

SIGARCH Annual Report

July 2022 – June 2023

OVERVIEW

Every year we report on our activities and initiatives along the three pillars in our mission statement – technical exchange, talent development and recognition, and outreach. These three pillars have a strong emphasis on diversity and inclusion with initiatives that have impacted communities across ACM and beyond. This report covers two years of activities because due to an inadvertent error the Annual Reports stating with 2020 covered the prior year. This year's report fixes the error by including both 2022 and 2023. This is also the last annual report with the current SIGARCH EC.

TECHNICAL EXCHANGE

SIGARCH (co-)sponsors a strong portfolio of conferences, many of which co-host a variety of highly attended specialized workshops and tutorials on leading-edge topics. We highlight below two conferences: ISCA, the premier conference for computer architecture (co-sponsored with IEEE-CS TCCA), and ASPLOS, the premier multidisciplinary systems conference that brings together architecture, programming languages, and operating systems (co-sponsored with SIGPLAN and SIGOPS).

(1) ISCA: The 49th ISCA was the first ISCA that came back to a physical meeting after COVID and was held in NYC. The conference featured 13 workshops, 9 tutorials, three keynotes, an industry track session, 22 (two-lane) technical paper sessions (with 400 submitted and 67 accepted papers), and two panels. ISCA 2022 was the second online edition of ISCA with 939 in-person and 231 remote participants and \$158,000 of sponsored funds.

The 50th ISCA was held in Orlando in June 2023 as part of FCRC. The conference featured 20 workshops, six tutorials, five plenary FCRC talks one of which one was given by Margaret Martonosi, a computer architect and the 2021 Eckert-Mauchly Award winner, another by Kunle Olukotun, a computer architect and the 2023 Eckert-Mauchly Award winner, an industry track session, and 14 technical paper sessions (with 372 papers submitted and 79 accepted). The credit for the success of ISCA 2023 also goes to the 704 in-person (and 61 remote) participants from all over the world, and to an equally passionate group of organizers who raised \$121K in industrial sponsorship funds for the conference during this difficult financial year for our industry. With additional funding from SIGARCH, TCCA, and NSF, ISCA'23 provided student travel grant support to 109 students. The conference also provided funds together with SIGARCH and CASA to support a special dinner for all ISCA students to network with PLDI students.

This edition of ISCA marked the 50th anniversary of the conference and also featured a number of events centered around this anniversary. A committee of ISCA 50 organizers put together a 25-year [volume](#) of retrospectives (following the tradition which started with ISCA 25) of 98 papers selected by a peer group of recent ISCA program chairs. The events also included a panel reflecting upon 50 years of ISCA, a set of social media posts with memories contributed from community members of various ISCA's and a speech by Mike Flynn who was the founder of ISCA, SIGARCH and TCCA.

(2) ASPLOS: ASPLOS'22 held in Lausanne, Switzerland was the first conference in our community that came back to in-person from COVID. The conference featured a strong technical program with 80

accepted papers and 397 paper submissions. The program included three keynotes, five workshops, and nine tutorials and had a total of 285 in-person and 212 remote attendees.

ASPLOS'23 was held in Vancouver, Canada. The conference was run for the first time with a multi-deadline review process allowing more time for the authors to decide when to submit their papers throughout the year and an extended window for revision and resubmission. This new process increased the number of submissions by nearly 50% and resulted in a program with 155 accepted papers (128 which appeared in ASPLOS'23 and the rest to be included in ASPLOS'24) and 588 submissions. The program included three keynotes, three workshops, and ten tutorials and had a total of 473 in-person and 53 remote attendees.

TALENT DEVELOPMENT & RECOGNITION

We have a number of awards that are given annually either by ACM/IEEE directly, by SIGARCH alone, or SIGARCH together with TCCA. José Martínez is our Awards Chair and coordinates the Maurice Wilkes and Alan Berenbaum awards. The Dissertation award has an alternating chair between a SIGARCH EC and a TCCA EC member every year. Natalie Enright Jerger coordinates the CACM highlights. The influential paper awards are coordinated by the conference chairs together with the respective steering committees or SIGARCH/TCCA chairs.

