V PAY IT FORWARD

cultivate

connect

catalyze

collaborate

VLSI

Editor-in-Chief:
Mondira Pant

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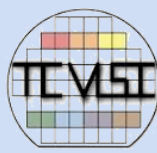
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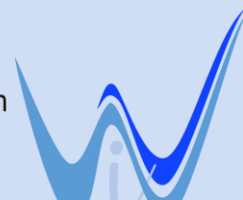
IEEE VLSI Circuits and Systems Letter

Volume 9, Issue 1, Summer 2023

Editorial

Introducing new members of the TCVLSI team

- Vice-Chair of TCVLSI – Prof Priya Panda

- TCVLSI Webmaster – Nicole Tian

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From the Editor-in-Chief's Desk - Editorial

The **IEEE VLSI Circuits and Systems Letter (VCaSL)** is affiliated with the **Technical Committee on VLSI (TCVLSI) under the IEEE Computer Societ**y. It aims to report recent advances in VLSI technology, education, and opportunities and, consequently, grow the research and education activities in the area. The letter **published** (since 2018), highlights snippets from the vast field of VLSI including semiconductor design, digital circuits and systems, analog and radio-frequency circuits, as well as mixed-signal circuits and systems, logic, microarchitecture, architecture and applications of VLSI. TCVLSI aims to encourage efforts around advancing the field of VLSI be it in the device, logic, circuits or systems space, promoting secured computer-aided design, fabrication, application, and business aspects of VLSI while encompassing both hardware and software.

IEEE TCVLSI sponsors a number of premium conferences and workshops, including, but not limited to, ASAP, ASYNC, ISVLSI, IWLS, SLIP, and ARITH. Emerging research topics and state-of-the-art advances on VLSI circuits and systems are reported at these events on a regular basis. Best paper awards are selected at these conferences to promote the high-quality research work each year. In addition to these research activities, TCVLSI also supports a variety of educational activities related to TCVLSI. Typically, several student travel grants are sponsored by TCVLSI at the following conferences: ASAP, ISVLSI, IWLS, iSES and SLIP. Funds are typically provided to compensate student travels to these conferences as well as to attract more student participation. The organizing committees of these conferences undertake the task of selecting right candidates for these awards.

The existing resource gap in VLSI is even further challenged as we enter the AI revolution. This special issue of VCaSL is focused on TCVLSI's "V" Pay It Forward campaign being launched to help bridge the resource gap. Featured are various initiatives TCVLSI is launching under this campaign. Further, shared are highlights of interviews with several global leaders in VLSI around the challenges we face today in the VLSI arena together with the opportunities ahead to address the growing importance of VLSI in the AI age. We also introduce our new TCVLSI Vice-Chair and Associate Editor, Prof Priya Panda and our new TCVLSI webmaster, Nicole Tian.

Additionally, included is a section on relevant recent announcements collated by our Associate Editor, Ishan Thakkar.

I'd like to thank Nicole Tian for designing the cover page of this newsletter. I'd like to thank the IEEE CS staff, for their professional services to make the newsletter publicly available. I'd love to hear from the readers on what you would like to see in future newsletters. I welcome recommendations/feedback via email. Happy reading.

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TCVLSI has a total of about 1100 active members as of July 2023 and a newsletter readership of about 30,000
To join TCVLSI (its free), click here: https://www.ieee.org/membership-catalog/productdetail/showProductDetailPage.html?product=CMYVLSI732

IEEE TCVLSI – New Committee Members

Professor Priya Panda

We are thrilled to welcome Prof Priya Panda as the Vice-Chair of IEEE Computer Society TCVLSI and Associate Editor of the TCVLSI Newsletter

