



Special Interest Group on Design Automation
ACM/SIGDA E-NEWSLETTER, Vol. 51, No. 12

SIGDA - The Resource for EDA Professionals

This newsletter is a free service for current SIGDA members and is added automatically with a new SIGDA membership.
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Online archive: <http://www.sigda.org/newsletter>

SIGDA News

1. [U.S. Looks to Coordinate Global Cybersecurity](#)

A proposed U.S. State Department cyber bureau seeks to train diplomats in cybersecurity techniques needed to confront escalating attacks by hackers, many believed to be state-sponsored.

2. [Air Safety Review Delays US 5G C-Band Plans](#)

Verizon and AT&T have been forced to delay their ambitious and expensive plans to roll out 5G networks in the C-band after the FCC and the Federal Aviation Administration (FAA) demanded a review of the plans, citing potential interference issues in the mid-band spectrum with aircraft signaling.

3. [TSMC, Sony to Partner in \\$7B Fab in Japan](#)

Taiwan Semiconductor Manufacturing Co. (TSMC) and Sony will join as investors in a chip facility in Japan to address the strong demand for specialty technologies at the 28nm and 22nm process nodes, the companies said in a joint statement.

4. [NASA's Laser Demonstrations Extend to Deep Space](#)

NASA plans to launch a pair of laser communications missions over the next nine months that would demonstrate high-bandwidth optical relays capable of someday transmitting streaming HD video and other data from planetary probes.

5. [Neuromorphic Developers Partner to Integrate Sensor, Processor](#)

Messages from the E-News EiCs

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.

For this month, we are delighted to introduce a new column "Who's Who in SIGDA" and the column committee: Yi-Chung Chen (Americas), Bei-Yu (Asia and Oceania), and Hussam Amrouch (Europe and Africa). In this column, we would like to introduce our featured members to the

SynSense and Prophesee are partnering to develop a single-chip, event-based image sensor integrating Prophesee's Metavision image sensor with Synsense's DYNAP-CNN neuromorphic processor.

6. [IBM Advances Quantum Roadmap With 127-Qubit Eagle Processor](#)

IBM used its annual Quantum Summit this week to unveil the 127-qubit Eagle processor, a design it hopes will lay the groundwork for practical quantum computing.

7. [Qualcomm Takes on Nvidia for MLPerf Inference Title](#)

The latest round of MLPerf AI inference benchmark scores are in. Nvidia has dominated both MLPerf training and inference results since the beginning, but in this round Qualcomm appears to be close on Nvidia's tail when it comes to data center/edge server inference.

8. [DDR5 Ecosystem Ramps Up](#)

Like all iterations of DRAM, DDR5 will need an ecosystem of supporting technologies for it to become dominant, even as advanced workloads drive memory bandwidth requirements.

public, and offer the opportunity to the companies to know their research.

We are still in the process of updating the E-newsletter and would like to have your feedback on the new format. Here is a tiny poll and your feedback will be very helpful for us as we move forward. Thank you for your time to take the poll, this should not take more than a few seconds. Poll link: <https://www.surveymonkey.com/r/3J6G6FG>.

Happy reading!

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

Who's Who in SIGDA

"Who's Who in SIGDA" is to regularly feature our members on SIGDA Website (<https://www.sigda.org/whos-who/>) with a short article to introduce the featured members. The purpose of "Who's Who in SIGDA" is to recognize our members, introduce our members to the public, and offer the opportunity to the companies to know their research. If you find someone is worthy of being featured in "Who's Who in SIGDA", please provide the following information and send it to one of the committee members, where the one in your geographical area is preferred. The nomination information will be reviewed by the committee to decide whether the nominated researcher will be featured on "Who's Who in SIGDA".

-
- 1) Name:
 - 2) Job Title:
 - 3) Affiliation:
 - 4) Email:

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- 6) Research interests:
- 7) Short bios (300 words):
- 8) Research Highlights (450 words):
- 9) Headshot photo (please attach the photo in the email by using your name as the file name with resolution no less than 1024x1024)

Americas:

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Webpage: <https://www.iti.uni-stuttgart.de/en/institute/team/Amrouch/>

ACM SIGDA Virtual Free Events at DAC 2021

1. DAC Ph.D. Forum

10:00 am-1:00 pm PST, Dec 6, 2021

Free Registration:

<https://www.sigda.org/sigda-events/phd-forum-cfp/>

2. The DAC Early Career Workshop

(1) Session 1: Scientific Research and Funding.

