

APPLIED COMPUTING 2009

The 24th Annual ACM Symposium on Applied Computing

PROCEEDINGS OF THE 2009 ACM
SYMPOSIUM ON APPLIED COMPUTING

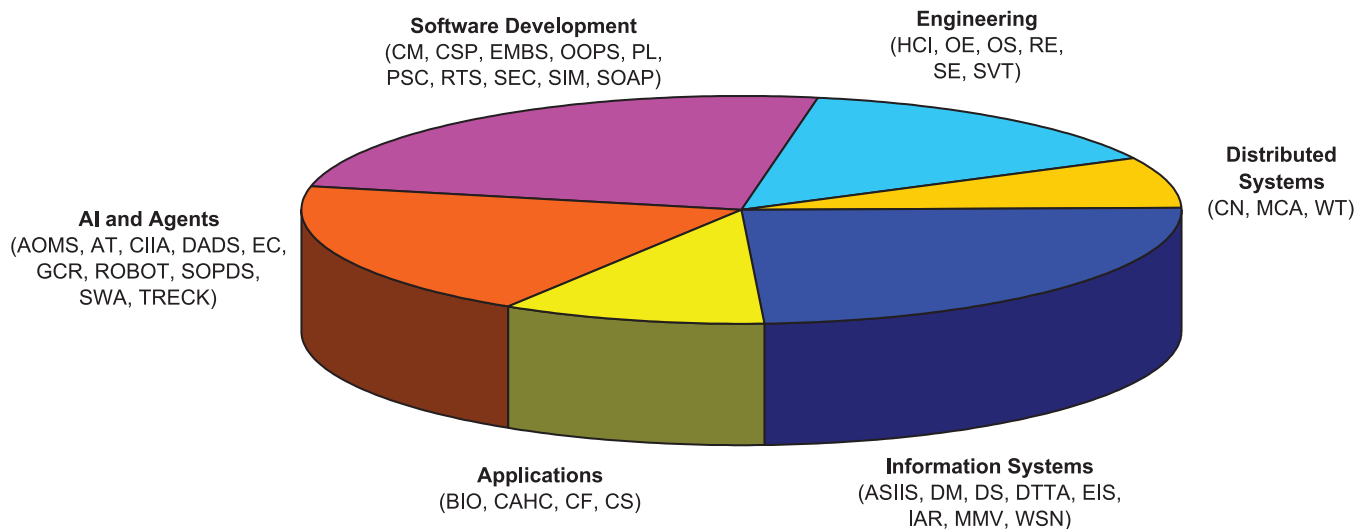
Honolulu, Hawaii, USA

March 8-12, 2009

Organizing Committee

Sung Y. Shin
Sascha Ossowski
Paulo Martins
Ronaldo Menezes
Mirko Viroli
Jiman Hong

Dongwan Shin
Mathew J. Palakal
Udo Fritzke
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Hosted by
University of Hawaii at Mānoa and Chaminade University of Honolulu

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The 24th Annual ACM Symposium on Applied Computing

Honolulu, Hawaii, USA
March 8-12, 2009

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The ACM Special Interest Group on Applied Computing is ACM's primary applications-oriented SIG. Its mission is to further the interests of the computing professionals engaged in the development of new computing applications and applications areas and the transfer of computing technology to new problem domains. SIGAPP offers practitioners and researchers the opportunity to share mutual interests in innovative application fields, technology transfer, experimental computing, strategic research, and the management of computing. SIGAPP also promotes widespread cooperation among business, government, and academic computing activities. Its annual Symposium on Applied Computing (SAC) provides an international forum for presentation of the results of strategic research and experimentation for this inter-disciplinary environment. SIGAPP membership fees are: \$30.00 for ACM Non-members, \$15.00 for ACM Professional Members, and \$8.00 for ACM Student Members. For further information on SIGAPP, please contact Barrett Bryant at bryant@cis.uab.edu or visit the SIGAPP website at <http://www.acm.org/sigapp>.

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Message from the Symposium Chairs

On behalf of the Organizing Committee, we welcome you to the 24th Annual ACM Symposium on Applied Computing (SAC 2009) hosted by Chaminade University in Hawaii. This international forum has been dedicated to computer scientists, engineers and practitioners for the purpose of presenting their findings and research results in various areas of computer applications. The organizing committee is grateful for your participation in this exiting international event. We hope that this conference proves interesting and beneficial.

The Symposium is sponsored by the ACM Special Interest Group on Applied Computing (SIGAPP), whose mission is to further the interests of computing professionals engaged in the design and development of new computing applications, interdisciplinary applications areas, and applied research. This conference is dedicated to the study of applied research of real-world problems. This event provides an avenue to discuss and exchange new ideas in the wide spectrum of application areas. We all recognize the importance of keeping up with the latest developments in our current areas of expedites.