Priya Panda is an assistant professor in the electrical engineering department at Yale University, USA. She received her B.E. and Master's degree from BITS, Pilani, India in 2013 and her PhD from Purdue University, USA in 2019. She was the recipient of outstanding student award in Physics at BITS Pilani. From 2013-14, she worked in Intel, India on RTL design for graphics power management. She has also worked with Intel Labs, USA, in 2017 and Nvidia, India in 2013 as research intern. During her internship at Intel Labs, she developed large scale spiking neural network algorithms for benchmarking the Loihi chip. She is the recipient of the 2019 Amazon Research Award, 2022 Google Research Scholar Award, 2022 DARPA Riser Award, 2023 NSF CAREER Award and 2023 DARPA Young Faculty Award. Her research interests lie in Neuromorphic Computing, Spiking Neural Networks, Energy-efficient Accelerators, and In-Memory Computing. She is an IEEE Member and has served on the technical program committees for DAC (2019-2023), DATE (2021-2023), ICCAD (2021-2023), ISLPED (2019-2023).
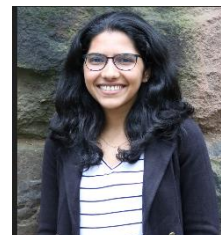
Nicole Tian

We are thrilled to welcome Nicole Tian as our new Webmaster for TCVLSI
Nicole Tian is a Class of 2026 Hahn Scholar at Yale University majoring in Computer Science and History major from the San Francisco Bay Area. She works in the Intelligent Computing Lab led by Professor Panda on spiking neural networks and processing LiDAR data and is interested in bio-plausible artificial intelligence. Her current project implements attention sharing for vision transformers to reduce the latency of LiDAR data for autonomous driving. She is a 2022 Regeneron International Science & Engineering Fair (ISEF) Finalist and the recipient of the 2022 Synopsys Science & Technology Championship Fair Grand Prize, Best of Championship, 1st Place Award in Physical Sciences category and 2020 National Center for Women & Information Technology (NCWIT) Award for Aspiration in Computing (AiC) National Honorable Mention. Outside of research, she is also part of the Dwight Hall Socially Responsible Investment Fund, Yale Undergraduate Legal Aid Association, and The Advocates for Human Rights.

"V Pay it Forward"

Mandy Pant (mondira.pant@ieee.org), Priya Panda (priya.panda@yale.edu)
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Introduction

IEEE TCVLSI is delighted to launch "**V Pay it Forward**," an exciting new initiative aimed at expanding and fortifying future contributions to the rapidly advancing field of VLSI (Very Large-Scale Integration), the cornerstone of the semiconductor industry. Our goal is to create a more appealing VLSI arena for future generations, fostering their active involvement and support. With a firm commitment to cultivating an inclusive and empowering atmosphere, this initiative places significant emphasis on nurturing a supportive community, enhancing research and recognition, promoting mentorship and leadership, and facilitating valuable networking opportunities. Our goal is to help with paving the way for a fast-paced future in VLSI that is characterized by equity and pioneering advancements, with a particular focus on empowering women in this field.

The semiconductor industry is the backbone of technology that impacts modern day human life in so many different areas be it healthcare, finance, automotive, education, consumer electronics, environment and even warfare. Needless to say, the entire AI revolution has been fueled by semiconductor advancements. Recognizing the critical role of semiconductors in driving leadership innovation, the United States government passed the Creating Helpful Incentives to Produce Semiconductors (CHIPS) Act in 2020[1]. This legislation aims to revitalize and strengthen the domestic semiconductor manufacturing industry, emphasizing the importance of maintaining a robust and diverse semiconductor workforce, a significant fraction of which are "VLSI" engineers. The semiconductor workforce emerges from Electrical Engineering, Electrical and Computer Engineering, Computer Engineering, Microelectronics and even related disciplines such as, Applied Physics, Biomedical Engineering, and Materials Science.

As the demand for skilled professionals in Very Large-Scale Integration (VLSI) continues to rise, it is imperative to ensure gender diversity and inclusion within the field. Women represent a significant talent pool that can contribute to the revitalization of the semiconductor workforce. However, despite their potential, we struggle to take advantage of this and women continue to remain underrepresented in VLSI disciplines.

