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da Design Automation
The resource for EDA Professionals

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Comments from the Editors

Dear ACM/SIGDA members,

We are excited to present to you December E-Newsletter. We encourage you to invite your students and colleagues to be a part of the SIGDA newsletter. The newsletter covers a wide range of information from the upcoming conferences and hot research topics to technical news and activities from our community. Get involved and contact us if you want to contribute an article or announcement.

The newsletter is evolving. Please let us know what you think.

Happy reading!

Debjit Sinha, Keni Qiu, Editors-in-Chief, SIGDA E-News

To renew your ACM SIGDA membership, please visit http://www.acm.org/renew or call between the hours of 8:30am to 4:30pm EST at +1-212-626-0500 (Global), or 1-800-342-6626 (US and Canada). For any questions, contact acmhelp@acm.org.

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SIGDA News

(1) "Qualcomm Teases Its Latest 5G Chipset – The Snapdragon 888"
[https://www.eetimes.com/qualcomm-teases-its-latest-5g-chipset-the-snapdragon-888...]

Qualcomm kicked off its highly anticipated and typically very well attended Snapdragon Tech Summit Tuesday morning, December 1st. While past Snapdragon Tech Summits have been about the promise of 5G, this one was more about the progress of 5G and a brief introduction to the company' s latest mobile SoC for premium 5G smartphones – the Snapdragon 888.

(2) "With 5G, Indoor Coverage is a Challenge"
[https://www.eetimes.com/with-5g-indoor-coverage-is-a-challenge/]

According to a widely cited statistic, some 80% of all mobile calls and data traffic is accessed indoors, either in homes or commercial buildings. This is likely to change as operators begin in earnest rolling out 5G networks, however.

(3) "Exposing Apple Mini M1 SoC"
[https://www.eetimes.com/exposing-apple-mini-m1-soc/]

After years of speculation and months of anticipation, Apple launched their first desktop and laptop computers powered by their own in-house chip design — M1 SoC. Apple and anticipation need no explanation. Buzz is their business.

(4) "Micro Magic RISC-V Core Claims to Beat Apple M1 and Arm Cortex-A9"
[https://www.eetimes.com/micro-magic-risc-v-core-claims-to-beat-apple-m1-and-arm-...]

Micro Magic has introduced what it claims is the world' s fastest 64-bit RISC-V core — a device it says outperforms the Apple M1 chip and Arm Cortex-A9. The company feels it has elegantly implemented David Patterson' s original vision for the reduced instruction set computer (RISC) architecture, working comfortably within the power budgets of today' s battery-powered devices.

(5) "Neuromorphic Startup Targets Applications Beyond Cameras"
[https://www.eetimes.com/neuromorphic-startup-targets-applications-beyond-cameras...]

Dutch neuromorphic computing startup Innatera Nanosystems has completed a seed funding round, raising €5 million (around $6 million). Innatera claims its chip will allow sensor data to be processed 100x faster and with 500x less energy than using conventional digital processing.

(6) "FeFET Memory Startup gets $20m to Turn Logic into Memory Cells"
[https://www.eetimes.com/fefet-memory-startup-gets-20m-to-turn-logic-into-memory-...]

The Ferroelectric Memory Company (FMC), a startup in Dresden, Germany, has raised $20 million in an oversubscribed series B funding round, to bring its ferroelectric field-effect transistor (FeFET) memory solution to the non-volatile memory market.

(7) "Snapdragon Ups Ante in Photography, Mobile Gaming"
[https://www.eetimes.com/snapdragon-ups-ante-in-photography-mobile-gaming/]

Day two of the Qualcomm Snapdragon Tech Summit provided the details of Snapdragon 888. As we indicated in our previous article, Qualcomm focused technology enhancements of the new SoC on improving three key areas: the camera, gaming, and AI.

(8) "Mythic AI Accelerator Targets High-End Edge With 35 TOPS"
[https://www.eetimes.com/mythic-ai-accelerator-targets-high-end-edge-with-35-tops...]

