tensor Unit running a LLaMA-2 7B-parameter Large Language Model (LLM) on an 'all in one' RISC-V AI IP core.

6. Chipelets drive new automated design tools at Leti

CEA-Leti has shown a scalable chipelet architecture for automotive and developed new automated tools for design exploration.

7. Startup Etched raises US\$120m to bet on transformer-only ASIC

Etched.ai Inc. (Cupertino, Calif.), a 2022 startup, has raised US\$120 million in Series A round of funding to develop a transformer-only ASIC called Sohu and take on Nvidia.

8. Squeezed light for photonic quantum computing

NTT Research in Japan is developing a new type of photonic quantum computer that could be faster and use less power.

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Communications Chair

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Finance Chair

Message from Outgoing Editors-in-Chief

Message from Debjit Sinha

Dear ACM SigDA newsletter readers,

This farewell message comes with a mix of emotions – pride, gratitude, and a touch of melancholy. It has been an honor to be associated with the newsletter for more than 10 years now (in various AE roles, and the current one). These past years have been an incredible journey. We've seen major changes to the newsletter including the introduction of innovative sections as well as a completely new format. I'm proud of what we've achieved together.

Most importantly, I want to express my sincere gratitude to all of you. To the dedicated team who tirelessly brought exceptional content to life, thank you for your talent, resilience, and unwavering commitment. To our valued readers, your continued support has been the fuel that kept us going. This publication will always hold a special place in my heart. I've learned so much from each of you, and I'm confident that the future is bright.

While I'm moving on to new endeavors, I'll be cheering you on from the sidelines. Please keep up the excellent work!

With warmest regards,
Debjit Sinha

Message from Keni Qiu

Dear ACM SigDA newsletter readers,

Before I say “goodbye”, I need to say, “thank you”. Thanks for the e-newsletter platform where we have shared a lot during the past four years. Looking back, it is such a great honor to have worked with the talented SigDA committee and e-news team. We together say yes to deadlines, yes to adventure, yes to excitement. The team and the workplace have been a nurturing ground to shape me and improve me. I believe this journey will fill my heart with cherished memories and an encouraging mind to meet the future.

I would like to especially express my appreciation to my mentors, Sharon, Yiran and Aida, for their invaluable guidance and faith in me. I will carry your advice as a beacon in my future endeavors.

The SigDA e-newsletter is evolving. I am confident that she will achieve greater success with a brighter future.

With warmest regards,
Keni Qiu

What is

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What is a DAG Generator?

Wanli Chang
Professor
College of EECS
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There are complex execution dependencies in many application domains, including deep learning, automotive, wireless communication, etc. Directed Acyclic Graph (DAG) task models are deployed to effectively and flexibly capture such dependencies. A DAG generator is a tool for creating

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DAG models. It can be used to evaluate the performance of algorithms applied to DAGs, such as scheduling, make comparisons, and guide their evolving.

There are two major types of DAG generators: enumeration-based and random-based. In order to evaluate a scheduling algorithm on DAGs without bias, it is essential to generate all DAG topologies within the parameter ranges, such as depth, width, number of nodes, edges, and connected components, shape, and in/out-degree, pertinent to each application domain [1]. The enumeration-based DAG generators are able to fulfill this requirement, and recursive enumeration is a popular method [2]. Random-based generators strive to generate sample DAGs uniformly on certain parameters of interest. There are different methods [1], including classical recursive/counting approaches incorporating random variables, random order methods, and Markov Chain Monte Carlo methods. Some work focuses on large-scale DAG task model generation [3] and fast random task model generation [4]. All these works have yielded various related tools, such as TGFF [5], GGen [6], DAGEN [7], XL-STaGe [8], MRTG [9], Random Workflow Generator [10], and RD-Gen [11].

However, to achieve full coverage, existing enumeration-based DAG generators produce a significant amount of redundant DAGs, hence suffering the scalability issue. Existing random-based DAG generators are unable to provide full topology coverage, resulting in biased results [1]. To address this, the DAG generator proposed in [12] avoids generating redundant DAGs and increases the controllable parameters. While previous research has improved the efficiency of DAG generation through algorithms and accelerators, the generators still face challenges of low generation speed, high computational cost, and significant memory overhead in large-scale DAG generation scenarios [3], calling for further efforts from the design automation community.

References

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- [2] Panafieu, Élie. "Analytic combinatorics of connected graphs." *Random Structures & Algorithms* 55.2 (2019): 427-495.
- [3] Wang, Cheng, Omar Lizardo, and David Hachen. "Algorithms for generating large-scale clustered random graphs." *Network Science* 2.3 (2014): 403-415.
- [4] Nobari, Sadegh, et al. "Fast random graph generation." *Proceedings of the 14th international conference on extending database technology*. 2011.

