Lecture Notes in Computer Science 7016

Commenced Publication in 1973
Founding and Former Series Editors:
Gerhard Goos, Juris Hartmanis, and Jan van Leeuwen

Editorial Board

David Hutchison
Lancaster University, UK

Takeo Kanade
Carnegie Mellon University, Pittsburgh, PA, USA

Josef Kittler
University of Surrey, Guildford, UK

Jon M. Kleinberg
Cornell University, Ithaca, NY, USA

Alfred Kobsa
University of California, Irvine, CA, USA

Friedemann Mattern
ETH Zurich, Switzerland

John C. Mitchell
Stanford University, CA, USA

Moni Naor
Weizmann Institute of Science, Rehovot, Israel

Oscar Nierstrasz
University of Bern, Switzerland

C. Pandu Rangan
Indian Institute of Technology, Madras, India

Bernhard Steffen
TU Dortmund University, Germany

Madhu Sudan
Microsoft Research, Cambridge, MA, USA

Demetri Terzopoulos
University of California, Los Angeles, CA, USA

Doug Tygar
University of California, Berkeley, CA, USA

Gerhard Weikum
Max Planck Institute for Informatics, Saarbruecken, Germany

Yang Xiang Alfredo Cuzzocrea
Michael Hobbs Wanlei Zhou (Eds.)

Algorithms and Architectures for Parallel Processing

11th International Conference, ICA3PP 2011
Melbourne, Australia, October 24-26, 2011
Proceedings, Part I

Springer

Volume Editors

Yang Xiang
Wanlei Zhou
Deakin University, School of Information Technology
Melbourne Burwood Campus, 221 Burwood Highway
Burwood, VIC 3125, Australia
E-mail: {yang, wanlei}@deakin.edu.au

Alfredo Cuzzocrea
ICAR-CNR and University of Calabria
Via P. Bucci 41 C, 87036 Rende (CS), Italy
E-mail: cuzzocrea@si.deis.unical.it

Michael Hobbs
Deakin University, School of Information Technology
Geelong Waurn Ponds Campus, Pigdons Road
Geelong, VIC 3217, Australia
E-mail: mick@deakin.edu.au

ISSN 0302-9743 e-ISSN 1611-3349
ISBN 978-3-642-24649-4 e-ISBN 978-3-642-24650-0
DOI 10.1007/978-3-642-24650-0
Springer Heidelberg Dordrecht London New York

Library of Congress Control Number: 2011937820

CR Subject Classification (1998): F.2, H.4, D.2, I.2, G.2, H.3

LNCS Sublibrary: SL 1 – Theoretical Computer Science and General Issues

© Springer-Verlag Berlin Heidelberg 2011
This work is subject to copyright. All rights are reserved, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, re-use of illustrations, recitation, broadcasting, reproduction on microfilms or in any other way, and storage in data banks. Duplication of this publication or parts thereof is permitted only under the provisions of the German Copyright Law of September 9, 1965, in its current version, and permission for use must always be obtained from Springer. Violations are liable to prosecution under the German Copyright Law.
The use of general descriptive names, registered names, trademarks, etc. in this publication does not imply, even in the absence of a specific statement, that such names are exempt from the relevant protective laws and regulations and therefore free for general use.

Typesetting: Camera-ready by author, data conversion by Scientific Publishing Services, Chennai, India

Printed on acid-free paper

Springer is part of Springer Science+Business Media (www.springer.com)

Message from the ICA3PP 2011 Program Chairs

A warm welcome to the 11th International Conference on Algorithms and Ar chitectures for Parallel Processing (ICA3PP 2011) and to Melbourne, Australia.

ICA3PP 2011 is the 11th in this series of conferences that started in 1995 and is devoted to algorithms and architectures for parallel processing. ICA3PP is now recognized as the main regular event focusing on the many dimensions of parallel algorithms and architectures, encompassing fundamental theoretical approaches, practical experimental results, and commercial components and systems. As applications of computing systems have permeated every aspects of daily life, the power of computing systems has become increasingly critical. On top of these motivations, ICA3PP 2011 provides a widely-known forum for researchers and practitioners from countries around the world to exchange ideas for improving the computation power of computing systems.

In response to the ICA3PP 2011 call for papers, we received 85 submissions from 33 different countries. These papers were evaluated on the basis of their originality, significance, correctness, relevance, and technical quality. Each paper was reviewed by at least three members of the Program Committee. Based on these evaluations, 24 regular papers and 17 short papers were selected for presentation at the conference, representing an acceptance rate of 28.2% for regular papers and 20% for short papers.

