SIGARCH Annual Report

July 2020 – June 2021

OVERVIEW

Our previous annual reports discussed the launching of several new initiatives to address each of the three components of our mission statement – technical exchange, talent development and recognition, and outreach. These three components have a strong emphasis on diversity and inclusion with initiatives that have impacted communities across ACM and beyond. Over the last year, we solidified many of these initiatives and started new ones, thanks to volunteers from the broader community. In the coming year, besides solidifying existing initiatives, we plan to focus on specific ones that help improve the health of our conferences, our community, as well as the publication and conference organization processes. Like diversity and inclusion, we hope that these initiatives transcend beyond SIGARCH and help improve other SIGs and the broader computing community.

TECHNICAL EXCHANGE

(1) Meetings: 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).

The 47th ISCA was held virtually in June 2020 due to COVID. The conference featured six workshops, nine tutorials, three keynotes, an inaugural industry track session (see below), twelve technical paper sessions (with both record submissions of 428 papers and 77 accepted papers), and twelve mini panels. ISCA 2020 was the first online edition of ISCA with a record number of registered attendees of 1,701 and $99,950 sponsored funds which were deferred for use in ISCA'21.

ASPLOS'20 was supposed to be held in Lausanne at EPFL but became the first conference in our community to go online due to COVID in March 2020. The conference featured a strong technical program with a record of 86 papers and 479 paper submissions. The program included three keynotes, five workshops, and eight tutorials. With the dedication and due diligence of the conference organizers (the program co-chairs and the general chair), the entire program moved to an online format with a sudden decision of just one week as COVID hit the world and Switzerland banned all large-scale in-person events. While the conference boasted a record number of (slack) attendees of 1,028, the lack of familiarity with online platforms and a virtual conference format resulted in a lower degree of engagement among attendees as compared to a physical conference.

(2) ISCA industrial track: To boost participation from industry, there was a proposal at the ISCA'19 business meeting to create an industry track for product papers which was well received. A recent CAT blog post studied 2000+ ISCA papers from 1973-2018 concluding a decline in participation from industry. While industrial product papers are of great value to our community, the guidelines for reviewing and evaluating such papers have to be revisited because they are fundamentally different from research papers with models or prototypes of proposed architectures that allow for flexibility in exploration. Many see great value in papers about working hardware that combine novel ideas that must work well together to help us understand the difficulty, cost, and performance of the ideas and the overall system. The track

received 21 abstracts out of which five were selected for inclusion in the program. Six other abstracts that were gauged by the program committee as high-quality were invited for submission to a special issue of IEEE Micro in 2020.

(3) Annual SIGARCH visioning workshops: The visioning workshops have been suspended due to COVID because organizers would prefer to have in-person meetings. The next workshop, which is on Bio-inspired computing, is planned for 2022.

TALENT DEVELOPMENT & RECOGNITION

(1) ACM/IEEE Eckert-Mauchly award: This is the most prestigious award in computer architecture, given for contributions to computer and digital systems architecture. The 2020 recipient was Luiz Barroso for "pioneering the design of warehouse-scale computing and driving it from concept to industry."

(2) SIGARCH Maurice Wilkes award: This is the most prestigious award given to a researcher in the first 20 years of their career and went to Luis Ceze and Karin Strauss for "contributions to storage and retrieval of digital data in DNA."

(3) SIGARCH/TCCA influential ISCA paper award: This award recognizes a paper from the ISCA 15 years earlier. The 2020 recipient was "Interconnections in Multi-Core Architectures: Understanding Mechanisms, Overheads and Scaling" by Rakesh Kumar, Victor V. Zyuban, Dean M. Tullsen.

(4) ASPLOS influential paper award: This award recognizes ASPLOS papers from 10 or more years ago. The 2020 recipients were "Energy-efficient computing for wildlife tracking: design tradeoffs and early experiences with ZebraNet" by Philo Juang, Hidekazu Oki, Yong Wang, Margaret Martonosi, Li Shiuan Peh, and Daniel Rubenstein in ASPLOS 2002, and "A comparison of software and hardware techniques for x86 virtualization" by Keith Adams and Ole Agesen in ASPLOS 2006.