Paper Deadlines

ASP-DAC'25 - Asia and South Pacific Design Automation Conference

Tokyo Odaiba Miraikan, Japan
Deadline: July 12, 2024 (Abstracts due: July 5, 2024)
Jan. 20-23, 2025
<http://www.aspdac.com>

Special Issue on Large Language Models for Electronic System Design Automation ACM TODAES

Deadline: July 31, 2024
https://dl.acm.org/pb-assets/static_journal_pages/todaes/pdf/TODAES_LLMSI_CfP.pdf

ISED'24 – Int'l Conference on Intelligent Systems and Embedded Design

NIT Rourkela, Odisha
Deadline: Aug. 15, 2024
Dec. 20-22, 2024
<http://isedconf.org>

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[9] Ashish, Mishra, et al. "A modular approach to random task graph generation." Indian Journal of Science and Technology 8 (2016): 8.

[10] Gupta, Indrajeet, Anubhav Choudhary, and Prasanta K. Jana. "Generation and proliferation of random directed acyclic graphs for workflow scheduling problem." Proceedings of the 7th International Conference on Computer and Communication Technology. 2017.

[11] Yano, Atsushi, and Takuya Azumi. "RD-Gen: Random DAG generator considering multi-rate applications for reproducible scheduling evaluation." 2023 IEEE 26th International Symposium on Real-Time Distributed Computing (ISORC). IEEE, 2023.

[12] Fang, Yinjie, et al. "Brief Industry Paper: A DAG Generator with Full Topology Coverage." 2023 IEEE RTSS.

SIGDA Awards

1. Best Paper Award @ GLSVLSI 2024 (<http://www.glsvlsi.org/>)

- EDA-schema: A Graph Datamodel Schema and Open Dataset for Digital Design Automation
Authors: Pratik Shrestha, Alec Aversa, Saran Phatharodom, and Ioannis Savidis
- Application of Quantum Tensor Networks for Protein Classification
Authors: Debarshi Kundu, Archisman Ghosh, Srinivasan Ekambaram, Jian Wang, Nikolay Dokholyan, and Swaroop Ghosh
- Incremental SAT-based Exact Synthesis
Authors: Sunan Zou, Jiaxi Zhang, and Guojie Luo

Upcoming Conferences

ISVLSI'24 – IEEE Computer Society Annual Symposium on VLSI

Knoxville, TN

July 1-3, 2024

<http://www.ieee-isvlsi.org>

ICECET'24 - IEEE International Conference on Electrical, Computer and Energy Technologies

Sydney, Australia

July 25-27, 2024

www.icecet.com

ISLPED'24 – ACM/IEEE Int'l Symposium on Low Power Electronics and Design

Newport Beach, CA

Deadline: Mar. 11, 2024 (Abstracts due: Mar. 4, 2024)

Aug. 5-7, 2024

<http://www.islped.org>

RTCSA'24 - The 30th IEEE International Conference on Embedded and Real-Time Computing Systems and Applications

Sokcho, South Korea

Aug. 21-23, 2024

<https://rtcsa2024.github.io/>

MLCAD'24 - ACM/IEEE Workshop on Machine Learning for CAD

Snowbird, Utah

Sep. 9-11, 2024

<https://mlcad-workshop.org/>

2. Best Poster/LBR Award @ GLSVLSI 2024 (<http://www.glsvlsi.org/>)

- System Architecture Optimization for Vertical Power Delivery
Authors: Sriharini Krishnakumar, Yaroslav Popryho, and Inna Partin-Vaisband
- Advanced Continuous-Time Convolution Framework for Security Assurance in Wireless Sensor Networks
Authors: Mohammad Monjur and Qiaoyan Yu
- Word2HyperVec: From Word Embeddings to Hypervectors for Hyperdimensional Computing
Authors: Alaaddin Goktug Ayar, Sercan Aygun, M. Hassan Najafi, and Martin Margala

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. [SK Hynix Speeds HBM Roadmap as AI Demand Soars](#)

SK Hynix has rolled out a roadmap indicating that the company will continue to dominate production of high-bandwidth memory (HBM) that

ESWEEK'24 - Embedded Systems Week

Raleigh, NC

Sept. 29 - Oct. 4, 2024

<http://www.esweek.org>

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/>

ICCD'24 – IEEE Int'l Conference on Computer Design

Milan, Italy

Nov. , 2024

<http://www.iccd-conf.com>

MICRO'24 – IEEE/ACM Int'l Symposium on Microarchitecture

Austin, Texas

Nov. 2-6, 2024

<http://www.microarch.org/micro57>

iSES'24 – IEEE Int'l Symposium on Smart Electronic Systems

Ahmedabad, India

Dec. 16-18, 2024

<http://www.ieee-ises.org>

is indispensable for AI. The lead that the company has gained over rival memory makers Samsung and Micron will face stiffer competition...

