

Letter from the General Chair

Dear IEEE Cluster 2013 attendees,

Welcome!

On behalf of the organizing committee, I am pleased to welcome you to Indianapolis and the 15th IEEE International Conference on Cluster Computing. I hope you enjoy your visit to our beautiful city. Indianapolis has undergone a real renaissance in recent years with many new buildings and an array of new highlights including excellent museums related to culture, the arts, and sports.

This year, through the contributions of many authors and the efforts of the conference committee, we have assembled another high-quality technical program with papers, posters, tutorials, and panels covering many aspects of issues associated with cluster computing, including:

- Current and future directions in cluster technology
- Clusters driving innovation in industrial and academic research
- Clusters in education and outreach
- Clusters and clouds in cyberinfrastructure strategy
- Clusters in distributed visualization

Along with the Cluster 2013 program, attendees have the opportunity to participate in four workshops on Friday on gateway computing environments, campus bridging, the LittleFe education appliance. A special workshop, because of its long history, is the 5th Workshop on Interfaces and Architectures for Scientific Data Storage (IASDS), held every year in conjunction with Cluster 2013 for five years.

We are pleased to have four pioneering leaders in cluster computing as the featured speakers at this year's event.

David E. Keyes is the keynote speaker for IEEE Cluster 2013. Dr. Keyes is professor of applied mathematics and computational science at King Abdullah University of Science and Technology (KAUST) in Saudi Arabia. Keyes is the founding dean of KAUST's division of Computer, Electrical, and Mathematical Sciences and Engineering, and has had the distinct opportunity to create a new academic program essentially from scratch, and to do so in the Mideast as well. Keyes' scientific work focuses on the algorithmic interface between parallel computing and the numerical analysis of partial differential equations, with an emphasis on scalable solvers for emerging extreme architectures that require drastic reductions in communication and synchronization.

Jessie Walker is coordinator of computer science at the University of Arkansas at Pine Bluff, a small historically black college and university (HBCU) located in the Arkansas Delta. Over the last six years he has helped HBCUs and teaching-oriented institutions in Arkansas to leveraged HPC resources/training as a core component of undergraduate

education. Dr. Walker has also helped develop a unique organization in Arkansas known as the Arkansas Minority Cyberinfrastructure Training, Education Consortium (AMC-TEC), with the major goal of empowering HBCUs and teaching-oriented institutions in Arkansas acquire and use cyberinfrastructure resources locally and nationally as an essential element of their undergraduate curriculum.

Jay Boisseau is director of the Texas Advanced Computing Center (TACC) at the University of Texas at Austin (UT Austin). Boisseau obtained his doctorate in astronomy using Cray vector supercomputers. While completing his doctoral research, Dr. Boisseau worked in user support at the Arctic Region Supercomputing Center in Fairbanks, Alaska. In 1996, he joined the San Diego Supercomputer Center (SDSC) to continue his career in high-performance computing. Dr. Boisseau returned to UT Austin in June 2001 to become the director of TACC, where he has taken on leadership in advanced cyberinfrastructure in UT-Austin, as well as having key leadership roles in the TeraGrid and XSEDE, and serving as PI on the NSF-funded Ranger and Stampede supercomputers.

Thomas Sterling, professor of informatics and computing at Indiana University (IU) and executive associate director of its Center for Research in Extreme Scale Technologies, will deliver the closing address. Best known as the “father of Beowulf,” Dr. Sterling developed groundbreaking research that dramatically reduced the cost and increased the accessibility of supercomputers. Sterling has performed applied research in parallel computing system structures, semantics and operations in industry, government labs and higher education. In 1997, he and his collaborators received the Gordon Bell Prize. Sterling's current research focuses on the ParalleX execution model for extreme scale computing, with the goal of devising a new model of computation to guide the development of next-generation exascale computing systems. ParalleX is the conceptual centerpiece of the XPRESS project, sponsored by the US Department of Energy Office of Science X-stack program. Sterling holds six patents and is coauthor of six books.

There are many indicators of the quality of a conference; one of them is the quality of the speakers and, in that regard, IEEE Cluster 2013 can claim to be among the very best in the US this year. Other indicators of quality include the number of submissions it attracts and the acceptance rate. This year there were a total of 119 papers submitted with 39% being accepted.

There were a number of innovations this year. Highly notable in my mind is the inclusion of an education, outreach, and training (EOT) track. The IEEE Cluster 2013 conference is known as a highly technical conference, but one does not have to look very hard into the US media to find great skepticism about the value of scientific research and increasing evidence that too few people in any country—and the US in particular—grow up wanting to pursue a career in scientific and technical computing. Other innovations include the visualization showcase and the introduction of the Mark Baker Best Student Paper Award. An approach adopted from other conferences this year is the option given to poster authors to include a 5-page technical “poster paper” in the proceedings. While shorter than the papers associated with a full conference presentation, this approach