AI accelerator chip startup Mythic has launched its first product, a 35-TOPS "high-end edge" accelerator whose analog compute-in-memory architecture enables low power consumption and low cost, alongside low latency and deterministic behavior.

(9) "AI on the Factory Floor Challenges Cybersecurity"
[https://www.eetimes.com/ai-on-the-factory-floor-challenges-cybersecurity/]

From the standpoint of cybersecurity, the use of AI and machine learning on the factory floor has both strengths and weaknesses. Both can help improve monitoring, detection, and prevention of threats and attacks, especially for Industry 4.0 endpoints. But smart manufacturing systems that rely on these technologies can be probed and manipulated by bad actors.

(10) "Cybersecurity Standards in OT and Industrial IoT"
[https://www.eetimes.com/cybersecurity-standards-in-ot-and-industrial-iot/]

It's fair to say that cybersecurity for operational technology (OT) and industrial control systems (ICS) lags quite considerably behind that of enterprise IT. Yet the move towards Industrial IoT (IIoT) means it is now vital to close this gap and protect not just manufacturing processes but also critical infrastructure such as energy, health, and transportation.

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"What is" Column

What is Machine Learning Assisted EDA System?

Cunxi Yu

Assistant Professor

Electrical and Computer Engineering Department

University of Utah

Targeted specialization of functionality in hardware has become arguably the best means for enabling improved compute performance and energy efficiency. However, as the complexity of modern hardware systems explodes, fast and effective hardware explorations are hard to achieve due to the lack of guarantee in the existing in electronic design automation (EDA) toolflow [1]. Recent years have seen increasing employment of machine learning (ML) techniques in EDA, which aims to

reduce the manual efforts and boost the design closure process in modern toolflows. In general, ML techniques have been leveraged to build a more accurate forecast model to estimate the quality-of-results (QoRs) at the end of the EDA design flows, which is then used to guide and accelerate the design space exploration process. These approaches have demonstrated promising performance in accelerating the exploration process and improving QoRs over hand-crafted design flows.

Various ML-based approaches have been developed to automatically optimizing toolflow configurations for modern FPGA and ASIC design, mainly focusing on two categories: 1) heuristics exploration [2][3][4] and 2) sequential decision making [5][6]. For example, a fast and accurate design space exploration framework for end-to-end industrial ICs design flow exploration, where a multi-fidelity estimation model is used to guide searching for optimal heuristic settings [2][3][4]. As EDA flows are sequences of heuristic algorithms that could be permutated differently, exploring permutable design flow space can be formulated as a sequential decision-making problem. Such classic decision-making problems can then be solved with classic algorithms such as Multi-armed Bandits [6] and deep learning approaches such as Recurrent Neural Networks [4][5]. More interestingly, we have seen increasing number of neural network based computer vision techniques being used to in ML-assisted EDA system, particularly for the placement and routing (PnR) stage. For example, forecasting the routing congestion can be formulated as an image colorization problem, and can be explored with generative neural networks [7][8].

In summary, ML techniques have been demonstrated to be effective in accelerating the exploration of EDA toolflows for both AISC and FPGA designs. More importantly, with the trends of increasing autonomy in EDA introduced by ML, a fully autonomous EDA system can also be expected in the future, e.g., Google demonstrates that placement could be solved with reinforcement learning algorithms [9]. However, there are still many challenges (also opportunities) of leveraging ML in EDA, such as limited machine explainability, lacking labeled data points, security and privacy threats, open-source community, etc.

References

[1] Yu, Cunxi, Chau-Chin Huang, Gi-Joon Nam, Mihir Choudhury, Victor N. Kravets, Andrew Sullivan, Maciej Ciesielski, and Giovanni De Micheli. "End-to-end industrial study of retiming." In 2018 IEEE Computer Society Annual Symposium on VLSI (ISVLSI), pp. 203-208. IEEE, 2018.

