

# SIGARCH Annual Report

## July 2014 - June 2015

### Overview

The primary mission of SIGARCH continues to be the forum where researchers and practitioners of computer architecture can exchange ideas. SIGARCH sponsors or co-sponsors the premier conferences in the field as well as a number of workshops. It publishes a quarterly newsletter and the proceedings of several conferences. It is financially strong with a fund balance of over a million dollars. The SIGARCH bylaws are available online at [http://www.acm.org/sigs/bylaws/arch\\_bylaws.html](http://www.acm.org/sigs/bylaws/arch_bylaws.html).

### Officers and Directors

During the past fiscal year David Wood served as SIGARCH Chair, Sarita Adve served as Vice Chair, and Partha Ranganathan served as Secretary/Treasurer. Norm Jouppi, Kai Li, Scott Mahlke, and Per Stenstrom served on the Board of Directors, and Doug Burger also served as Past Chair. 2015 is an election year for SIGARCH; the current slate of elected officers is serving their second two-year term in accordance with SGB bylaws. In addition to these elected positions, there are three appointed positions. Doug DeGroot continues to serve as the Editor of the SIGARCH newsletter Computer Architecture News. Boris Grot has been appointed to serve as the SIGARCH Information Director, providing SIGARCH information online. Mattan Erez continues to serve as SIGARCH's liaison on the SC conference steering committee.

The election was delayed due to a combination of personal issues among the nomination committee—consisting of David Wood, Doug Burger, and Norm Jouppi—and difficulty getting qualified candidates to agree to run for the senior positions. The slate has been submitted and the election will be completed this summer. The current officers will continue to serve until a new board is elected.

### Awards

The Eckert-Mauchly Award, cosponsored by the IEEE Computer Society, is the most prestigious award in computer architecture. SIGARCH endows its half of the award, which is presented annually at the Awards Banquet of ISCA. Norm Jouppi, Google, Inc., received the award in 2015, for “*For pioneering contributions to the design and analysis of high-performance processors and memory systems.*” In 2009, SIGARCH petitioned ACM to increase the ACM share of the award to \$10,000, using an endowment taken from the SIGARCH fund balance, which ACM has approved. The increase will happen when IEEE approves a matching increase, which will increase the amount of the award to \$20,000.

SIGARCH has endowed the Maurice Wilkes Award, an award established to recognize computer architects early in their careers, named after one of the pioneers of computer architecture who began making significant contributions early in his career. The award is selected by a vote of the Executive Committee and Board of SIGARCH, from a list of nominees supplied by a three person nominating committee. The 2015 award went to Christos Kozyrakis, of Stanford/EPFL, “*For outstanding contributions to transactional memory systems.*”

SIGARCH also cosponsors, along with the IEEE-CS TCCA, the Influential ISCA Paper Award which is presented annually at the ISCA conference. This award recognizes the paper, presented at the ISCA conference 15 years previously, which has had the most impact on computer architecture. The tenth Influential ISCA Paper Award was presented to David Brooks, Vivek Tiwari, and Margaret Martonosi, “*Wattch: A Framework for Architectural-Level Power Analysis and Optimizations,*” which appeared in the proceedings of the 26th ISCA (2000).

In 2009, SIGARCH and the ASPLOS co-sponsors (SIGPLAN and SIGOPS) approved the creation of an

ASPLOS Best Paper Award, the first one of which was awarded in 2009. The Award is determined by a vote of the Program Committee, and announced at the conference. In 2015, the best paper was "*GhostRider: A Hardware-Software System for Memory Trace Oblivious Computation*," by Chang Liu, Austin Harris, Martin Maas, Michael Hicks, Mohit Tiwari, and Elaine Shi .

Starting in 2011, ASPLOS began awarding an "Influential Paper Award," modeled after the award presented at ISCA. The ASPLOS Influential Paper Award is awarded to any paper published in ASPLOS conferences ten or more conferences prior to the conference in which the award is being made. In 2015, the award was given to "*The Case for a Single-Chip Multiprocessor*," by Kunle Olukotun, Basem A. Nayfeh, Lance Hammond, Ken Wilson, and Kunyung Chang, which was published at ASPLOS 1996.

In 2007 the ACM Awards Committee approved the establishment of the SIGARCH Distinguished Service Award, for "important service to the Computer Architecture community." Nominations are due each year by February 15<sup>th</sup>, and can be sent to the SIGARCH Secretary/Treasurer at any time. In 2015, the award was not given.

