Message from the General Chairs

On behalf of the HPCA-18 organizing and technical committees, we welcome you to HPCA 2012 (as most will call it) here in New Orleans. HPCA has been considered a top-tier computer architecture conference from the start, and continues to enjoy that reputation. Attendees are investigators advancing and re-shaping this field, maintaining the pace of innovation that gives us ever more powerful and efficient computing systems each year. But you all know that, right?

The site of our conference, New Orleans, is a unique American city. The city is well known for a vibrant musical and culinary culture; visitors are urged to sample the many nearby restaurants during lunch breaks, and maybe even take in some nightlife on free evenings. The local oil and gas industries are large users of high-performance computing, for example, for exploration. The State of Louisiana has funded information technology research, including a Top-500 computing cluster (Queen Bee) and many smaller systems, and a statewide optical (lambda rail) network. The state has also been promoting digital media research and industries, combining the state's culture of creativity with 21st century technologies.

As usual we have an outstanding technical program, thanks to the tireless efforts of Program Chair David Brooks and the excellent judgment of the top-notch program committee he assembled to review and select the best of many submissions. Our many workshop and tutorial organizers, overseen by co-chairs Meeta Gupta and Lixin Zhang, have added further depth and breadth to the technical content (the spice that, as Emeril would say, Bam! Kicks it up a notch). You all found out the details of the conference through our Publicity chair Resit Sendag and Web chair Michael Powell, and have these proceedings in your hands thanks to Publications chair Engin Ipek. Your smooth registration experience was thanks to Registration chair Lu Peng, while Finance Chair Mauricio Breternitz kept the piggy bank operating. And last but not least, you will enjoy the venue and extra-curricular activities thanks to the efforts of Local Arrangements chair Jaganathan (Ram) Ramanujam, who has undertaken this while simultaneously serving as General Chair of our sister conference, PPoPP! We are greatly indebted to this excellent team for the work they have put in to make this all come together.

A key factor in making this conference feasible is the support of industry partners. We gratefully acknowledge AMD, Facebook, IBM Research, Intel, HP Labs and Microsoft Research for their most valuable generosity.

Finally, a big thank-you to the IEEE TCCA for funding student travel grants, and Dave Kaeli, TCCA chair, for giving us the honor of chairing this event and also helping out with some key items. Please enjoy the ambience of New Orleans, Tuesday's excursion and banquet, the conference and workshop presentations, and the company of your fellow attendees!

Dave Christie, AMD
David Koppelman, LSU
Message from the Program Chair

It is a great pleasure, on behalf of the program committee, to present the program of the 2012 International Symposium on High Performance Computer Architecture. This year we are continuing the tradition of co-locating the conference with PPoPP. HPCA 2012 has 11 regular paper sessions, an industrial track session, and a “Best of CAL” session. We are lucky to have two outstanding keynotes from Sanjeev Kumar (Facebook) and Keshav Pingali (UT-Austin).

The final HPCA 2012 program includes a very strong selection of papers. In response to the call for papers, we received 213 finalized submissions, and the program committee accepted 36 papers for presentation at the conference – an acceptance rate of 17%. Several papers were assigned shepherds, allowing the authors to work with a PC member to continue to improve the paper. All but a handful of papers were assigned to four PC members for review resulting in 17 to 19 papers per PC member, and nearly all papers had an additional external reviewer assigned resulting in 1028 total reviews. The authors had the opportunity to respond to these reviews through a rebuttal. The reviews and the rebuttal were taken in consideration when reaching the final decision for each paper. All papers were reviewed anonymously through a double-blind process. PC members that had a conflict with the paper being discussed were requested to leave the room. Also, no PC member saw the reviews or the rankings of conflict papers. Non-PC papers were discussed in rank order; PC papers did not appear in the overall rank and were discussed in a separate session using the same selection criteria. The vast majority of paper outcomes were decided via a consensus among the reviewers, but several papers required a vote from the entire PC after significant discussion.

The PC meeting was held on Saturday, November 5, 2011 at the Hyatt Harborside near Logan Airport in Boston, Massachusetts. We had excellent PC meeting attendance with 43 out of 47 members being physically present, and the rest dialing in via teleconference. We also owe a debt of gratitude to the large number of external reviewers who participated in the review process. The always difficult and time consuming task of setting up and maintaining the review software fell on Glenn Holloway. Amanda Tseng provided assistance with PC meeting logistics.

Thanks to Aamer Jaleel for organizing the industrial track session, which undergoes a separate review process from the regular HPCA program. A new feature of HPCA this year is a special session highlighting exciting work published in IEEE Computer Architecture Letters (CAL) during the 2011 calendar year. A joint HPCA-CAL selection committee chose four presentations for this session after nomination by the CAL editorial board. We look forward to lively discussion about this early work at HPCA. Special thanks to Kevin Skadron, José Martínez, and Christos Kozyrakis for assistance in organizing this.