According to recent data from US universities, there is a gender gap in the enrollment of women in VLSI. For example, a study conducted by the American Society for Engineering Education (ASEE) in 2021 revealed that women accounted for only around 20% of bachelor's degrees awarded in VLSI core competencies of electrical engineering and computer engineering combined[2]. Furthermore, the numbers decline at the graduate level, with women constituting less than 10% of master's and doctoral degrees in these fields.

The underrepresentation of women in VLSI is not only a missed opportunity for talented individuals but also a limitation on overall progress and innovation within the industry. By increasing the participation and leadership of women in these fields, we can bring diverse perspectives, fresh ideas, and unique problem-solving approaches that lead to breakthrough innovations.

The Semiconductor Research Corporation ([SRC](#)) is a leading organization in the field of VLSI research and education. SRC has been actively involved in initiatives to support women in VLSI and has contributed valuable insights and figures on the challenged enrollment of women in this field. See table below for SRC Scholar Population as published Jan 2023.

Year	Total SRC Scholars	Degree of Study			Gender[1]			Ethnicity				Citizenship	
		Bachelor's	Master's	Ph.D.'s	Male	Female	Not Reported	Asian	Caucasian[1]	URM[*,1]	Not Reported	US Citizens	International Citizens
2020	1507	11%	8%	81%	63%	17%	20%	44%	14%	12%	30%	30%	70%
2021	1263	10%	6%	84%	54%	14%	31%	45%	13%	11%	31%	29%	71%
2022	1173	10%	9%	81%	40%	13%	47%	45%	12%	12%	31%	29%	71%
2023	Reported Apr'24												
2030 Goal	≥ 5x increase	Evenly Represented			Balanced Representation - Improved Trust - Continued Advocacy								

*2022 URM = American Indian, Black, Hispanic, Middle Eastern, Pacific Islander, and those identifying as Other
[1] Starting Jan-2023 we will apply new categories for Ethnicity and also provide an option for the use of preferred pronoun(s)

According to SRC's data, the enrollment of women in VLSI-related programs remains low, highlighting the need for increased efforts to promote gender diversity and inclusion [3].

By actively engaging women in VLSI and encouraging their participation, we can strengthen the talent pool, foster innovation, and drive the advancement of the semiconductor industry. Together, we can ensure that women have an equal opportunity to contribute their expertise, skills, and unique perspectives to the exciting world of VLSI.

A message from SRC CEO, Dr. Todd Younkin

In Very-Large-Scale Integration (VLSI), we find ourselves at the heart of global innovation, with limitless possibilities that await those who embark on this exciting journey. Today, as a man helping to champion this critical domain, I stand proud to lend my voice in support of the **"V Pay it Forward" Campaign**, *pledging to do everything in my power to support its mission.*

Throughout history, women have demonstrated their brilliance, resilience, and unwavering dedication in the face of adversity. Their achievements in VLSI have enriched the field and society at large. Women bring unique perspectives and talents that foster creativity and innovation in everyone. By embracing diversity, we not only widen our talent pool but also create an inclusive environment where ideas can flourish, and breakthroughs are accelerated.

As we look forward to the next frontier of VLSI, let us stand shoulder to shoulder, regardless of gender, to collectively push the boundaries of what is imagined and then realized. Encouraging more women to pursue VLSI careers and supporting them as an ally throughout their individual journey is not just a matter of fairness, but imperative for the health and renaissance of our technologies, industry, and society.

Objectives: Paving the Way for Success with the four "C" s

TCVLSI's "**V Pay it Forward**" campaign recognizes the need to bridge the gender gap and harness the untapped potential of women in VLSI.

By empowering women to pursue higher studies and careers in VLSI, we can contribute to the revitalization of the semiconductor workforce and help shape the future of technology.

The campaign aims to inspire and support women at every stage of their educational and professional journey in VLSI. Through community building, research showcase initiatives, mentorship programs, and targeted outreach efforts, we strive to break down barriers, provide opportunities, and create a supportive environment for women to thrive in the field.

The core objectives of the "V Pay it Forward" campaign are:

1. **Connect: Building a Strong Community of Women in VLSI:** We aim to create a robust community of women in VLSI by connecting female students, professionals, and researchers. This community will provide a supportive network for women in the field and help break down barriers that hinder career advancement. Through community building activities, we aim to inspire, uplift and empower women in VLSI.