(1) ACM/IEEE Eckert-Mauchly award: This is the most prestigious award in our community given for contributions to computer and digital systems architecture. The 2022 recipient was Mark Horowitz for “contributions to microprocessor memory systems.” The 2023 recipient was Kunle Olukotun for “contributions and leadership in the development of parallel systems, especially multicore and multithreaded processors.”

(2) SIGARCH Maurice Wilkes award: This is the most prestigious award given to a researcher in the first 20 years of their career. The 2022 recipient was Moin Qureshi for “contributions to high-performance memory systems.” The 2023 recipient was Abhishek Bhattacharjee for “contributions to memory address translation used in widely available commercial microprocessors and operating systems.”

(3) SIGARCH/TCCA influential ISCA paper award: This award recognizes a paper from the ISCA 15 years earlier. The 2022 recipient was “Power Provisioning for a Warehouse-Sized Computer” by Xiaobo Fan, Wolf-Dietrich Weber and Luiz Andre Barroso. The 2023 recipient was “3D-Stacked Memory Architectures for Multi-Core Processors” by Gabriel Loh.

(4) ASPLOS influential paper award: This award recognizes ASPLOS papers from 10 or more years ago. The 2022 recipients were “Learning from Mistakes: A Comprehensive Study on Real World Concurrency Bug Characteristics” by Shan Lu, Soyeon Park, Eunsoo Seo and Yuanyuan Zhou in ASPLOS 2008, “Rethinking the Library OS from the Top Down” by Donald E. Porter, Silas Boyd-Wickizer, Jon Howell, Reuben Olinsky, Galen C. Hunt in ASPLOS 2011, and “Design and Evaluation of a Compiler Algorithm for Prefetching” by Todd C. Mowry, Monica S. Lam, Anoop Gupta in ASPLOS 1992. The 2023 recipient was “Clearing the Clouds: a study of emerging scale-out workloads on modern hardware” by Michael Feldman, Almutaz Adileh, Onur Kocberber, Stavros Volos, Mohammad Alisafae, Djordje Jevdjic, Cansu Kaynak, Adrian Daniel Popescu, Anastasia Ailamaki, Babak Falsafi in ASPLOS 2012.

(5) SIGARCH Alan D. Berenbaum Distinguished Service Award: This award is presented annually to an individual who has contributed important service to the computer architecture community. The 2022 recipient was Kathryn McKinley for “elevating awareness and mitigating harassment and discriminatory behavior, and for advancing best practices to improve diversity, equity, and inclusion in our computer architecture and broader computing communities.” The 2023 recipient was David Wood for “his exemplary stewardship of the SIGARCH-SIGHPC transition and his decades of leadership in the SIGARCH and broader computer architecture community.”

(6) SIGARCH/TCCA Outstanding Dissertation Award: This award is presented annually to recognize excellent thesis research by doctoral candidates in the field of computer architecture.

The 2022 recipient was Prakash Murali from Princeton (advised by Margaret Martonosi) for “Enabling Practical Quantum Computation: Compiler and Architecture Techniques for Bridging the Algorithms-to-Devices Resource Gap.” The award citation was “for cross-layer computer architecture and compilation techniques that facilitate practical quantum hardware and software, bridging the resource gap between quantum applications and hardware.” Honorable Mentions went to Akshitha Sriraman from University of Michigan (advised by Thomas Wenisch) for “Enabling Hyperscale Web Services” with the award citation “for contributions enhancing the efficiency and scalability of hardware and software architecture for hyperscale datacenter systems.”