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[8] Xie, Zhiyao, Yu-Hung Huang, Guan-Qi Fang, Haoxing Ren, Shao-Yun Fang, Yiran Chen, and Jiang Hu. "RouteNet: Routability prediction for mixed-size designs using convolutional neural network." In 2018 IEEE/ACM International Conference on Computer-Aided Design (ICCAD), pp. 1-8. IEEE, 2018.

[9] Mirhoseini, Azalia, Anna Goldie, Mustafa Yazgan, Joe Jiang, Ebrahim Songhori, Shen Wang, Young-Joon Lee et al. "Chip Placement with Deep Reinforcement Learning." arXiv preprint arXiv:2004.10746 (2020).

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Paper Submission Deadlines

TAU' 21 – ACM Int' l Workshop on Timing Issues in the Specification and Synthesis of Digital Systems
Monterey, CA
Deadline: Jan 9, 2021
Apr 8-9, 2021
http://www.tauworkshop.com

FCCM' 21 - The 29th IEEE International Symposium On Field-Programmable Custom Computing Machines
Orlando, FL
Deadline: Jan 11, 2021 (Abstracts due: Jan 4, 2021)
May 9 – May 12, 2021
https://www.fccm.org/

DAC' 21 – Design Automation Conference
San Francisco
Deadline: Jan 20, 2021 (Designer Track, Embedded Track, and IP Track), Mar 5, 2021 (Late Breaking Results)
http://www.dac.com/

ISED' 21 – 10th Int' l Symposium on Embedded Computing & System Design
Kollam, India
Deadline: Apr 25, 2021
Jul 16-18, 2021
http://isedconf.org

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Upcoming Conferences and Symposia

ICDCS'20 – IEEE Int'l Conference on Distributed Computing Systems
Virtual
Nov 29 - Dec 1, 2020
https://icdcs2020.sg

HOST'20 – IEEE Int' l Symposium on Hardware-Oriented Security and Trust
Virtual Conference
Dec 7-11, 2020
http://www.hostsymposium.org

FPT'20 - Int'l Conference on Field-Programmable Technology
Virtual

Dec 7-11, 2020
http://icfpt.org

HiPC'20 – IEEE Int'l Conference on High Performance Computing, Data, And Analytics
Pune, India
Dec 16-19, 2020
http://www.hipc.org

iSES' 20 – IEEE Int' l Symposium on Smart Electronic Systems
Chennai, India
Dec 14-16, 2020
http://www.ieee-ises.org

ASP-DAC'21 - Asia and South Pacific Design Automation Conference
Virtual Conference
Jan 18-21, 2021
http://www.aspdac.com

HiPEAC'21: Int'l Conference on High Performance Embedded Architectures & Compilers
Budapest, Hungary
Jan 18-20, 2021
https://www.hipeac.net/2021/budapest

DATE'21 - Design Automation and Test in Europe
Grenoble, France
Feb 1-5, 2021
http://www.date-conference.com

ISSCC'21 – IEEE Int'l Solid-State Circuits Conference
San Francisco, CA
Feb 14-18, 2021
http://isscc.org

VLSID'21 – International Conference on VLSI Design & International Conference on Embedded Systems
Virtual Conference
Feb 20-24, 2021
http://embeddedandvlsidesignconference.org/

FPGA' 21 – ACM/SIGDA Int' l Symposium on Field-Programmable Gate Arrays
Virtual Conference
Feb 28-Mar 2, 2021
http://www.isfpga.org

ISPD' 21 – ACM Int' l Symposium on Physical Design (canceled)
Mar 21-24, 2021
http://www.ispd.cc

ISQED'21 - Int'l Symposium on Quality Electronic Design
Santa Clara, CA
Apr , 2021
http://www.isqed.org

RTAS'21 – 27th IEEE Real-Time and Embedded Technology and Applications Symposium
Nashville, USA
May 18-21, 2021

http://2021.rtas.org

ISCA' 21 – Int' l Symposium on Computer Architecture
Valencia, Spain
May 22 – 26, 2021
https://iscaconf.org/isca2021/

DAC' 21 – Design Automation Conference
San Francisco
Jul 11 - 15, 2021
http://www.dac.com/

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Call for ACM/SIGDA Chair and Executive Committee Members Nominations

(1) ACM SIGDA CHAIR Nominations

ACM SIGDA invites nominations for elections for the chair position. All applicants for the chair should have significant service experience of at least 3 years in the design automation community and SIGDA, in particular. They should have served at least one term in the executive committee in roles other than the chair. Equivalent experience through service to SIGDA-approved sponsored conferences as deemed acceptable by the nominating committee will be allowed. Nominees for chair cannot run for other Executive SIGDA positions in the same election cycle. Nominations committee will select final nominees for the elections.