We would like to thank the Program Committee members and additional reviewers from all around the world for their efforts in reviewing the large number of papers. We are grateful to all the associated Conference/Workshop Chairs for their dedication and professionalism. We would like to extend our sincere thanks to the ICA3PP Steering Committee Chairs, Prof. Wanlei Zhou and Prof. Yi Pan, and to the General Chairs, Prof. Andrzej Goscinski and Prof. Peter Brezany. They provided us with invaluable guidance throughout the process of paper selection and program organization. We thank Georgi Cahill, the Conference Secretary, for her professional organization. We also thank Yu Wang and Sheng Wen for their help on completing the final proceedings.

Last but not least, we would also like to take this opportunity to thank all the authors for their submissions to ICA3PP 2011 and the associated symposium/workshops. Many of you have travelled some distance to participate in the conference.

Welcome to Melbourne and enjoy!

October 2011

Yang Xiang
Alfredo Cuzzocrea
Michael Hobbs

Message from the ICA3PP 2011 General Chairs

Welcome to the beautiful and 'World's Most Livable City' – Melbourne. We are privileged and delighted to welcome you to the 11th International Conference on Algorithms and Architectures for Parallel Processing (ICA3PP 2011).

Following the traditions of the previous successful ICA3PP conferences held in Hangzhou, Brisbane, Singapore, Melbourne, Hong Kong, Beijing, Cyprus, Taipei and Busan, this year ICA3PP 2011 is held in Melbourne, Australia. The objective of ICA3PP 2011 is to bring together researchers and practitioners from academia, industry and government to advance the theories and technologies in parallel and distributed computing. ICA3PP 2011 focuses on two broad areas of parallel and distributed computing, i.e., architectures, algorithms and networks, and systems and applications. The conference of ICA3PP 2011 is organized by Deakin University, Australia.

In addition to the ICA3PP 2011 main conference, one symposium and three workshops are being held together with ICA3PP 2011. They are:

1. 2011 International Symposium on Advances of Distributed Computing and Networking (ADCN 2011)
2. The 4th IEEE International Workshop on Internet and Distributed Computing Systems (IDCS 2011)
3. The 1st IEEE International Workshop on Parallel Architectures for Bioinformatics Systems (HardBio 2011)
4. The 3rd International Workshop on Multicore and Multithreaded Architectures and Algorithms (M2A2 2011)

We sincerely thank the many people who have helped in organizing ICA3PP 2011 and the associated symposium/workshops. We would like to thank the Program Chairs, Yang Xiang, Alfredo Cuzzocrea and Michael Hobbs, for their leadership in providing the excellent technical program.

We wish you a very enjoyable and rewarding experience at ICA3PP 2011 in Melbourne!

October 2011

Andrzej Goscinski
Peter Brezany

ICA3PP 2011 Committees

General Chairs

Andrzej Goscinski	Deakin University, Australia
Peter Brezany	University of Vienna, Austria

Program Chairs

Yang Xiang	Deakin University, Australia
Alfredo Cuzzocrea	ICAR-CNR and University of Calabria, Italy
Michael Hobbs	Deakin University, Australia

Steering Committee Chairs

Wanlei Zhou	Deakin University, Australia
Yi Pan	Georgia State University, USA

Workshop Chairs

Wen Tao Zhu	Chinese Academy of Sciences, China
Muhammad Khurram Khan	King Saud University, Saudi Arabia

Publicity Chairs

Ali Shahrabi	Glasgow Caledonian University, UK
Haixin Duan	Tsinghua University, China

Publication Chairs

Meikang Qiu	University of Kentucky, USA

Program Committee

Bechini Alessio	University of Pisa, Italy
Giuseppe Amato	ISTI-CNR, Italy
Cosimo Anglano	Università del Piemonte Orientale, Italy
Novella Bartolini	Univ. of Rome La Sapienza, Italy
Ladjel Bellatreche	ENSMA, France
Ateet Bhalla	NRI Institute of Information Science and Technology, India
Angelo Brayner	University of Fortaleza, Brazil
Massimo Cafaro	University of Salento, Italy

