SIGARCH Annual Report
July 2013 - June 2014

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.

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 will be 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. Kevin Lim continues 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.

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. Trevor Mudge, University of Michigan, received the award in 2014, for "*For pioneering contributions to low-power computer architecture and its interaction with technology.*" 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 2014 award went to Ravi Rajwar of Intel, "*For contributions to the design and commercialization of hardware transactional memory.*"

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 Seth Copen Goldstein, Herman Schmit, Matthew Moe, Mihai Budiu, Srihari Cadambi, R. Reed Taylor, and Ronald Laufer, "`PipeRench: A Coprocessor for Streaming Multimedia Acceleration,`" which appeared in the proceedings of the 25th ISCA (1999).

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 2014, two papers were selected as best papers: *DianNao: A Small-Footprint High-Throughput Accelerator for Ubiquitous Machine-Learning*, by Tianshi Chen (ICT) ; Zidong Du (ICT); Ninghui Sun (ICT); Jia Wang; Chengyong Wu (ICT); Yunji Chen

(ICT); Olivier Temam (INRIA) and *K2: A Mobile Operating System for Heterogeneous Coherence Domains*, by Felix Xiaozhu Lin (Rice University); Zhen Wang (Rice University); Lin Zhong (Rice University).

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 2014, the award was given to *Secure program execution via dynamic information flow tracking,* by Gookwon Edward Suh, Jae W. Lee, David Zhang, and Srinivas Devadas, which was published at ASPLOS 2004.

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 15th, and can be sent to the SIGARCH Secretary/Treasurer at any time. In 2014, the award was given to Doug DeGroot, "For dedicated service to SIGARCH spanning four decades."

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 2013 recipient of the Ken Kennedy Award was Jack Dongarra, for "*influential contributions to mathematical software, performance measurement, and parallel programming, and significant leadership and service within the HPC community.*"

Three of the above awards, the Eckert-Mauchly Award, the Maurice Wilkes Award, and the Influential ISCA Paper Award were presented at ISCA 2014 in Minneapolis, MN.

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 2014 included tutorials on accelerating Big Data computations, emerging memory technologies, and heterogeneous systems, as well as workshops on architectures for Big Data, Neuromorphic architectures, architectural support for security and privacy, energy efficiency, energy security, 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, with the encouragement of ACM, has begun exploring the creation of a European SIGARCH, implemented through the SIG Chapter mechanism. Goals of a European SIGARCH Chapter 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

This effort is still in its early stages, but we have high hopes that it will be successful and emulated in other regions, especially India, China, and South Korea. A group in South Korea is exploring establishing a chapter there.

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 if 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 2014, SIGARCH funding for student travel was also supplemented by sponsorship from IEEE, Google, 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 2014.

END SUMMARY

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 41st annual ISCA (ISCA 2014) was held in Minneapolis, MN. Pen-Chung Yew and Antonia Zhai were the General Chairs, and Steve Keckler was the Program Chair. ISCA 2014 has been pledged $82,000 in industrial donations to support the conference, plus an additional $25,000 in support for student travel grants ($20,000 of this from SIGARCH). ISCA 2015 will be held in Portland, OR, as part of FCRC, with David Albonesi 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 2013 was be held in Denver, CO and SC 2014 will be New Orleans, LA. 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. The conference had been held biannually since 1982, alternating its location between San Jose and Boston. Starting in 2008 the conference has been held annually. ASPLOS 2014 was held in Salt Lake City, UT, with Al Davis and Rajeev Balasubraminian as General Chairs and Sarita Adve as Program Chair. ASPLOS 2015 will begin a cycle where every third year the conference is held internationally. ASPLOS 2012 was held in London, England. ASPLOS 2015 will be held in Istanbul, Turkey with Kemal Ebcioglu and Ozcan Ozturk as General Chairs and Sandhya Dwarkadas as Program Chair. Site selection and organizing committee selection for ASPLOS 2016 are underway.

SIGARCH sponsors the International Conference on Supercomputing (ICS). ICS 2014 will be held Munich, Germany June 10th to 14th. Arndt Bode and Michael Gerndt served as General Chairs and Per Stenström, Lawrence Rauchwerger, Bart Miller, and Martin Schulz served as (area) Program Chairs. Organization for ICS 2015 is underway but is somewhat behind schedule.

The 20th Symposium on Parallel Algorithms and Architectures (SPAA), jointly sponsored by SIGARCH and SIGACT, was held in Prague, Czech Republic, with Guy Blelloch as General Chair and Peter Sanders as Program Chair. SPAA 2015 expects to be part of FCRC.

SIGARCH is a 10% co-sponsor of CCGrid: The IEEE/ACM International Symposium on Cluster, Cloud and Grid Computing. CCGrid '14 will be held in Chicago, IL with Xian-He Sun and Ian T. Foster as General Chairs and Kirk W. Cameron and Dimitris S. Nikolopoulos as Program Chairs. CCGrid 2015 will be held in Shenzhen, China, with Pavan Balaji and Cheng-zhong Xu as General Chairs and Daniel Katz and Xiaobo Zhou as Program Chairs.

SIGARCH is one-half cosponsor of the International Symposium on High Performance Distributed Computing. HPDC 2014 was held in Vancouver, BC, Canada, with Beth Plale and Matei Ripeanu as General Chairs and Franc Cappello and Dongyan Xu as Program Chairs. HPDC 2015 will be held as part of FCRC in Portland, OR, with Thilo Kielmann as General Chair and Dean Hildebrand and Michela Taufer as Program 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 2013 was held in Edinburgh, Scotland, with Michael O'Boyle as General Chair and André Seznec and François Bodin as Program Chairs. PACT 2014 will be held in Edmonton, Alberta, Canada, with J. Nelson Amaral as General Chair and Josep Torrellas as Program Chair.

SIGARCH is one-fourth co-sponsor of the Symposium on Architectures for Networking and Communications Systems (ANCS). ANCS 2013 was held in San Jose, CA, with Walid Najjar as General Chair and Raj Yavatkar and Scott Rixner as Program Chairs. ANCS 2014 will be held in Marina del Ray, CA with Viktor Prasanna as General Chair and Gordon Brebner and Isaac Keslassy as Program Chairs.

In 2007 SIGARCH was a founding co-sponsor of the International Symposium on Networks-on-Chips (NOCS). NOCS 2013 was held in Tempe, AZ, with Karam S. Chatha and Chita Das as General Co-Chairs and Natalie Enright Jerger and John Bainbridge as Program Co-Chairs. NOCS 2014 will be held in Ferra, Italy, with Davide Bertozzi and Luca Bernini as General Chairs and Sudhakar Yalamanchili and Joerg Henkel 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, 937, 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 $2,654,505. 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

For SC'14, $112,500 has been budgeted for SC special projects. 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 is 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 1457 as of April 2014. 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, 937, 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