The 2023 recipient was Georgios Tzimpragos from UCSB (advised by Timothy Sherwood) for his dissertation entitled “Computing with Temporal Operators.” The award citation was “for temporal logic architectures with applications to in-sensor computation and superconducting electronics.” Honorable Mentions went to Vidushi Dadu from UCLA (advised by Tony Nowatzki) for “Generalizing Programmable Accelerators for Irregularity” with the award citation “for broadening the scope of programmable accelerators by systematizing forms of irregularity across domains and exposing specialization primitives within unified task-dataflow execution models”, Udit Gupta from Harvard (advised by David Brooks and Gu-Yeon Wei) for “Enabling High Performance, Efficient, and Sustainable Deep Learning Systems at Scale” with the award citation “for contributions to hardware/software design of neural recommendation systems, recognition of the sustainability impact of large-scale AI, and development of embodied carbon models” and Gururaj Saileshwar from Georgia Tech (advised by Moin Qureshi) for “Architecting Secure Processor Caches” with the award citation “for developing principled state-of-the-art cache attacks and defenses by exploiting architectural insights.”

(7) CACM Research Highlights: SIGARCH has a four-member standing committee to nominate papers for CACM Research Highlights. The candidate papers are solicited through a survey of conference attendees as well as nominations by Program Chairs of the most prestigious conferences sponsored by SIGARCH. These candidates are then forwarded to the CACM Editorial Board to make the final decision. The nominated papers are also listed on our [website](#) to reflect the high prestige of the papers being selected. Last year, the papers nominated were “Neural Architecture Search for Program Transformation Exploration” by Jack Turner, Elliot J. Crowley, Michael O’Boyle from ASPLOS’21, “Computing with Time: Microarchitectural Weird Machines”, by Dimtry Evtvushkin, Thomas Benjamin, Jesse Elwell, Jeffrey Eitel, Angelo Sapello, Abhrajit Ghosh from ASPLOS’21, “Ten Lessons From Three Generations Shaped Google’s TPuv4i” by Norman Jouppi, Doe Hyun Yoon, Matthew Ashcraft, Mark Gottscho, Thomas Jablin, George Kurian, James Laudon, Sheng Li, Peter Ma, Xiaoyu Ma, Thomas Norrie, Nishant Patil, Sushma Prasad, Cliff Young, Zongwei Zhou, David Patterson

from ISCA'21, and “Compiler-Driven FPGA Virtualization with SYNERGY” by Joshua Landgraf, Tiffany Yang, Will Lin, Christopher Rossbach, Eric Schkufza from ASPLOS'21.

The papers nominated in 2023 are “TMO: Transparent Memory Offloading in Datacenters” by Johannes Weiner, Niket Agarwal, Dan Schatzberg, Leon Yang, Hao Wang, Blaise Sanouillet, Bikash Sharma, Tejun Heo, Mayank Jain, Chunqiang Tang, Dimitrios Skarlatos from ASPLOS 2022, “SRAM Has No Chill: Exploiting Power Domain Separate to Steal On-Chip Secrets” by Jubayer Mahmud, Matthew Hicks from ASPLOS 2022 and “NvMR: Non-Volatile Memory Renaming for Intermittent Computing” by Abhishek Bhattacharyya, Abhijith Somashekhar, Joshua San Miguel from ISCA 2022.

(8) Honoring retirees: Jointly with TCCA, we launched a program in 2017 to honor at ISCA the contributions of members of our community who are retiring or have recently retired. We did not have any announced retirees in 2023 or 2022.

(9) Remembering recently departed members: With TCCA, we also launched a program at ISCA in 2017 to remember members of our community who have passed away. At ISCA'22, we mourned the passing of Davide Giri, a PhD student at Columbia University with a tribute from his colleague Joseph Zuckerman, and Amirhossein Mirhosseini, a PhD alumnus from the University of Michigan with a tribute from his advisor Tom Wenisch. At ISCA'23, we mourned the passing of three pioneers in computing, Michel Dubois, Professor at University of Southern California, William Wulf, Professor of Computer Science at University of Virginia, and Fred Brooks Jr., Professor of Computer Science at University of North Carolina. Per Stenström, Kevin Skadron and Dave Patterson gave tribute.