SIGARCH is a co-sponsor of the Ken Kennedy Award, founded in 2009. The ACM-IEEE CS Ken Kennedy Award is awarded annually and recognizes substantial contributions to programmability and productivity in computing and substantial community service or mentoring contributions. The award includes a \$5,000 honorarium and the award recipient will be announced at the SC Conference. The recipient will give a presentation, normally technical, at the SC conference at which it is announced, or at an ACM or IEEE conference of the winner's choosing during the year following the announcement. The 2014 recipient of the Ken Kennedy Award was Charles Leiserson, for "*For enduring influence on parallel computing systems and their adoption into mainstream use through scholarly research and development and for distinguished mentoring of computer science leaders and students.*"

Three of the above awards, the Eckert-Mauchly Award, the Maurice Wilkes Award, and the Influential ISCA Paper Award were presented at ISCA 2015 in Portland, OR.

### New Areas and Programs

SIGARCH continues to broaden its definition of Computer Architecture to encompass both new technology challenges and new application areas. On the technology front, as Moore's Law draws to a close, decreasing transistor reliability is driving a resurgence in novel ideas to build dependable systems from unreliable components. Similarly, the end of Dennard Scaling, which enabled power to largely scale with transistor counts, has resulted in a plethora of novel solutions using heterogeneity and/or new instruction set architectures to achieve fundamental increases in energy efficiency. And new non-volatile memory technologies have spurred the development of novel memory and storage architectures, which have great promise for transforming solutions for Big Data applications. On the application front, new architectures have been proposed to fundamentally revisit how to provide software security and increase programmer productivity. Finally, the importance of energy efficiency—at all levels—is driving an increasing recognition of the commonalities between the mobile space and the data center.

To address these emerging areas, SIGARCH has sponsored tutorials and workshops in these emerging areas. ISCA 2015 included tutorials on accelerating Big Data computations, exploitation of emerging accelerators, and virtualization, as well as workshops on architectures for Big Data, Machine learning, Cloud Computing, security and privacy, reconfigurable logic, and mobile platforms.

### Innovative Programs

SIGARCH supports child care and companion support travel programs to conferences, although participation since approval of these programs has been low. Reimbursement for child care is capped at \$1000 per conference. SIGARCH has also formalized funding levels for its student travel grant program, and now

provides a level of support to all conferences that SIGARCH sponsors at a 33% level or higher, which previously was only provided to the ISCA and ASPLOS conferences. SIGARCH, as co-sponsor of ISCA, was one of the largest supporters of the FCRC child care program.

SIGARCH, with the encouragement of ACM, has begun exploring the creation of SIGARCH Chapters in Europe, India, China, and South Korea. Goals of these chapters include:

- promote student research and education activities to make the computer architecture community grow long term
- promote networking events; conferences, workshops and summer schools
- promote collaboration with other SIGs (e.g. SIGPLAN, SIGOPS, SIGBED) within Europe as well as globally

FY2015 marked the creation of the first SIGARCH Chapter in South Korea, currently with forty members, which is well timed with plans to host ISCA in Seoul in June 2016. Efforts are well established to create a SIGARCH Chapter in Europe and in the early stages elsewhere.

#### Travel Grants

SIGARCH has regularly supported student travel grants to its flagship conferences, ISCA and ASPLOS, but starting from 2011, SIGARCH broadened this program to other SIGARCH-sponsored conferences. The allocation to each conference is based on SIGARCH revenues and the percentage sponsorship of the conference and is set by dividing the travel grant budget by number of attendees, giving an extra 33% allocation to international conferences, and a small additional budget (~10%) to ISCA as the flagship conference. The grants are restricted to student members of SIGARCH, following several votes of the SIGARCH membership. (But the travel grant administrators are encouraged to highlight the cheap SIGARCH online membership option available for students.) For FY2014, SIGARCH budgeted \$80,000 for travel grants. For ISCA 2015, SIGARCH funding for student travel was also supplemented by sponsorship from IEEE, Intel, Huawei, AMD, Google, IBM, Microsoft Research, Unisys, and NSF (SIGARCH funds accounted for half the total student travel funds). 145 students were funded by the ISCA student travel. SIGARCH plans to continue to emphasize and support student participation in SIGARCH-sponsored conferences going forward as well. SIGARCH also supports a companion travel grant program for SIGARCH members who are either (1) a person with a physical disability necessitating a companion, or (2) a parent of an infant less than one year old who cannot travel without the infant and a care-provider for the infant. This program was utilized once in 2015.