7:30 AM - 9:30 AM PST, Dec 5, 2021

SIGDA E-News Editorial Board

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Ying Wang,
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Who's Who (Americas)

Bei-Yu,
Who's Who (Asia and
Oceania)

Hussam Amrouch,
Who's Who (Europe and
Africa)

(2) Session 2: Industry Collaboration and Impacts.
7:30 AM - 9:30 AM PST, Dec 6, 2021

(3) Session 3: Faculty Recruitment and Promotion.
7:30 AM - 9:30 AM PST, Dec 7, 2021

Workshop Web: <https://sites.google.com/ndsu.edu/2021-ecw/>
Free Registration: <https://forms.gle/Ci3K4KGaokHZe9R49>

What Is

What is Hyperdimensional Computing/Vector Symbolic Architectures?

*Denis Kleykom,
Visiting Scholar,
Redwood Center for Theoretical Neuroscience,
University of California at Berkeley*

Hyperdimensional Computing [1] also known as Vector Symbolic Architectures [2] (HDC/VSA) is an umbrella term that refer to a family of computational models that use high-dimensional distributed representations and rely on the algebraic properties of their key operations to incorporate the advantages of structured symbolic representations and vector distributed representations. HDC/VSA originated from the proposals of integrating the advantages of the symbolic approach to Artificial Intelligence, such as compositionality and systematicity, and those of the neural networks approach to Artificial Intelligence, such as vector-based representations, learning, and grounding [3].

Notable models in the HDC/VSA family are Tensor Product Representations, Holographic Reduced Representations, Multiply-Add-Permute, Binary Spatter Codes, and Sparse Binary Distributed Representations. A major advantage of the HDC/VSA models has been the ability to use their operations for introducing the compositionality into distributed representations. These representations constitute a single unified format to represent data of varied types and modalities [4]. This feature was leveraged for applications in such domains as machine learning [5, 6, 7], cognitive computing [8, 9], communications [10] and others.

Paper Deadlines

DAC'22 – Design Automation Conference
San Francisco, CA
Engineering Tracks Deadline: Jan. 17, 2022
July 10-14, 2022
<http://www.dac.com/>
FCCM' 22 - IEEE International Symposium On Field-Programmable Custom Computing Machines
New York
Deadline: Jan 10, 2022 (Abstracts due: Jan 3, 2022)
May 15–18, 2022
<https://www.fccm.org/>

MDTS'22 – IEEE Microelectronics Design & Test Symposium
Albany, NY
Deadline: Feb 28, 2022
May 23-25, 2022
<http://natw.ieee.org>

ISVLSI'22 – IEEE Computer Society Annual Symposium on VLSI
Cyprus
Deadline: Mar 4, 2022
July 6-8, 2022
<http://www.ieee-isvlsi.org>

VLSI-SoC'22 – IFIP/IEEE Int'l Conference on Very Large Scale Integration
Patras, Greece
Deadline: April 25, 2022 (Abstracts due: April 18, 2022)
Oct 3-5, 2022
<http://www.vlsi-soc.com>

Another important feature that contributed to the current interest in HDC/VSA is the robustness of distributed representations formed by HDC/VSA to noise and nonidealities. This is important in context of the global trend for searching computing paradigms alternative to the conventional (von Neumann) one. Examples of such paradigms are neuromorphic and nanoscalable computing, where HDC/VSA is prospected to play an important role. Existing examples of implementing HDC/VSA on unconventional hardware include, e.g., neuromorphic platforms [11], in-memory computing [12], and monolithic 3D integration hardware [13]. The fact that HDC/VSA can be implemented in various hardware platforms allows seeing it as an abstraction algorithmic layer that can be used for designing computational primitives while being agnostic to implementation details [4].