2. **Catalyze**: **Accelerate Research and Recognition in VLSI:** Our program strives to catalyze research and recognition in VLSI by providing a platform for female students and researchers to showcase their cutting-edge work. Through interviews with leading voices in VLSI from academia and industry, we aim to highlight the innovative research of female graduate students and drive advancement in the field. By recognizing innovation and fostering research excellence, we aim to create new opportunities for women in STEM.

3. **Cultivate**: **Fostering Mentorship and Leadership:** We seek to foster mentorship and leadership by organizing workshops and networking events that connect female students and researchers with experienced professionals in the VLSI field. Our outreach efforts aim to guide and support women as they pursue their careers and build a pipeline of female leaders in VLSI. Additionally, we aim to reach out to K-12 and undergraduate students, recruit students to help develop a basic curriculum, and launch competitions for high school students to promote a more balanced VLSI and electronics field.

4. **Collaborate: Partner with SRC**: By collaborating on existing opportunities presented by the Semiconductor Research Corporation (SRC) Joint University Microelectronics Program (JUMP) program, we can enhance inclusivity in long-term VLSI based strategic research relevant to the computing industry. Integrating "V Pay it Forward" workshops with annual SRC center events will facilitate meaningful connections and collaborations within the microelectronics community. This initiative will bring together researchers, students, and industry professionals from VLSI, facilitating valuable networking opportunities for women and graduate students.

The Time is Now: AI Revolution-Recognizing the Elephant in the Room

Never has it been as important a time for the VLSI community as now. The AI revolution has rapidly reshaped our world, permeating various aspects of our daily lives. From AI-powered assistants to advanced search algorithms, artificial intelligence has made significant strides, revolutionizing the way humans interact with technology. However, the rapid progress of AI is now faced with a critical bottleneck in the field of Very Large Scale Integration (VLSI), hindering its full potential. In recent years, the demand for high computation power to drive AI advancements has outpaced the traditional performance growth of VLSI chips[4]. While Moore's Law, which predicted a doubling of chip performance every two years, has been the driving force behind the technology industry, it is becoming increasingly harder to prove it out with the exponential growth of AI algorithms. This poses a significant challenge in implementing complex machine learning models efficiently on current hardware, limiting the widespread adoption of AI applications.

To address this challenge and take action for change, it is imperative to introduce new innovations and attract funding and key talent for experimentation in the VLSI industry. By leveraging cutting-edge research and development, we can spur breakthroughs in hardware development to bridge the gap between the computational requirements of AI and the capabilities of VLSI chips. By actively driving innovation in VLSI, we can pave the way for design and manufacturing of chips that can match the computing performance and power demands of the rapidly advancing AI algorithms. This requires collaborative efforts between industry, academia, and research institutions to explore new architectures, design methodologies, and optimization techniques that align with the evolving needs of AI applications. Additionally, attracting funding for experimentation is crucial to facilitate the development and implementation of these innovative solutions. By raising awareness and advocating for increased investment in VLSI research, we can secure the necessary resources to drive progress and propel the VLSI industry forward.

Through initiatives like "**V Pay it Forward**," we can foster a supportive community that recognizes the challenges and opportunities presented by the AI revolution in VLSI. By bringing together researchers, professionals, and students, we can facilitate collaboration, knowledge-sharing, and mentorship, enabling collective action to shape the future of VLSI and unlock its potential in the AI era.

Together, let us take action for change in the VLSI industry. By recognizing the transformative power of the AI revolution, advocating for innovation and funding, and fostering collaboration, we can overcome the VLSI bottleneck and pave the way for a future where AI can reach its full potential.