(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 2020 recipient was Alvin Lebeck for "creating, curating, and architecting the Computer Architecture Today blog, which has transformed the way in which our community connects and communicates." May Berenbaum, Alan Berenbaum's sister, together with the SIGARCH chair announced the award at the online ceremony.

(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 2020 recipient was Caroline Trippel from Princeton (advised by Margaret Martonosi), for her dissertation entitled "Concurrency and Security Verification in Heterogeneous Parallel Systems." The award citation was "for developing efficient, formal, hardware-aware concurrency verification methods, which resulted in the identification of important correctness and security vulnerabilities." Honorable mentions went to Mengjia Yan from UIUC (advised by Josep Torrellas) for her dissertation entitled "Cache-based Side Channels: Modern Attacks and Defenses," with the award citation for "introducing secure processor and cache architecture designs that effectively thwart cache-based side channel attacks, including new attacks proposed in the dissertation," and to Joseph Earl McMahan from UCSB (advised by Timothy Sherwood) for the dissertation entitled "The ZARF Architecture for Recursive Functions," with the award citation for

"introducing a novel approach to software verification and cross-stack hardware design for critical systems by rethinking instruction-set architectures from a mathematical perspective."

(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 the SIGARCH website to reflect the high prestige of the papers being selected. There were two papers nominated to the CACM Editorial Board in 2020: "Architecting Noisy Intermediate-Scale Trapped Ion Quantum Computers" by Prakash Murali, Dripto M. Debroy, Kenneth R. Brown, and Margaret Martonosi from ISCA 2020, and "Orbital Edge Computing: Nanosatellite Constellations as a New Class of Computer System" by Bradley Denby and Brandon Lucia from ASPLOS 2020.

(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. In 2020, we didn't have any retirees to announce.

(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. We mourned the passing of Sang Lyul Min, Professor of Computer Science and Engineering at Seoul National University (SNU). Prof. Jaejin Lee, a colleague of Prof. Min at SNU, provided a tribute at ISCA'20.

(10) Student mentoring: We continued our "Meet a Senior Architect" mentoring program at ISCA'20 under the leadership of Joel Emer. The program matches students with mentors (through questions asked in the conference registration form), providing students the opportunity to meet 1-on-1 with a senior architect for about half an hour at the conference. Starting with 17 mentors and 33 students in 2016, this year the program attracted 140 mentors and 182 students. The program has been growing in size and has moved on to virtual platforms for the 2020 virtual conferences. We have expanded the mentoring program to other conferences (e.g., ASPLOS, MICRO) together with CASA (see below) which offers a "Meat a Senior Student" mentoring program.

(10) 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. Natalie Enright Jerger (the current SIGARCH vice chair) chairs the WICArch subcommittee. WICArch has launched a number of initiatives including a webpage showcasing female architects and their profiles, a flyer widely publicizing women in computer architecture (and systems) for the academic recruiting season, a strong Slack community, and a monthly webinar series. WICArch created a Bylaws document in 2020 and has launched an official election process for the positions of Chair, Vice Chair, and Executive Committee members.

(11) Computer Architecture Student Association (CASA): In 2020, Elba Garza, a PhD student at Texas A&M, and Raghav Pothukuchi, a PhD student at UIUC launched CASA in response to calls for mentorship of junior students in the community by senior students. CASA is an independent student-run organization with the express purpose of developing and fostering a positive and inviting student community within computer architecture. 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. CASA also runs the “Meet a Senior Student” together with SIGARCH’s “Meet a Senior Architect” at our conferences.

OUTREACH

(1) Computer Architecture Podcasts: Boris Grot, our Communication’s Team chair launched the Computer Architecture Podcasts in 2020 with Suvinay Subramanian and Lisa Hsu as the editors to interview 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 2020 there were a total of three podcasts with Kim Hazelwood of Facebook, Bill Dally of Nvidia, and Jim Larus of EPFL. Since its launch, the podcasts have been downloaded over 4700 times.

(2) Computer Architecture Today (CAT): CAT has emerged as a successful platform for our community members and those in related fields to discuss diverse topics of interest, thanks to the dedicated efforts of the founding blog editor, Alvin Lebeck, and the current blog editor, Rajeev Balasubramonian, with the help of the associate blog editor, Vijay Reddi. As of January 2020, the incoming associate blog editor is Christina Delimitrou together with Vijay Reddi remaining as the associate editor. This year the blog featured 49 articles with over 100,000 views.