Jiannong Cao	Hong Kong Polytechnic University, Hong Kong
Andre Carvalho	Universidade de Sao Paulo, Brazil
Tania Cerquitelli	Politecnico di Torino, Italy
Ruay-Shiung Chang	National Dong Hwa University, Taiwan
Yue-Shan Chang	National Taipei University, Taiwan
Tzung-Shi Chen	National University of Tainan, Taiwan
Zizhong Chen	Colorado School of Mines, USA
Carmela Comito	University of Calabria, Italy
Raphaël Couturier	University of Franche Comté, France
Gennaro Della Vecchia	ICAR-CNR, Italy
Der-Rong Din	National Changhua University of Education, Taiwan
Susan Donohue	The College of New Jersey, USA
Shantanu Dutt	University of Illinois at Chicago, USA
Todd Eavis	Concordia University, Canada
Giuditta Franco	University of Verona, Italy
Karl Fuerlinger	University of California, USA
Jerry Gao	San Jose State University, USA
Jinzhu Gao	University of the Pacific, USA
Jose Daniel Garcia	University Carlos III of Madrid, Spain
Irene Garrigos	University of Alicante, Spain
Alex Gerbessiotis	New Jersey Institute of Technology, USA
Harald Gjermundrod	University of Nicosia, Cyprus
Houcine Hassan	Univ. Politécnica de Valencia, Spain
Pilar Herero	Univ. Politécnica de Madrid, Spain
Ching-Hsien Hsu	Chung Hua University, Taiwan
Tsung-Chuan Huang	National Sun Yat-sen University, Taiwan
Yo-Ping Huang	National Taipei University of Technology, Taiwan
George Karypis	University of Minnesota, USA
Muhammad Khurram Khan	King Saud University, Saudi Arabia
Soo-Kyun Kim	PaiChai University, Korea
Changhoon Lee	Hanshin University, Korea
Deok-Gyu Lee	ETRI, Korea
Laurent Lefevre	INRIA, France
Daniele Lezzi	Barcelona Supercomputing Center, Spain
Keqin Li	State University of New York at New Paltz, USA
Keqin Li	SAP Research, France
Keqiu Li	Dalian University of Technology, China
Kai Lin	Dalian University of Technology, China
Pangfeng Liu	National Taiwan University, Taiwan
Alberto Marchetti-Spaccamela	Sapienza U. of Rome, Italy
Tomas Margalef	Universitat Autonoma de Barcelona, Spain
Amiya Nayak	University of Ottawa, Canada

Leonardo B. Oliveira	Unicamp, Brazil
Marion Oswald	Hungarian Academy of Sciences, Hungary
Deng Pan	Florida International University, USA
Apostolos Papadopoulos	Aristotle Univ. of Thessaloniki, Greece
Dana Petcu	West University of Timisoara, Romania
Rubem Pereira	Liverpool John Moores University, UK
Kleanthis Psarris	The University of Texas at San Antonio, USA
Pedro Pereira Rodrigues	University of Porto, Portugal
Casiano Rodriguez-Leon	Universidad de La Laguna, Spain
Marcel C. Rosu	IBM, USA
Giovanni Maria Sacco	Universitá di Torino, Italy
Erich Schikuta	University of Vienna, Austria
Martin Schulz	Lawrence Livermore National Laboratory, USA
Seetharami Seelam	IBM T.J. Watson Research Center, USA
Edwin Sha	University of Texas at Dallas, USA
Rahul Shah	Louisiana State University, USA
Giandomenico Spezzano	ICAR-CNR, Italy
Peter Strazdins	The Australian National University, Australia
Domenico Talia	Universitá della Calabria, Italy
Uwe Tangen	Ruhr-Universität Bochum, Germany
Jichiang Tsai	National Chung Hsing University, Taiwan
Chen Wang	CSIRO ICT Centre, Australia
Cho-Li Wang	The University of Hong Kong, Hong Kong
Xiaofang Wang	Villanova University, USA
Qishi Wu	University of Memphis, USA
Fatos Xhafa	Polytechnic University of Catalonia, Spain
Zheng Yan	Nokia Research Center, Finland
Chao-Tung Yang	Tunghai University, Taiwan
Zhiwen Yu	Northwestern Polytechnical University, China
Eiko Yoneki	University of Cambridge Computer Laboratory, UK
Sotirios G. Ziavras	NJIT, USA
Roger Zimmermann	National University of Singapore, Singapore

ICA3PP 2011 Additional Reviewers

Atif, Muhammad	Gouvea, Conrado P.L.
Cai, Jie	Guazzone, Marco
Canonico, Massimo	Jin, Chao
Chan, Philip	Khan, Bilal
Ding, Chong	Macias, Mario
Dionysiou, Ioanna	Miranda-Valladares, Gara
Eldefrawy, Mohamed	Mochetti, Karina
Estévez, José Ignacio	Mou, Duxing
Figueiredo, Thomaz	Printista, Marcela

Rodríguez Martínez, Diego
Ruj, Sushmita
Segredo Gonzalez, Eduardo Manuel
Segura, Carlos
Song, Huaguang
Tiskin, Alexander
Tsai, Pei-Wei
Vlad, Ioan
Zhu, Kai
Zola, Matteo

Table of Contents – Part I

ICA3PP 2011 Keynote

ICA3PP 2011 Regular Papers

ICA3PP 2011 Short Papers

Table of Contents – Part II

ADCN 2011 Papers

IDCS 2011 Papers

M2A2 2011 Papers

HardBio 2011 Papers