Nominations (including self nominations can be made) to the chair of nominations committee, Prof. Vijay Narayanan (vxn9@psu.edu) with Subject: ACM SIGDA CHAIR nominations by 5 pm New York time on Nov 30, 2020. Nomination should include a brief one paragraph position statement.

(2) ACM SIGDA Executive Committee Position Nominations

ACM SIGDA invites nominations for elections to the Executive Committee (EC). The EC typically consists of five members who oversee various activities including Finance, Communications, Conferences, Technical Activities, Educational Activities, and Awards. The EC members will determine their specific roles in the committee after their election, along with an elected chair and past chair.

Nominations (including self nominations can be made) to the chair of nominations committee, Prof. Vijay Narayanan (vxn9@psu.edu) with Subject: ACM nominations by 5 pm New York time on Nov 30, 2020. Nomination should include a brief one paragraph position statement and a one paragraph biography.

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Call for Nominations for ACM/SIGDA Outstanding Ph.D. Dissertation/New Faculty Awards

The deadline has been extended to Dec. 7, 2020

(1) ACM Outstanding Ph.D. Dissertation Award in Electronic Design Automation

Design automation has gained widespread acceptance by the VLSI circuits and systems design community. Advancement in computer-aided design (CAD) methodologies, algorithms, and tools has become increasingly important to cope with the rapidly growing design complexity, higher performance and low-power requirements, and shorter time-to-market demands. To encourage

innovative, ground-breaking research in the area of electronic design automation, the ACM's Special Interest Group on Design Automation (SIGDA) has established an ACM award to be given each year to an outstanding Ph.D. dissertation that makes the most substantial contribution to the theory and/or application in the field of electronic design automation.

The award consists of a certificate and a check for $1,000 and is presented at the Design Automation Conference, which is held in June/July of each year. The award is selected by a committee of experts from academia and industry in the field and appointed by ACM in consultation with the SIGDA Chair.

Deadline: November 30th of each year (extended to Dec. 7 this year)

Nomination requirements: Each department of any university may nominate at most two Ph.D. dissertations whose final submission date is between July 1st of the previous year and June 30th of the current year. Each nomination package must be emailed by November 30 (extended to Dec. 7) and should consist of:
1. The PDF file of the Ph.D. dissertation. If the nominated Ph.D. dissertation is not written in English, an English translation of the entire dissertation must be included in the nomination package.
2. A statement (up to two pages) from the nominee explaining the significance and major contributions of the work.
3. A nomination letter from nominee's department chair or dean of the school endorsing the application.
4. Optionally, up to three letters of recommendation from experts in the field. These letters may be included in the nomination package or sent separately to the address below.
The nomination materials should be emailed to SIGDA-Award@acm.org (Subject: ACM Outstanding Ph.D. Dissertation Award in EDA).

All standard conflict of interest regulations as stated in ACM policy will be applied (see https://awards.acm.org/conflict-of-interest). Any awards committee members will recuse themselves from consideration of any candidates where a conflict of interest may exist. For more information, https://www.sigda.org/awards/opda/

(2) SIGDA Outstanding New Faculty Award

The SIGDA Outstanding New Faculty Award recognizes a junior faculty member early in her or his academic career who demonstrates outstanding potential as an educator and/or researcher in the field of electronic design automation. While prior research and/or teaching accomplishments are important, the selection committee will especially consider the impact that the candidate has had on her or his department and on the EDA field during the initial years of their academic appointment. The award is presented annually at Design Automation Conference, and currently consists of a $1,000 award to the faculty member, along with a citation.