Addressing the Resource (Gender) Gap in VLSI - Insights from Leading Academicians and Industry Experts

In our ongoing effort to increase the population involved in the field of Very Large-Scale Integration (VLSI) by addressing the gender gap, we reached out to leading academicians and industry experts to gather their valuable insights and strategies for promoting gender diversity in the VLSI community. Here's what they shared:

Dr. Tanay Karnik from Intel highlighted the significant shortage of female talent in VLSI. He noted that the number of students opting for VLSI is small compared to those in CS-oriented disciplines. Moreover, the underrepresentation of female students pursuing STEM curricula after high school exacerbates the gender gap in VLSI. Dr. Karnik emphasized the importance of mentorship, having served as a mentor to several female graduate students. He also actively participated in high school panels to encourage young women to consider engineering careers.

Dr. Vivek De from Intel, shed light on the gender gap at the PhD level, where there is a lack of women graduates in VLSI. He attributed this trend to various factors, including the time required to complete a PhD, which may conflict with personal plans related to marriage and family. Dr. De suggested efforts such as funding women PhD candidates for their research projects and providing internship opportunities to female students in the industry to further enhance the presence and opportunities for women in VLSI.
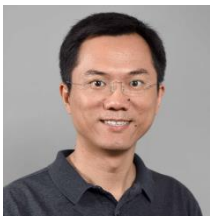
Prof Yu Cao from Arizona State University discussed the challenges in attracting students, especially minority students, to VLSI due to its high barrier to entry, including specialized terminology. She recommended introducing more real-life applications of VLSI, discussing its history and industry development, and engaging with the VLSI industry to create early career opportunities for female students. Dr. Cao also highlighted the potential of VLSI for artificial intelligence (AI) and the need to emphasize this connection to attract a more gender-diverse talent pool.

Dr. Alice Wang, representing Everactive, highlighted the "leaky pipeline" phenomenon where the gender gap widens as women progress from undergraduate studies to their careers. She emphasized the need for community-building initiatives to foster a supportive environment for women in VLSI. Wang's efforts included establishing the IEEE SSCS Women in Circuits committee, which provided a platform for women in VLSI to come together, share their experiences, and increase their visibility. She also stressed the importance of role models and diverse leadership in promoting gender diversity in VLSI.

[Prof. Rajit Manohar](#) from Yale underscored the importance of conveying the excitement and real-world impact of VLSI to students early on. He highlighted the influence of societal factors and the need to engage with high school students to generate interest in VLSI careers. Prof. Manohar emphasized the significance of positive and encouraging interactions and recognizing the top performers among female students to inspire and support their pursuit of VLSI.

[Prof. Sayeef Salahuddin](#) from UC Berkeley pointed out that the gender gap in VLSI and engineering, in general, is rooted in the lack of proper articulation of the need for engineers and their societal impact at the high school level and below. He shared his efforts in promoting gender balance, including organizing open-source design contests, mentoring female students and junior faculty, and defining research topics with societal impact. Prof. Salahuddin stressed the need for active engagement in high school education to attract more women to VLSI.

[Prof. Boris Murmann](#) from Stanford University emphasized the need to invest time and effort in outreach activities. He suggested that measuring the involvement of the community in paying it forward and the number of people they interact with might be more meaningful metrics than solely tracking.

To see the detailed responses from the above experts to the questions, click [here](#).

Calling All Change-Makers: Unleash Your Potential with "V Pay it Forward" Initiatives!

Are you ready to make a difference and shape the future of Very Large Scale Integration (VLSI)? Join us as we launch a series of exciting initiatives under the "V Pay it Forward" program. We are on a mission to empower women, promote diversity, and foster a more inclusive VLSI community. Now, it's your chance to get involved through one or more of the following areas and be part of the revolution.

1. **Community Building: Be a Catalyst for Connection**
Ignite the power of community by becoming a vital force in building a supportive network for women in VLSI. Through virtual meetups, online forums, and mentorship programs, you can help create a safe space where women can connect, share experiences, and uplift each other. Together, let's forge strong bonds and break down the barriers that hinder progress.

2. **Research Showcase: Spotlight on Trailblazers**
Be a champion for the extraordinary research conducted by women in VLSI. As a volunteer, you'll play a pivotal role in organizing insightful interviews and captivating webinars with esteemed academicians and industry experts. By shining a spotlight on their research agenda and showcasing accomplishments of their female graduate students, you can inspire more women to pursue VLSI research and open doors to new opportunities in STEM.