Despite the applications mentioned above, scaling-up the HDC/VSA-based solutions to real-world problems is still a challenge. There is, nevertheless, a consensus in the area that eventually, research will distill the application niches where the advantages of HDC/VSA will be self-evident. Currently, one of the promising niches seems to be tiny machine learning, and, in particular, its sub-domain of in-sensor classification of biomedical signals [14]. This application allows combining the ability of HDC/VSA to solve machine learning problems with energy-efficient implementation in hardware. Thus, HDC/VSA is a perspective computing framework for enabling machine learning functionality on unconventional hardware. For further reading on HDC/VSA covering subtleties and peculiarities of the area, please refer to tutorial-like introductory articles [1, 15] and a two-part comprehensive survey providing a broad coverage of HDC/VSA [16, 17]. Also, below there is a list of additional resources that might be useful for quickly getting up to date with the area.

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- [4] Kleyko, et al. (2021). Vector Symbolic Architectures as a Computing Framework for Nanoscale Hardware. *arXiv:2106.05268*, pages 1–28.

Upcoming Conferenc es

2nd ROAD4NN Workshop:
Research Open Automatic
Design for Neural Networks
(Co-located with DAC 2021)
San Francisco, CA
Dec 5, 2021

<https://easychair.org/cfp/ROAD4NN2021>

DAC'21 – Design Automation
Conference
San Francisco
Dec 5–9, 2021

<http://www.dac.com/>

FPT'21 - Int'l Conference on
Field-Programmable
Technology
Auckland, New Zealand
Dec 6-10, 2021

<http://icfpt.org>

DAForum'21 - SIGDA/IEEE CEDA
Ph.D. Forum at DAC 2021
San Francisco, CA
Dec 6, 2021

<https://easychair.org/cfp/daforum21>

HOST'21 – IEEE Int'l
Symposium on
Hardware-Oriented Security
and Trust

Washington DC
Dec 12-15, 2021

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- [17] Kleyko, D., et al. (2021). A Survey on Hyperdimensional Computing aka Vector Symbolic Architectures, Part II: Applications, Cognitive Models, and Challenges. *arXiv*, pages 1–36.

<http://www.hostsymposium.org>

HiPC'21 – IEEE Int'l Conference on High Performance Computing, Data, And Analytics
Bangalore, India
Dec 17-20, 2021
<http://www.hipc.org>

VLSID'22 – International Conference on VLSI Design & International Conference on Embedded Systems
Virtual Conference
Feb 19-23, 2022
<http://embeddedandvlsidesignconference.org/>

iSES'21 – IEEE Int'l Symposium on Smart Electronic Systems
Jaipur, India
Dec 20-22, 2021
<http://www.ieee-ises.org>

ASP-DAC'22 - Asia and South Pacific Design Automation Conference
Virtual Conference
Jan 17-20, 2022
<http://www.aspdac.com>

ISSCC'22 – IEEE Int'l Solid-State Circuits Conference
San Francisco, CA
Feb 20-24, 2022
<http://isscc.org>

FPGA'22 – ACM/SIGDA Int'l Symposium on Field-Programmable Gate Arrays
Monterey, CA
Feb 27 - Mar 1, 2022
<http://www.isfpga.org>

DATE'22 - Design Automation and Test in Europe
Antwerp, Belgium, and online
Mar 14-23, 2022

Technical Activities

1. [Testing Beyond the 5 Cs of IoT Testing](#)

As more IoT systems become complex and mission-critical, testing is crucial to deliver the highest-quality device and best possible customer experience...

2. [AV market consolidation; Indy AV race; solid-state batteries; acquisitions](#)

Autonomous driving tech market is consolidating; SK Innovation planning to deliver solid-state batteries by 2025; TileLink NoC silicon IP for Risc-V...

3. [Trapped Ion Paves the Way for Industrial-Grade Quantum Computing](#)

Trapped ion provides low error rate and a high connectivity between qubits. Quantum computing company IonQ is using this technology...