(10) Student mentoring: Joel Emer has been running the “Meet a Senior Architect (MASA)” together with “Meet a Senior Student (MASS)” launched by CASA at our conferences. The programs match students with mentors (through questions asked in the conference registration form), providing students the opportunity to meet 1-on-1 with a senior architect or a senior student for about half an hour at the conference. These programs ran virtually during COVID. Mentorship is now codified at ISCA, ASPLOS and MICRO as a service with an assigned chair on the conference organizing committee and guidelines about how to run the mentorship programs. These programs collectively boast several hundreds of mentees and mentors in our conferences. As of 2022, CASA has launched an online mentorship platform called CALM which offers services beyond conferences and meeting events.

(11) Women In Computer Architecture (WICArch): WICArch was created in 2018 as part of SIGARCH to build a community of female architects, celebrate their accomplishments, and boost talent development for women in architecture. WICArch is currently chaired by Kelly Shaw with a portfolio of activities including an annual flyer showcasing women graduates in the academic market, virtual seminars, reading groups, industry engagement and conference meetups.

(12) Computer Architecture Student Association (CASA): CASA is an independent student-run organization with the express purpose of developing and fostering a positive and inviting student community within computer architecture. CASA is now run by a steering committee of 13 members. SIGARCH has been co-sponsoring CASA together with IEEE TCCA with funds for activities aligned with its mission. SIGARCH also hosts CASA on the sigarch.org website. We have funded CASA for hosting balanced mental health seminars for graduate students and networking events including a joint dinner for ISCA with PLDI students at FCRC'23.

OUTREACH

Boris Grot leads the communication team with Akanksha Jain as the content editor (for the website, announcements, and the newsletter), Adrian Sampson remains the social media editor and Jayneel Gandhi as the video editor in charge of the SIGARCH YouTube! channel. The YouTube! channel has continued to serve as a platform to host all recordings for the virtual/hybrid conferences, starting with ASPLOS'20.

(1) Computer Architecture Podcasts: The Computer Architecture Podcasts run by Lisa Hsu and Suvinay Subramanian as the editors interviews leading figures in the architecture community about cutting-edge topics in architecture, their vision, and career experiences. The podcasts are available in standard formats and are hosted at comparchpodcast.podbean.com. In 2022 and 2023 the podcasts enjoyed 7500 and 11600 downloads respectively, a 50% increase year after year.

(2) Computer Architecture Today (CAT): In 2022, CAT continued serving as a successful platform for our community members and those in related fields to discuss diverse topics of interest, thanks to its blog editor, Rajeev Balasubramonian, with the help of the associate blog editor, Christian Delimetrou. In 2023, Brandon Lucia took over as the blog editor. We thank Rajeev for his outstanding service. CAT boasts over 40 blogs a year and a few hundred thousands of views.

GRANTS & SUPPORT PROGRAMS

We have a number of grants and support programs that are coordinated and managed by our Treasurer, Karin Strauss. These include:

(1) Talent development grants: We have launched financial support for initiatives aimed at developing talent, improving well-being, and advancing diversity and inclusion for the computer architecture community. The Undergrad Architecture Mentoring Workshop (Uarch) targets boosting participation from undergrads in parts of the world and institutions with lower average participation at computer architecture conferences. In 2022 and 2023, the workshop was held at ISCA with 2022 having hosted 31 students in person and over 50 students virtually. In 2023, the selected candidates represented 14 countries, and 29 schools with 45% of students coming from outside North America, including students from Ethiopia, Nigeria, Uruguay, and Costa Rica to name a few, 45% of students being women, and 53% coming from schools that do not have a strong Computer Architecture program.