SAC 2009 offers Technical Tracks and Posters. The success of the conference can be attributed to the substantial contribution of talented Track Chairs and Co-Chairs. Each track maintains a program committee and a set of highly qualified reviewers. We wish to thank the Track Chairs, Co-Chairs, Committee Members and participating reviewers for their hard work and effort to make the SAC 2009 conference a high quality conference. We also thank our invited keynote speakers, Dr. Vahid Tarokh, Harvard University and Dr. Rolf-Peter Kudritzki, University of Hawaii's Institute for Astronomy for sharing their knowledge with SAC attendees. Most of all, special thanks to the authors and presenters for sharing their experience with the rest of us and to all attendees for joining us in Honolulu, Hawaii this year.

The local organizing committee has always been a central contributor to the success of the SAC 2009 conference. Our gratitude goes to the Conference Vice-Chair Dr. Paulo Martins of Chaminade University and Local Chair Dr. Martha Crosby of University of Hawaii at Mānoa. We also extend our thanks to the Publication Chair, Dr. Dongwan Shin, New Mexico Tech for his tremendous effort in putting together the conference proceedings, Posters Chair Dr. Jiman Hong of Soongsil University for his hard work to make a successful Poster Program, Publicity Chair, Dr. Udo Fritzke, PUC-Minas for his hard work, and eConference Management Chair, Dr Mathew J. Palakal of Indiana University Purdue University for successfully maintaining the eCMS system. A special thanks goes to our Program Chairs Dr. Mirko Viroli, Università di Bologna and Dr. Ronaldo Menezes, Florida Institute of Technology for coordinating and bringing together an excellent Technical Program.

Again, we welcome you to SAC 2009 and the beautiful city of Honolulu, Hawaii. We hope you enjoy the SAC 2009 conference and your stay in Hawaii. Next year, we invite you to participate in SAC 2010 to be held in Crans Montana, Switzerland. The conference will be hosted by the University of Applied Sciences of Western Switzerland.

Sung Y. Shin and Sascha Ossowski
SAC 2009 Conference Chairs

Message from the Program Chairs

Ronaldo Menezes

Florida Institute of Technology, USA

Mirko Viroli

Alma Mater Studiorum – Università di Bologna, Italy

It is a pleasure to introduce the Proceedings of the 24th Symposium on Applied Computing (SAC 2009). Over the past 23 years, SAC has been an international forum for researchers and practitioners to present their findings and research results in the areas of computer applications and technology. SAC 2009 consolidates this tradition, and offers a Technical Program with a wide range of tracks covering major areas of computer applications. Published papers have been reviewed by highly qualified referees with strong expertise and special interest in their respective research areas. As part of the Technical Program, this is the sixth year that SAC incorporates poster papers into the Technical Program, carefully selected by Poster Chair Jiman Hong from Soongsil University in Korea.

SAC 2009 would not be possible without contributions from members of the scientific community. It is easy to imagine that many people have dedicated tremendous time and effort over the period of the last 12 months to bring you an excellent program. The success of SAC 2009 relies on the effort and hard work of many volunteers. On behalf of the SAC 2009 Organizing Committee, we would like to take this opportunity to thank all of those who made this year's technical program a reality, including speakers, referees, track chairs, session chairs, presenters, and attendees. We would specially like to thank the local arrangement committee lead by Paulo Pedro from the Chaminade University.

SAC's open Call for Track Proposals resulted in the submission of 60 track proposals. These proposals were carefully evaluated by the conference Program Committee, based on their scientific quality, on available data from previous editions, and on their appropriateness for SAC. In response to the call for papers produced by each track, 1084 papers were submitted from more than 58 countries, and 41 tracks have been eventually established. After a reviewing process where each paper was evaluated by a minimum of three reviewers, 316 papers were accepted as full papers for inclusion in the Conference Proceedings and presentation during the Symposium. This gives SAC 2009 an acceptance rate of 29.2% across all tracks. These numbers make SAC 2009 the most competitive SAC to date. Additionally, 97 posters have been selected to form the Poster Paper Program, and to appear as short papers in the proceedings. Due to the success last year, this year we maintained the idea of organizing the tracks into themes related to 6 main areas in computer science. The themes were used in the preparation of the Proceedings and the schedule of presentations, aiming at forming streams of related track sessions, and at minimizing the overlap of presentations in related fields.