Eligibility: SIGDA Outstanding new faculty who are developing academic careers in areas in or related to electronic design automation are encouraged to apply for this award. Note that this award is not intended for senior or highly experienced investigators who have already established independent research careers, even if they are new to academia. Candidates must have recently completed at least one full academic year and no more than four full academic years in a tenure-track position. Applications will also be considered from people whose appointments are continuing (non-visiting) positions with substantial educational responsibilities regardless whether or not they are tenure track. Persons holding research-only positions are not eligible. Exceptions to the timing requirements will be made for persons who have interrupted their academic careers for substantive reasons, such as family or medical leave. The presence of such reasons must be attested by the sponsoring institution, but no explanation is needed.

Application: Candidates applying for the award must submit the following to the selection committee no later than November 30 (extended to Dec. 7) of the current year:
1. a 2-page statement summarizing the candidate's teaching and research accomplishments since

beginning their current academic position, as well as an indication of plans for further development over the next five years;
2. a copy of a current curriculum vitae;
3. a letter from either the candidate's department chair or dean endorsing the application.
The nomination materials should be emailed by the deadline to SIGDA-Award@acm.org (Subject: ACM/SIGDA Outstanding New Faculty Award).

All standard conflict of interest regulations as stated in ACM policy will be applied (see https://awards.acm.org/conflict-of-interest). Any awards committee members will recuse themselves from consideration of any candidates where a conflict of interest may exist. More info can be found https://www.sigda.org/awards/onfa/

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Technical Activities

(1) "Hardware Is Back, Says CEA-Leti's CEO"

In the opening keynote of the recent Leti Innovation Days, Emmanuel Sabonnadière, CEO of CEA-Leti, described Leti's commitments and actions for a world dramatically altered by Covid-19 pandemic. Not only is hardware making a comeback, but it is a game changer...
[https://www.eetimes.eu/hardware-is-back-says-cea-letis-ceo/]

(2) "Europe Regulates 6GHz, While Wi-Fi 7 is on the Horizon"

European regulators have been coming under increasing pressure regarding the slow pace at which the necessary lower 6-GHz band for Wi-Fi and its successor, Wi-Fi 6E, has been made available in the region...
[https://www.eetimes.eu/europe-regulates-6ghz-while-wi-fi-7-is-on-the-horizon/]

(3) "THE REDEMPTION OF AMD IN HPC"

Many of the technologists at AMD who are driving the Epyc CPU and Instinct GPU roadmaps as well as the $35 billion acquisition of FPGA maker Xilinx have long and deep experience in the high performance computing market that is characterized by the old school definition of simulation and modeling workloads running on federated or clustered systems...
[https://www.nextplatform.com/2020/11/30/the-redemption-of-amd-in-hpc/]

(4) "IC market forecasts; new edge AI chips; automotive software"

The so-called 'semiconductor renaissance' is tightly related to the artificial intelligence boom, so this week the latest IC market growth figures fit well with the updates about new edge AI chips from well-funded startups. Automotive software is also making news, along with some last-minute additions to the virtual events calendar...
[https://www10.edacafe.com/blogs/editorial/]

Job Openings:
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(1) University of California Berkeley College of Engineering, United States

Job Title: Assistant Professor, Quantum Computing and Information Science - Electrical Engineering and Computer Sciences

Description: The University of California, Berkeley invites applications for an approved tenure-track position in Electrical Engineering and Computer Sciences at the Assistant Professor level in the

specialized area of Quantum Computing and Information Science (QCIS). The expected start date for the position is July 1, 2021. Joint appointments with department-affiliated institutes and initiatives, or other UC Berkeley departments, will also be considered. Preference will be given to applicants whose research, teaching, or service has prepared them to contribute to our commitment to diversity, equity, and inclusion in higher education. Support for faculty candidates on writing effective statements that demonstrate commitment to diversity, equity, and inclusion, can be found at: https://ofew.berkeley.edu/recruitment/contributions-diversity/support-faculty-candidates. How to Apply: To apply go to: https://aprecruit.berkeley.edu/JPF02766