3. **Workshops and Networking Events: Empower and Elevate**
Harness your passion for mentorship and leadership by helping us organize transformative workshops and networking events. By connecting female students and researchers with experienced professionals in VLSI, you can provide invaluable guidance, support, and skill-building opportunities. Together, let's empower women to thrive and cultivate a pipeline of future VLSI leaders.

4. **K-12 and Undergraduate Outreach: Spark Curiosity, Ignite Passion**
Unleash your enthusiasm for inspiring the next generation of VLSI enthusiasts! Join us in developing engaging curriculum content and reaching out to high schools. By launching exciting events for high school students, you can ignite curiosity and encourage them to pursue a career in VLSI. Together, let's create a more balanced and diverse future for the field by nurturing young talent.

5. **Advocacy and Policy: Drive Systemic Change**
Step up as a catalyst for change by advocating for gender equality and diversity in VLSI. Collaborate with industry partners, academic institutions, and policymakers to promote initiatives that create an inclusive environment. Your voice can help shape policies that will pave the way for a more equitable VLSI landscape.

6. **Awareness and Outreach: Amplify the Message**
Help us raise awareness about VLSI as a career option for women through targeted outreach efforts. By showcasing success stories, organizing webinars, and partnering with educational institutions, you will inspire more women to pursue VLSI and create a diverse talent pool. Together, let's create a stronger presence for women in this dynamic field.

Join us in making a lasting impact and redefining the future of VLSI through our "V Pay it Forward" initiatives. Together, we can empower women, foster innovation, and create a thriving community. Don't miss this opportunity to be at the forefront of change!

To learn more about our initiatives and how you can get involved, visit our campaign page and reach out to us at ieee.tcvlsi@gmail.com. Let's write the next chapter of VLSI history together!

Stay Connected:

Website: https://tc.computer.org/tcvlsi
Email: ieee.tcvlsi@gmail.com

Thank you for your support and dedication to strengthening the VLSI arena.

References:

1. Creating Helpful Incentives to Produce Semiconductors (CHIPS) for America Act, Public Law No: 116-129.
2. American Society for Engineering Education (ASEE) Data Mining Project, 2021.
3. Semiconductor Research Corporation (SRC) - https://www.src.org/about/broadening-participation/
Reference:
4. Brownlee, J. (2023, February 21). The Death of Moore's Law and the Future of AI. Machine Learning Mastery. (https://machinelearningmastery.com/death-of-moores-law-and-the-future-of-ai/)

(1) How China is Building an Open National Chip Plan Around RISC-V
[https://www.hpcwire.com/2023/07/19/how-china-is-building-an-open-national-chip-plan-around-risc-v/]

China's plan to cut reliance on Western chip technology revolves around homegrown chips built using the open RISC-V architecture. China has for years has talked about moving its chip strategy toward RISC-V, a free-to-license API blueprint to build chips, but no serious action was taken. This year the China government has finally shown seriousness about funding RISC-V initiatives.

(2) Cerebras Sells $100 Million AI Supercomputer, Plans Eight More
[https://www.eetimes.com/cerebras-sells-100-million-ai-supercomputer-plans-8-more/]

G42 and Cerebras have partnered to build a significant AI supercomputer, Condor Galaxy 1, to be built this year in nearby Santa Clara, based on Cerebras hardware. Condor Galaxy 1 will consist of 64 connected Cerebras CS-2 wafer-scale AI accelerators.

(3) Quantum Computing Inc. Launches the First Quantum Photonic Vibrometer
[https://thequantuminsider.com/2023/07/20/quantum-computing-inc-launches-the-first-quantum-photonic-vibrometer/]

Quantum Computing Inc. a first-to-market nanophotonic-based quantum technology company announced the release of its first-in-a-series Quantum Photonic Vibrometer (QPV), a proprietary, powerful instrument for remote vibration detection, sensing, and inspection. This device is the first quantum accelerated photonics vibrometer available in the market today and offers significant advancements in sensitivity, speed, and resolution, capable of discerning highly obscured and non-line-of-sight objects for the first time.