(specifically copied from ACM SIGUCCS) creates the option for authors to have a peer-reviewed, citable paper associated with a poster presentation and thereby increase the impact of their work in the scientific and technical community. A particularly exciting new occurrence is the award of funds by the US National Science Foundation (NSF) to support student participation and participation by those who would otherwise not be able to attend this conference due to funding constraints. Special thanks to Eric Wernert (Principal Investigator) and Co-PIs Henry Tufo of the University of Colorado Boulder, Charles Peck of Earlham University; Therese Miller of IU; and Robert Ping of IU for their work to secure and carry out NSF award 1349813. The support of the NSF is gratefully acknowledged; any opinions expressed here are those of the conference general chair and do not necessarily reflect views of the NSF or the PI/Co-PI team. There were notable innovations—mostly borrowed from IEEE/ACM SCxy and ACM SIGUCCS—in structuring the conference leadership. As SCxy, SIGUCCS, and many other conferences have shown, a broad network of community involvement is critical to ongoing success of a conference series. This year we have a particularly broad group of universities and other organizations lending the time and talent of some of their best faculty and staff to the operation of IEEE Cluster 2013, including Jay Boisseau as General Chair of IEEE Cluster 2011 and other representatives of the IEEE Cluster 2011 organizing team. We plan to copy from ACM IEEE SCxy and the ACM SIGAPP-sponsored XSEDE conference the process of creating a formal handover report to be given to next year's conference leaders. We hope that conference leaders of the future will continue to draw on a large international network of experts to lead and support this conference for many years to come.

We are grateful for the work of the committee of scientific and technical experts who reviewed all of the technical contributions—papers, tutorials, posters, panel, visualization showcase proposals and more. The full list of committee leaders and participants is included as part of the front matter for this report, but I want to particularly thank the following individuals who have put in hours above and beyond the call of duty to make this conference a success:

- Henry Tufo (University of Colorado Boulder) has been a wonderful leader as Technical Program Chair, putting in many hours of hard work, providing great insight, and really providing critical leadership for the conference as a whole.
- Nick Cardo (Lawrence Berkeley National Laboratory) and Stephen Simms (IU) handled the technical-paper review process with admirable skill and dedication during a tremendously compressed review process.
- Henry Neeman (Oklahoma University) led the reviews for the first Education, Outreach, Training track ever included in the IEEE Cluster conference.
- David Hart (National Center for Atmospheric Research) has handled the proceedings process with his trademark aplomb and attention to detail.
- D.K. Panda (Ohio State University) led the tutorial selection process, made difficult by a particularly strong set of tutorial submissions
- Amy Apon (Clemson University) and Phil Papadopoulos (San Diego Supercomputer Center) chaired the panel committee and arranged some particularly exciting and interesting panels.

- D.F. “Rick” McMullen (University of Arkansas) chaired the workshops committee
- Barbara Hallock (IU), Stephanie Burks (IU), and Renato Figueiredo (University of Florida) organized student programs and student volunteers.
- Greg Newby (University of Alaska Fairbanks) did an outstanding job as chair for Posters.
- Nancy Wilkins-Diehr (San Diego Supercomputer Center) stepped in near the last minute to take on the role of chair of the awards committee.
- Margaret Dolinsky (IU) and Eric Wernert (IU) led the implementation of the visualization showcase.
- Stacie Burns (IU) chaired the finance committee and was of great help with this particularly important aspect of a successful conference
- Maria Perez (Universidad Politécnica de Madrid), next year’s general chair, has been deeply involved in the planning for this year, which has aided us and we hope will aid the hosts of IEEE cluster 2014.
- Damon Beals (IU) was particularly helpful in working with the Hilton Hotel staff on networking issues!
- Thanks to Jeremy Fischer (IU) for his management of the web site.
- Thanks to Nina Paine (IU) for her assistance to the IEEE Cluster 2013 committee throughout the process of planning for and putting on the conference.
- Last, and anything but least, my deepest gratitude to Therese Miller (IU) and Robert Ping (IU) who did simply heroic work on overall conference logistics and management.

Thanks to the staff of the Hilton Hotel in Indianapolis (particularly Joshua Gilliam and Ashlee Anderson), Yvonne Bean, Director, Global Accounts of HelmsBriscoe, and IU Conferences (particularly Melissa Kocias) for their help with hotel and registration arrangements.

I also want to thank IEEE for sponsorship of this conference and for publishing the proceedings of this conference in IEEE Xplore. I want to thank, particularly and personally, Evan Butterfield and Hazel Harrison of the IEEE Computer Society. They have been extremely helpful and easy to work with. Toni Cortes (Barcelona Supercomputing Center/Centro Nacional de Supercomputación), chair of the Cluster 2013 steering committee, has also been superb. At moments when the fate of this conference was in question, these three helped provide the advice, leadership, and troubleshooting needed to make it a success.

The financial support of sponsors has been tremendously important. I would like to thank the commercial and not-for-profit sponsors of IEEE Cluster 2013:

- **Commercial sponsors**
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 - University of Miami Center for Computational Science (Bronze)
 - Mississippi State University (Bronze)
 - University of Notre Dame (Bronze)
 - San Diego Supercomputer Center (Bronze)

Sponsors always deserve tremendous thanks. This year the IEEE Cluster conference sponsors deserve particular and special thanks for being willing and able to sponsor this important technical conference with a much shorter timeline between requests for sponsorships and the conference than is usual.

We acknowledge with particular thanks the United States National Science Foundation for support of student participation in IEEE Cluster 2013 through grant award #1249813.

We extend our thanks to the many authors, presenters, and speakers whose presentations provide the foundation for this annual conference. And we wish to express our appreciation to the conference committee chairs and the members of those committees and review teams, who contributed their time, talent, and efforts to making Cluster 2013 a success. Their voluntary efforts on behalf of this community often stretch into evenings, weekends, and holidays and reflect the highest professionalism and dedication.

Last, and definitely not least, thanks to you the attendees. I hope you enjoy the conference and the hospitality of Indianapolis and the many people and organizations who have made this conference possible.

Sincerely,

Craig Stewart

General Chair, IEEE Cluster 2013

Executive Director, Pervasive Technology Institute

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