We hope you will enjoy the meeting and have the opportunity to exchange your ideas and make new friends. We also hope you will enjoy your stay in Hawaii, USA and take pleasure from the many entertainments and activities that the city and Honolulu has to offer. We encourage you and your colleagues to submit your research findings to next year's technical program when the conference will be move back to Europe, more specifically to Switzerland. Thank you for being part of SAC 2009, and we hope to see you in Switzerland for SAC 2010.

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Exploiting Stack Distance to Estimate Worst-Case Data Cache Performance	1979
<i>Yu Liu, Southern Illinois University Carbondale, United States</i>	
<i>Wei Zhang, Southern Illinois University Carbondale, United States</i>	
An Implementation of the Earliest Deadline First Algorithm in Linux	1984
<i>Dario Faggioli, Scuola Superiore Sant'Anna, Italy</i>	
<i>Michael Trimarchi, Scuola Superiore Sant'Anna, Italy</i>	
<i>Fabio Checconi, Scuola Superiore Sant'Anna, Italy</i>	
<i>Marko Bertogna, Scuola Superiore Sant'Anna, Italy</i>	
<i>Antonio Mancina, Scuola Superiore Sant'Anna, Italy</i>	
An Orthogonal Real-Time Scheduling Architecture for Responsiveness QoS Requirements in SOA Environments	1990
<i>F.J. Monaco, University of São Paulo, Brazil</i>	
<i>M. Nery, University of São Paulo, Brazil</i>	
<i>M.M.L. Peixoto, University of São Paulo, Brazil</i>	

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Designing Reliable Real-Time Concurrent Object-Oriented Software Systems	1996
<i>Alfredo Capozucca, LASSY-University of Luxembourg, Luxembourg</i>	
<i>Nicolas Guelfi, LASSY-University of Luxembourg, Luxembourg</i>	
Designing a Multi-Core Hard Real-Time Test Bed for Energy Measurement Experiments	1998
<i>Tongquan Wei, Michigan Tech University, United States</i>	
<i>Xiaodao Chen, Michigan Tech University, United States</i>	
<i>Piyush Mishra, Michigan Tech University, United States</i>	

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Track Co-Chairs: Giampaolo Bella, Dipartimento di Matematica e Informatica –
Università di Catania, Italy
Luca Compagna, SAP Research France, France

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Privacy-Preserving Linear Programming	2002
<i>Jaideep Vaidya, Rutgers University, United States</i>	

On the Practical Importance of Communication Complexity for Secure Multi-Party Computation Protocols	2008
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<i>Daniel Dahlmeier, SAP Research, Germany</i>	
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<i>Debmalya Biswas, IRISA/INRIA, France</i>	
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<i>Rouven Kadura, RWTH Aachen University, Germany</i>	
Improving Stream Correlation Attacks on Anonymous Networks	2024
<i>Gavin O’Gorman, Dublin City University, Ireland</i>	
<i>Stephen Blott, Dublin City University, Ireland</i>	
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<i>Flavio Lombardi, Consiglio Nazionale delle Ricerche, Ufficio Sistemi Informativi, Italy</i>	
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<i>Ricardo Villamarín-Salomón, University of Pittsburgh, United States</i>	
<i>José Carlos Brustoloni, University of Pittsburgh, United States</i>	
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<i>Hahn-Ming Lee, National Taiwan University of Science & Technology / Academia Sinica, Taiwan</i>	
<i>Devi Parikh, Carnegie Mellon University, United States</i>	
<i>Tsuhan Chen, Carnegie Mellon University, United States</i>	
<i>Si-Yu Huang, National Taiwan University of Science & Technology, Taiwan</i>	
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<i>Aggelos Kiayias, University of Connecticut, United States</i>	
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<i>Nicolas Nicolaou, University of Connecticut, United States</i>	
<i>Alexander Russell, University of Connecticut, United States</i>	
<i>Andrew See, University of Connecticut, United States</i>	
<i>Narasimha Shashidhar, University of Connecticut, United States</i>	
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<i>Yi Yuan, George Mason University, United States</i>	
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<i>Chris Fink, JRM Technologies, United States</i>	
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<i>Nuno Fachada, LaSEEB-ISR, Portugal</i>	
<i>Vitor V. Lopes, INETI - Instituto Nacional de Engenharia, Tecnologia e Inovação, Portugal</i>	
<i>Agostinho Rosa, LaSEEB-ISR, Portugal</i>	
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Wireless Sensor Networks Track

Track Co-Chairs: Julie McCann, Imperial College London, United Kingdom
Richard Anthony, Greenwich University, United Kingdom

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Volker Linnemann, Institute of Information Systems, University of Lübeck, Germany
Martin Lipphardt, Institute of Telematics, University of Lübeck, Germany

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