(2) Student travel grants: Student travel grants for conferences are among our flagship benefits for student members. All conferences where SIGARCH co-sponsors at a level greater than 33% are eligible for student travel grant support at levels of \$5K-\$20K. Survey results in 2016 indicated that 39% of the respondents said they would come to ISCA only if they received some travel grant and 5% of the students used personal funds to cover the difference between actual costs and these travel grants. In 2022 and 2023, we continued supporting our student members through the travel grants at sponsored conferences.

(3) Diversity and inclusion grants: SIGARCH provides financial support for a number of initiatives aimed at developing talent, improving well-being, and advancing diversity and inclusion for our members at various levels of seniority at SIGARCH-sponsored events. In 2022 and 2023, we financially sponsored CASA's Mental Health events and networking dinner with PLDI students, the Undergrad Architecture Mentoring Workshop (Uarch), Young Architect

Workshop (Yarch), and the grad cohort of CRA Committee on Widening Participation in Computing Research (CRA-WP).

(4) Companion assistance and childcare grants: SIGARCH was a pioneer in supporting travel grants for companions for childcare or disability support for those attending professional meetings while traveling. These have expanded to supporting on-site childcare in recent years.

GUIDELINES & RESOURCES FOR ORGANIZERS

With the tragic passing of a student member in our community in 2019 and the subsequent revelations of professional misconduct in our community, we have launched a number of initiatives to help improve our community's health and restore confidence in our processes. These initiatives include extending CARES' mandate to cover aid with reporting violations of publication and review policies and code of ethics, announcing clear ethics guidelines to all program committee members at ISCA and ASPLOS, and tightening security and activity tracking in HotCRP. In collaboration with TCCA, and under Martha Kim's leadership we have outlined, created and maintained "packets" for Program Chairs and General Chairs, best practices for conference reviewing and best practices for program chairs (with Boris and José collaborating with Daniel Jiménez and Moin Qureshi of TCCA). Martha has also created and maintained a document outlining guidelines for SIGARCH sponsored conferences that include high standards for review processes, well-articulated processes for the creation and maintenance of a steering committee and a commitment to diversity and inclusion from organizers.

We have also outlined a number of questions in a Computer Architecture Today [blog](#) in 2021 about ACM's processes and policies for professional misconduct. We are glad to see that ACM is taking steps in addressing some of these concerns, and that other SIGs are following a few of our guidelines for conference organizers to vet team members against ACM's sanctions database.

(1) ConflictDB: In 2020, we launched the development of ConflictDB that enables tracking both DBLP-crawled and self-declared conflicts (through two-way confirmation) for use by the community across multiple computer architecture conferences. We have finished the development and will pilot the platform with ISCA'24. We are also in touch with ACM to make this platform available to other SIGs.

(2) MASA/MASS guidelines: Gururaj Saileshwar, the MICRO'20 and ASPLOS'21 MASS/MASA chair has put together a document of best practices recommended for MASA/MASS chairs. The document outlines the timeline for setting up MASS/MASA events based on the process which was followed for ASPLOS'21.

(3) Travel grants guidelines: Dimitrios Skarlatos, the ASPLOS'23 travel grants chair has put together a document of best practices recommended for the ISCA Travel Grant Chair. The primary purpose of this document is to provide guidance to future Travel Grant Chairs as they engage in fund-raising, assigning funds to students, and perform reimbursement and reporting.

SUMMARY

SIGARCH remains a financially healthy and vibrant organization while increasing the scope of its initiatives to sponsor activities for technical exchange, talent development, and recognition, outreach, and grants/support programs with a strong emphasis on diversity and inclusion. It takes a village to launch and deliver on these initiatives. We would not be able to realize our vision without the dedication of a large number of volunteers in various [committees](#). We gratefully acknowledge the ACM staff, notably our liaisons J. C. Peeples (until 2023) and Katie Balben (from 2023 onwards), for their support and for graciously handling the increased workload.

Respectfully submitted,

Babak Falsafi, Chair

On behalf of the SIGARCH Executive Committee

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