(2) University of Texas Austin, Department of Computer Science, United States

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

Description: The Department of Computer Science of the University of Texas at Austin is recruiting for full-time, non-tenure track faculty (Lecturer, Assistant Professor of Instruction, Associate Professor of Instruction, Professor of Instruction) positions. For more information about the department, please visit https://cs.utexas.edu. The primary duty is teaching undergraduate courses. Teaching opportunities range from introductory computer science courses, such as computer theory, discrete math, data structures, and computer organization to advanced courses, such as game development, mobile computing and cybersecurity. Applicants should be able to teach in one or more areas of computer science. All faculty positions require a cover letter, current curriculum vita, teaching statement and three (3) professional reference letters. Letters of reference must address the candidate’ s overall quality of teaching and/or presentation skills, the ability to communicate complex topics and expertise in the field of computer science. Applications for non-tenure track positions will be considered on an on-going basis. Inquiries may be directed to faculty-search@cs.utexas.edu.

(3) The Chinese University of Hong Kong, Hong Kong

Title: Assistant Professor in Quantum Science and Technology

Description: The Department of Computer Science and Engineering, Faculty of Engineering at The Chinese University of Hong Kong is vigorously hiring faculty members in Computer Science and Computer Engineering to pursue new strategic research initiatives and to fill up vacant positions within current strengths. Applicants should have (i) a PhD degree; and (ii) a good scholarly record demonstrating (potential for) teaching and research excellence. Applicants of all levels are encouraged to apply and those in the following areas are particularly welcome: Artificial intelligence and machine learning; Bioinformatics; Computer system security or cybersecurity; Data analytics or data science; Image processing; computer graphics, AR/VR; Cyber-physical systems and Internet of things; Energy efficient acceleration for Recognition, Mining and Synthesis (RMS) applications; Hardware and embedded security; Smart hardware for human machine interaction. Applicants please upload full CV, copies of academic credentials, publication list with abstracts of selected published papers, details of courses taught and evaluation results (if available), a research plan, a teaching statement, together with names, addresses and e-mail addresses of at least three referees to whom the applicants' consent has been given for their providing references. The University only accepts and considers applications submitted online for the posts above. For more information and to apply online, please visit career.cuhk.edu.hk.

(4) Queen’ s University at Kingston, Canada

Title: Tenure-Track Faculty Position in Electrical and Computer Engineering

Description: The Department of Electrical and Computer Engineering in the Faculty of Engineering

and Applied Science at Queen’ s University invites applications for a tenure-track faculty position at the rank of Assistant Professor with specialization in a field related to circuits and systems for emerging applications, microelectronics, microsystems, optoelectronics, imaging technology. The preferred start date is July 1, 2021. The successful candidate(s) must have completed a PhD in electrical engineering, computer engineering or a related discipline by the start date of the appointment. Postdoctoral and/or industrial experience will be considered an asset. Professional engineering licensure in Canada, or the eligibility to obtain licensure, is a requirement. Note that all forms of engineering licensure in Canada are considered acceptable (e.g. P.Eng., temporary engineering license, provisional engineering license, etc.). A complete application consists of: a cover letter (including one of the two statements regarding Canadian citizenship/permanent resident status specified in the previous paragraph); a current curriculum vitae; a statement of research interests; a statement of teaching interests and experience (including teaching outlines and evaluations if available); a statement of commitment to – as well as ideas and any experience on how to ensure equity, diversity and inclusivity in scholarly activities; three sample publications; and the names and contact information of three referees. Applicants are requested to send their application package electronically as a single PDF file to the Department Head, Prof. Carlos Saavedra, at ecehead@queensu.ca with the following subject line: Application for Faculty Position. The deadline for applications is January 5, 2021; however, applications will continue to be reviewed until the position is filled.

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Notice to Authors

This newsletter is a free service for current SIGDA members and is added automatically with a new SIGDA membership.
Circulation: 2,700