(3) Communication Team: We have a new Communication Team with Boris Grot as the chair, Samira Khan as the content editor (for the website, announcements, and the newsletter), and Jayneel Gandhi as the video editor in charge of the SIGARCH YouTube! channel. Adrian Sampson remains the social media editor. The YouTube! channel, which was originally created to host the visioning workshop talks, is now a platform to host all recordings for the virtual/hybrid conferences, starting with ASPLOS’20. Boris Grot also helped ASPLOS’20 organizers to replicate the iscaconf.org efforts and create the asplos-conference.org to host the ASPLOS websites. The SIGARCH website now also has a “Featured Announcements” section at the top of the portal currently featuring our commitment to diversity and inclusion, as well as, our denunciation of racism statements.

GRANTS & SUPPORT PROGRAMS

(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) was inaugurated at ISCA’19 and targeted boosting participation from undergrads in parts of the world and institutions with lower average participation at computer architecture conferences. The workshop raised $56K to host 49 students from 26 colleges and universities from around the world. These programs will be expanded in 2020 to include workshops for early-career academics and student mentoring.

(2) Student travel grants: Student travel grant for conferences is our flagship benefit 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 2020, 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 2020, we financially sponsored 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. We are pleased to continue seeing an increase in applications for these grants as well as to see IEEE TCCA supporting its own similar program.

VIOLATIONS OF CODE OF ETHICS & PUBLICATION PROCEDURES

On February 8th, 2021, ACM publicly announced a summary of the Joint Investigative Committee's (JIC's) investigation into allegations of professional and publications-related misconduct in our community. We thank ACM for their tremendous effort in having impaneled JIC and truly appreciate the conclusion of JIC's investigation and that appropriately severe penalties were given to the perpetrators.

The troubling events in the community in the past two years have revealed areas where our policies and processes can be improved to deter and prevent misconduct, promptly detect and investigate it when it happens, and enforce penalties on the perpetrators. Unfortunately, with this announcement, many questions remain unanswered regarding our policies and processes. We outlined a few of these questions in a Computer Architecture Today blog. We understand that ACM is aware and is working on many of these areas and look forward to clear guidelines to help reinstate the trust and confidence in our system.

In our annual report last year, we listed a number of initiatives we have taken in response to the events starting in 2019 including 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. This year, in addition we have accomplished the following:

(1) Best practices for conference reviewing: Partly in response to allegations of the violation of ethics and review processes, SIGARCH and TCCA created a joint task force with two members from each Executive Committee (Boris Grot and José Martínez for SIGARCH, Daniel Jiménez and Moin Qureshi for TCCA) to prepare a best-practices document for anonymity, conflict of interest and ethics guidelines for program committee chairs, authors and reviewers. A draft of this document was presented to the community for feedback and the feedback is currently being integrated, with plans to make the document publicly available in the fall of 2021. The document will hopefully inspire other SIGS to adopt similar best practices as they see fit.

(2) Aid for conference organizers: We have launched several initiatives to help guide conference organizers. In 2020, to help balance the reviewing load in the community and improve diversity/inclusion, we launched the Architecture PCDB, a database of service history from reviewers in four computer architecture conferences, and made them public on the SIGARCH website. The webpage tracks the history of service by a reviewer as a main or external program committee member. We are preparing a PC

and GC packet for organizers. Besides general information to guide the organizers, the packets also include pointers to tools for review processes (for Program Chairs) and ACM's and IEEE's policies and processes on violation of code of ethics (for both Program and General Chairs).

(3) ConflictDB: One of the key concerns for conferences in our community is the increase in the number of submitted papers and review load. Program chairs are now running main program committees of 100 members with over 400 papers submitted. The PC Chair guidelines packet includes pointers to open-source tools for use by organizers to crawl DBLP and identify conflicts. Self-declared conflicts, conflicts not evident through DBLP because of new collaborations, or other forms of conflicts that may need to be considered as outlined in the Best Practices for Conference Reviewing document still require a manual check which is prohibitive given the number of papers, authors, and reviewers involved. 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.

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 liaison J. C. Peeples, 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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