2. Sarcina Unveils Bump Pitch Transformer Capabilities

Sarcina Technology, the Application Specific Advanced Packaging (ASAP) Design Service and Production leader, today unveiled its Bump Pitch Transformer design capabilities that slash 2.5D packaging NRE and production costs while significantly reducing design cycle time...

3. Microchip Rad-hard MCU Targeted at Aerospace and Defense Market

Space exploration is experiencing a resurgence with exciting new missions such as the highly anticipated Artemis II mission, the recent successful lunar landing missions such as JAXA SLIM and Chandaaryan-3, and New Space deployments in Low Earth Orbit (LEO). Designers require electronic components that meet stringent radiation and reliability standards to operate in the harsh environments found in space...

4. The Autonomous Car Industry in 2024: Sensors, Software and Safety

The automotive industry is going through the most transformative journey in its history. Only 15 years ago, autonomous cars were a pipe dream; electric cars were the butt of jokes; and safety was reactive, aiming to minimize the consequences of collisions rather than prevent them. Now, in 2024, autonomous mobility services are available to the public across the U.S. and China; electric cars are a desirable mainstream option; and the future of safety is preventative, trying to ensure crashes never happen...

Job Positions

1. University of Copenhagen, Denmark

Job Title: Assistant/Associate/Full Professor of Computer Science

Description: We are looking for an outstanding, experienced researcher with an innovative mindset and intellectual curiosity to strengthen and complement the department's research profile within Digital Learning and Education. We look for candidates with specialized knowledge about learning analytics for higher and secondary education, digital education, and digital transformation of educational institutions. Additional research areas include but are not limited to theoretical and technological aspects of learning analytics; quantitative and qualitative research methods; practical applications such as dashboards and feedback systems; institutional analytics, human factors, and concerns in relation to fairness or ethics. Candidates are expected to publish in premier venues within

technology-enhanced learning, including but not limited to Learning Analytics and Knowledge, Artificial Intelligence and Education, Journal of Learning Analytics, British Journal of Educational Technologies, and Computers and Human Behaviour. The position is affiliated with the Center for Digital Education which is a joint effort between Department of Science Education and Department of Computer Science, which aims at connecting experts from computer science and science education to explore the possibilities and consequences of the digitalization of STEM education across the school system. The Associate Professor will be employed at the Department of Computer Science but some obligations related to the position may be shared among the Department of Computer Science and the Department of Science Education. Duties include the applicant's own research, development of the field, assessment tasks, grant applications, and research management such as supervision and training of research fellows and other staff. The successful applicant must also teach, supervise, prepare and participate in examinations, and fulfill other tasks requested by the Department. For more information, please refer to <https://facultyvacancies.com/assistantassociatefull-professor-of-computer-science.i39226.html>.

2. Technical University Munich, Germany

Job Title: Postdoctoral Position in Software Engineering

Description: The Chair for Aircraft Design is looking for a doctoral researcher in the field of Aircraft Design Software Engineering. As part of a national multi-university research group you will be working on an open source aircraft design framework to support research (and teaching) on future aircraft concepts. You will work at the interface of software engineering and aircraft conceptual design. The candidate we seek to join our team as a research associate in aircraft design software engineering must possess a strong background in software development and, ideally, aerospace. Therefore, you should bring a MSc. or Dipl. degree in informatics, or similar, well above average, showcasing a proficiency in programming languages such as Modern C++ and Python. The ideal candidate should have a track record of successful software projects, preferably in the aerospace domain, and a passion for exploring innovative solutions to complex engineering challenges. Thus, you should be interested in cooperation with other groups, bring good communication, and writing skills in English to publish scientific papers. Besides research activities, you will also contribute to the lectures and organizational tasks of the chair. For more information, please refer to <https://facultyvacancies.com/postdoctoral-position-in-software-engineering.i39124.html>.

3. ETH Zurich, Switzerland

Job Title: PhD Position in Electrical Engineering

Description: In the framework of the NCCR Automation, we are looking for a motivated doctoral student to investigate and develop methods which target energy system design and operation jointly. To date, the traditional methods of planning and operating energy systems have been mostly separated. A particular focus of our novel approach lies on investigating bi-level optimization and/or diffusing timescale methods which serve as candidates for energy system related applications. Challenges encompass - among others - harmonizing the differing design and control objectives, bridge the differing timescales of interest and comparing and contrasting candidate approaches. We plan to utilize historical data in the Empa's NEST demonstrator and its multi-energy backbone to design and test novel electrical and thermal energy management systems. Later in the doctorate we envision real-life deployment of the resulting methods to the design of the energy system of a district in Switzerland. Your goal will be to translate your own research ideas to tackle these challenges, in close collaboration with our interdisciplinary team and external scientific and industry partners. As part of this process, you will support our master students, publish in scientific journals, and participate in conferences. For more information, please refer to <https://facultyvacancies.com/phd-position-in-electrical-engineering,i39200.html>.

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