#### END SUMMARY

#### Chapters

The Korea ACM SIGARCH Chapter was established July 2014 with a kick-off meeting attended by 20 founding members on July 15th 2014. Professor Jung Ho Ahn was elected as chapter chair. As the primary activity, an inaugural workshop was held January 30th 2015 at Seoul National University. The workshop was a great success: 87 people registered, two keynote speeches made - one from professor Sang Lyul Min, the general co-chair of ISCA 2016 and the other from professor Nam Sung Kim at University of Wisconsin Madison, 30 posters presented, and a good mixture of a discussion section and invited talks from both Academia and Industry (Samsung, SK Hynix, and LG) given. As a result of these activities, the chapter has grown to forty members. The second workshop will take place July 23rd 2015 at KAIST. In order to further recruit members and raise the visibility of computer architecture in Korea, the chapter plans to hold a tentatively named "simulation camp", where tutorials on famous computer architecture simulators, such as gem5, GPGPUsim, and McPAT, will be given. The chapter will leverage ISCA 2016, which will be held in Seoul, Korea, to increase participation.

#### Conferences

SIGARCH is a 50% cosponsor of ISCA, the International Symposium on Computer Architecture, which is the premier conference in the field of computer architecture. The 42nd annual ISCA (ISCA 2015) was held in Portland, OR as part of ACM FCRC. Debbie Marr was the General Chair, and David Albonesi was the Program Chair. ISCA 2016 will be held in Seoul, South Korea, with Gabe Loh and Sang Lyul Min as General co-Chairs and Andre Seznec as Program Chair.

The SC'XY Conference is jointly sponsored by SIGARCH and the IEEE Computer Society. Formerly known as the Supercomputing Conference, the conference has successfully evolved away from its focus on supercomputers and is now the High Performance Networking and Computing Conference. In addition to its technical success, SC'XY is large enough that it must be scheduled many years in advance. SC 2014 was held in New Orleans, LA, and SC'15 will be held in Austin, TX. In Fall 2012 the ACM SGB with SIGARCH's support approved creation of the Special Interest Group in High-Performance Computing (SIGHPC). SIGARCH has since entered into an agreement with SIGHPC to transition sponsorship of SC'XY to SIGHPC, with SIGARCH remaining in-cooperation in the long term. Beginning with SC'12, any surpluses net of special projects will accrue to SIGHPC, to build up their fund balance. SIGHPC is also liable for any losses, with SIGARCH effectively acting as their banker in this event (i.e., in this hopefully rare case, SIGARCH will cover the loss, but SIGHPC will remain obligated to eventually repay SIGARCH).

SIGARCH is a cosponsor of the Conference on Architectural Support for Programming Languages and Operating Systems, commonly known as ASPLOS, along with SIGPLAN and SIGOPS. Starting in 2008 the conference has been held annually. ASPLOS 2015 begins a cycle where every third year the conference is held internationally. ASPLOS 2012 was held in London, England. ASPLOS 2015 was held in Istanbul, Turkey with Kemal Ebcioglu and Ozcan Ozturk as General Chairs and Sandhya Dwarkadas as Program Chair. ASPLOS 2016 will be held in Atlanta, GA with Tom Conte as General Chair and Yuanyuan Zhou as Program Chair.

SIGARCH sponsors the International Conference on Supercomputing (ICS). ICS 2015 was held in Newport Beach, CA, with Laxmi Bhuyan as General Chair and Fred Chong and Vivek Sarkar as Program Chairs. Planning for ICS 2016 is underway.

The 20th Symposium on Parallel Algorithms and Architectures (SPAA) is jointly sponsored by SIGARCH and SIGACT. SPAA 2015 was held as part of FCRC, with Kunal Agrawal as Program Chair. SPAA 2016 will be held at the Asilomar Conference Grounds in CA.

SIGARCH is a 10% co-sponsor of CCGrid: The IEEE/ACM International Symposium on Cluster, Cloud and Grid Computing. CCGrid 2015 was held in Shenzhen, China, with Pavan Balaji and Cheng-zhong Xu as General Chairs and Daniel Katz and Xiaobo Zhou as Program Chairs. CCGrid '16 will be held in Cartagena, Columbia, with Harold Castro, Carlos Varela, and Carlos Jaime Barrios as General Chairs.

SIGARCH is one-half cosponsor of the International Symposium on High Performance Distributed Computing. HPDC 2015 was held as part of FCRC in Portland, OR, with Thilo Kielmann as General Chair and Dean Hildebrand and Michela Taufer as Program Chairs. HPDC '16 will be held in Kyoto, Japan, with Hiroshi Nakashima as General Chair and Kenjiro Taura and John Lange as Program Co-Chairs.