I would like to thank the HPCA steering committee for inviting me to chair the program. I want to personally thank Pradip Bose and Shubu Mukherjee for their advice as previous program chairs. I also want to thank Dave Christie and David Koppelman, the co-general chairs for their help with the process. Last but not least, I would like to thank you for submitting your great work to HPCA, and for attending the conference – you have made HPCA 2012 possible.

Enjoy the HPCA program!
David Brooks
Harvard University
HPCA-18 Organizing Committee

General Co-Chairs:
David Christie, AMD
David Koppelman, Louisiana State University

Program Chair:
David Brooks, Harvard University

Program Committee:
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Arvind, MIT
Irís Bahar, Brown University
Valeria Bertacco, University of Michigan
Abhishek Bhattacharjee, Rutgers University
Naveen Muralimanohar, HP Labs
Ramon Canal, UPC
Chita Das, Penn State University
Bronis R. de Supinski, LLNL
Lieven Eeckhout, Ghent University
Natalie Enright Jerger, University of Toronto
Mattan Erez, University of Texas Austin
Babak Falsafi, EPFL
Kim Hazelwood, University of Virginia
James Hoe, Carnegie Mellon University
Hillery Hunter, IBM
Ravishankar Iyer, Intel
Vijay Janapa Reddi, University of Texas Austin
Lizy John, University of Texas Austin
Russ Joseph, Northwestern University
Hyesoon Kim, Georgia Tech
Martha Kim, Columbia University
Rakesh Kumar, UIUC
James Laudon, Google
Benjamin C. Lee, Duke University
Ruby Lee, Princeton University
Tao Li, University of Florida
Gabriel Loh, AMD
Ahmed Louri, University of Arizona / NSF
Ken Mai, Carnegie Mellon University
Milo Martin, University of Pennsylvania
Onur Mutlu, Carnegie Mellon University
Satish Narayanasamy, University of Michigan
Li-Shiuan Peh, MIT
Ronny Ronen, Intel
Eric Rotenberg, NC State
Yanos Sazeides, University of Cypress
Cristina Silvano, Politic di. Milano
Viji Srinivasan, IBM
Steve Swanson, UCSD
Josep Torellas, UIUC
Dean Tullsen, UCSD
Chris Wilkerson, Intel
Qiang Wu, Facebook
Yuan Xie, Penn State University
Chia-Lin Yang, National Taiwan University
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Meeta Gupta, IBM TJ Watson Research Center
Lixin Zhang, ICT/Chinese Academy of Sciences

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Michael Gschwind, IBM
Aamer Jaleel (session chair), Intel
Naveen Muralimanohar, HP Labs
Emre Ozer, ARM
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Submissions Chair Glenn Holloway, Harvard University

Steering Committee Laxmi Bhuyan, Pradip Bose, Tom Conte, Chita Das, R. Govindarajan, Matthew Jacob, Daniel Jimenez, David Kaeli, Yale Patt, Timothy Pinkston, Yan Solihin, Josep Torrellas
Workshops:

The 16th Workshop on Interaction between Compilers and Computer Architectures (INTERACT-16)
Jaejin Lee, Seoul National University (general chair)
Pedro Trancoso, University of Cyprus (program co-chair)
Gayatri Mehta, University of North Texas (program co-chair)

The 3rd Workshop on SoCs, Heterogeneous Architectures and Workloads (SHAW-3)
Ravi Iyer, Intel
Ramesh Illikkal, Intel
Raj Yavatkar, Intel
Mei Chen, Intel

The 7th International Workshop on Unique Chips and Systems (UCAS-7)
Byeong Kil Lee, University of Texas at San Antonio
Dhireesha Kudithipudi, Rochester Institute of Technology
Tor Aamodt, University of British Columbia

The 1st Workshop on Architecture and Application Exploration of Micro-Server Systems
Rui Hou, Institute of Computing Technology, Chinese Academy of Sciences
Andrew N. Sloss, ARM
Jian Li, IBM Research
Michael C. Huang, University of Rochester
Xue Liu, McGill University

Tutorials:

Tutorial on Ocelot and SST-MacSim Simulator
Hyesoon Kim, Georgia Tech
Sudhakar Yalamanchili, Georgia Tech

Sustainability and Energy Efficiency in Data Centers Design and Operation
Krishna Kant, George Mason University
David Du, University of Minnesota

InfiniBand and High-Speed Ethernet Architectures for Scientific and Enterprise Computing: Opportunities and Challenges
Dhabaleswar Panda, Ohio State University

Security for Computer Architects
Ruby B. Lee, Princeton University
Simha Sethumadhavan, Columbia University