(4) Lightelligence Revolutionizes Big Data Interconnect with World's First Optical Network-on-Chip Processor
[https://www.globenewswire.com/news-release/2023/06/28/2696401/0/en/Lightelligence-Revolutionizes-Big-Data-Interconnect-with-World-s-First-Optical-Network-on-Chip-Processor.html]

Lightelligence unveils Hummingbird, the first Optical Network-on-Chip (oNOC) processor for domain-specific AI workloads, integrating photonic and electronic chips with low latency and power reduction. It offers 64 transmitters and 512 receivers, supporting dense optical network topologies and future chiplet architectures for scalability.

(5) RISE project gives RISC-V an open-source software lift
[https://www.embedded.com/rise-project-gives-risc-v-an-open-source-software-lift/]

The Linux Foundation Europe has launched a new global collaborative effort to accelerate the availability of software for high-performance and power-efficient RISC-V cores running high level operating systems for a variety of market segments. Called the RISC-V Software Ecosystem (RISE) project, it brings together key players in the ecosystem with a governing board that includes Andes, Google, Intel, Imagination Technologies, MediaTek, Nvidia, Qualcomm Technologies, Red Hat, Rivos, Samsung, SiFive, T-Head, and Ventana.

(6) TinyML computer vision is turning into reality with microNPUs (μNPUs)
[https://www.embedded.com/tinyml-computer-vision-is-turning-into-reality-with-micronpus]

With smaller NNs and with a clear understanding of the workloads involved, developers could now design optimized silicon for tiny AI. This led to the micro-neural processing unit (micro NPU). By tightly managing memory organization and data flow, while exploiting massive parallelism, these small, dedicated cores can execute NN inference 10x or 100x faster than the unaided CPU in a typical MCU.

(7) For the First Time, UCIe Shares Bandwidth Speeds Between Chiplets
[https://www.hpcwire.com/2023/06/07/for-the-first-time-ucie-shares-bandwidth-speeds-between-chiplets/]

The first numbers of the available bandwidth between chiplets are out – UCIe is estimating that chiplet packages could squeeze out communication speeds of 630 GB/s, or 0.63 TB/s, in a very tight area.

TCVLSI Sponsored Conferences for 2023

Financially sponsored/co-sponsored conferences

- AEECA, IEEE Conference on Advances of Electrical Engineering and Computer Applications
  - AEECA 2023 : http://www.aeeca.com/ conference dates: Aug 18th-19th 2023
- ARITH, IEEE Symposium on Computer Arithmetic
  - ARITH 2023: http://arith2023.arithsymposium.org/ conference dates: Sept 4th-6th 2023
- ASAP, IEEE International Conference on Application-specific Systems, Architectures and Processors
  - ASAP 2023: https://www.asap2023.org/   Conference dates: July 19th -21st 2023
- ASYNC, IEEE International Symposium on Asynchronous Circuits and Systems
  - ASYNC 2023: https://www.async2023.org/ Conference dates: July 16th-19th 2023
- iSES, (formerly IEEE-iNIS) IEEE International Smart Electronic Systems
  - IEEE iSES 2023: https://ieee-ises.org/2023/ Conference dates: Dec 18th -20th 2023
- ISVLSI, IEEE Computer Society Symposium on VLSI
  - ISVLSI 2023: https://www.ufrgs.br/isvlsi2023/ Conference dates: June 20th–June 23rd 2023
- IWLS, IEEE International Workshop on Logic & Synthesis
  - IWLS 2023: https://www.iwls.org/iwls2023/ Conference dates: June 5th -6th 2023
- SLIP, ACM/IEEE System Level Interconnect Prediction
  - SLIP 2023: http://www.sliponline.org/ Conference dates: Nov 2nd, 2023

Explore conference sponsorship options with TCVLSI here: https://www.computer.org/conferences/organize-a-conference/sponsorship-options