SIGARCH is one-third cosponsor of the Conference on Parallel Architectures and Compiler Techniques (PACT), along with the IEEE Computer Society and IFIP, and annually held in the fall. PACT 2014 was held in Edmonton, Alberta, Canada, with J. Nelson Amaral as General Chair and Josep Torrellas as Program Chair. PACT 2015 will be held in San Francisco, CA with Costin Iancu and Kathy Yelick as General Chairs and Marc Snir as Program Chair.

SIGARCH is one-fourth co-sponsor of the Symposium on Architectures for Networking and Communications Systems (ANCS). ANCS 2015 was held in Oakland, CA with Gordon Brebner as General Chair and Alex

Bachmutsky and Chita Das as Program Chairs. ANCS 2016 will be held in Santa Clara, CA with Patrick Crowley as General Chair and Luigi Rizzo and Laurent Mathy as Program Chairs.

In 2007 SIGARCH was a founding co-sponsor of the International Symposium on Networks-on-Chips (NOCS). NOCS 2014 was held in Ferra, Italy, with Davide Bertozzi and Luca Bernini as General Chairs and Sudhakar Yalamanchili and Joerg Henkel as Program Chairs. NOCS 2015 will be held in Vancouver, Canada with Andre Ivanov and Diana Marculescu as General Chairs and Partha Pratim Pande and José Flich as Program Chairs.

In addition to the above conferences, SIGARCH is co-sponsoring, or is in cooperation with, several other conferences. SIGARCH has a 10% sponsorship position in SenSys, a conference on Sensor Systems and a 40% sponsorship of International Conference on Utility and Cloud Computing (UCC). In addition, SIGARCH has in-cooperation status with CloudComp, TCE, HotPar, HIPEAC, HiPC, HPCS, HPDS, ICWET, IPDPS, HotChips, CoolChips, PAPA, Nano-Net, and TridentCom.

### Publications

CAN (Computer Architecture News), SIGARCH's newsletter, is published 5 times a year. Of those five, the ISCA Proceedings form a special issue, and the ASPLOS Proceedings is likewise distributed as a special issue. The regular issues of the newsletter consist of technical contributions, reports of panels, Internet nuggets (the most interesting or controversial articles from the comp.arch newsgroup), book reviews, and calls for papers. There are occasional single topic special issues based principally on workshops. Proceedings of SC, SPAA and ICS are available through the Member Plus program. In 2009, SIGARCH began offering a new electronic membership for regular members and students, at reduced cost with no proceedings mailed. Currently more than half, 900 of 1400, of SIGARCH's members have registered under the electronic membership option. Given the continuing shift to electronic memberships, the SIGARCH Executive Committee is exploring alternatives to revitalize, reform, or replace CAN.

### Finances

SIGARCH enjoys a healthy fund balance that is currently larger than the \$1.2M fund balance required by the ACM for sponsorship of SIGARCH conferences for FY'15. The projected SIGARCH fund balance for FY'15 is \$2.7 million. Given prior large surpluses, SIGARCH and the SC Steering Committee have an agreement that some of the future profits from SC'XY will be in large part returned to the SC community, in the form of a series of project-oriented grants (to be matched by the other sponsor of SC'XY, the IEEE Computer Society). The grant amounts are capped by the average surplus over the first two of the previous three years. ISCA, SIGARCH's flagship conference, continues to be healthy and show attendance near the top of historical levels.

### SC Conference Grants

As part of the transition plan, SIGARCH was responsible for ACM's share of the special projects budget for SC'12 and SC'13 and was responsible for a pro rata share with SIGHPC (based on relevant surpluses) for SC'14. SIGHPC will be fully responsible for ACM's share of special projects beginning with SC'15.

### Membership

SIGARCH membership was declining gradually since 1999, dropping from its peak of 1452 in 2005 to 1344 in 2009, but has started to recover, increasing to 1400 as of April 2015. SIGARCH's membership continues to shift to electronic-only membership, available at reduced cost, and is likely a factor in growing membership. Last year, more than half of SIGARCH's members chose electronic-only membership. There is opportunity to increase membership, particularly of students, and we will explore increased outreach to

facilitate increased student participation. ISCA, SIGARCH's flagship conference, continues to be healthy and show attendance near the top of historical levels.

#### Summary

SIGARCH remains a financially healthy institution with an enthusiastic membership. The interest of its members can be gauged by the health of all of its major conferences in the past year. The challenges remain as they have in previous years: how to better serve our members, how to encourage other members of the architecture community to join, how to help steer the community as the nature of our field changes, and how to use our fund balance most effectively.

Respectfully submitted,

David Wood, SIGARCH Chair  
Doug Burger, SIGARCH Past Chair