Job Openings

1. University of Wisconsin Madison Department of Electrical and Computer Engineering United States

Job Title: Assistant Professor in Power Electronics

Description: The Department of Electrical and Computer Engineering (ECE) at the University of Wisconsin-Madison is growing its faculty in the area of energy systems and is seeking candidates for a tenure-track position in the broad discipline of power electronics. The department is especially interested in candidates with a strong background and experimental expertise in areas such as power converter topologies, hardware integration, and controls implementation for emerging electrification applications and grid-energy systems. Candidates who transcend traditional disciplinary boundaries are especially encouraged. The University of Wisconsin-Madison is engaged in a Title and Total Compensation (TTC) Project to redesign job titles and compensation structures. As a result of the TTC project, official job titles on current job postings may change. Job duties and responsibilities will remain the same. For more information please visit: <https://hr.wisc.edu/title-and-total-compensation-study/>.

2. Hong Kong University of Science and Technology (Guangzhou)

Job Title: Founding Tenured/Tenure-Track Faculty

Description: The Hong Kong University of Science and Technology (HKUST) is a leading international university ranked 1st by Times Higher Education Young University Rankings 2020 and 27th by QS World University Rankings 2021. HKUST establishes a new campus in Guangzhou, China (hkust-gz.edu.cn). The Guangzhou campus synergizes with and maintains the same academic standard as the Clear Water Bay campus. Microelectronics Thrust is an academic department in the Guangzhou campus and focuses on integrating novel electronic and photonic devices into circuits, architecting information systems, and automating their designs and

<http://www.date-conference.com>

ISPD'22 – ACM Int'l Symposium on Physical Design
Banff, Alberta, Canada
Mar 27 - 30, 2022
<http://www.ispd.cc>

ISQED'22 - Int'l Symposium on Quality Electronic Design
California
April 6-8, 2022
<http://www.isqed.org>

RTAS'22 - IEEE Real-Time and Embedded Technology and Applications Symposium
Milano, Italy
May 4-6, 2022
<http://2022.rtas.org>

ISCA'22 – Int'l Symposium on Computer Architecture
New York City, USA
June 11-15, 2022
<https://iscaconf.org/isca2022/>

ISCAS'22 – IEEE Int'l Symposium on Circuits and Systems
Austin, TX
May 28 - June 1, 2022
<http://iscas2022.org>

optimizations. Applications should be submitted at facrecruit.hkust.edu.hk which will be open until the positions are filled. If there is any question, please contact the Acting Head, Prof. Jiang Xu, at jiang.xu@ust.hk. HKUST is committed to equal opportunity and diversity in recruitment and employment. We strongly encourage candidates of diverse backgrounds to apply.

3. National Tsing Hua University Taiwan

Job Title: Dean of the College of Electrical Engineering and Computer Science

Description: National Tsing Hua University (NTHU), Taiwan, R.O.C., invites applications or recommendations for the position of Dean of the College of Electrical Engineering and Computer Science (EECS College). The University seeks for a person with vision to provide academic, intellectual and administrative leadership for the EECS College in its mission to become one of the world's leading institute for research and teaching in electrical engineering and computer science. The starting date for the new dean is August 1st, 2022. The term is for three years and renewable for another three. All recommendations and applications will be kept confidential. Confidential inquiries may be sent to Professor TingTing Hwang, chairperson of the Search Committee, at tingting@cs.nthu.edu.tw.

SIGDA Partner Journal: ACM Transactions on Design Automation of Electronic Systems

ACM TODAES announces the introduction of the Distinguished Review Board

Reviewers who consistently return timely and quality reviews provide invaluable services to TODAES as well as to the

community. To acknowledge such reviewers' contributions, ACM Transactions of Design Automation of Electronic Systems will formally recognize such reviewers by establishing the ACM TODAES Distinguished Reviewer Board. The Distinguished Reviewer Board will be shown on TODAES webpage and will also be flagged within the Manuscript Central system.

Criteria and process:

- A Distinguished Reviewer must have reviewed 3 or more distinct papers in a 12 month period.
- A Distinguished Reviewer returns all the reviews on time.
- The reviewer has been rated by the inviting AEs to have 4 or above score (based on the quality of the reviews).
- The Distinguished Reviewer Board will go live in January 2022, and will be updated every three months.

If you are interested in being considered as a Distinguished Reviewer, please fill the form at https://docs.google.com/forms/d/e/1FAIpQLScSOiAK5KEGP9bMLw5Rrmph9SPOYdkLtIA_ECO777n2bGu0PA/viewform?usp=sf_link

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