2012 Imperial College Computing Student Workshop

ICCSW'12, September 27-28, 2012, London, United Kingdom

Edited by

Andrew V. Jones





Editor

Andrew V. Jones
Verification of Autonomous Systems Group
Department of Computing
Imperial College London
180 Queen's Gate, London, SW7 2AZ
United Kingdom
andrewj@doc.ic.ac.uk

ACM Classification 1998
A.O. Conference Proceedings

ISBN 978-3-939897-48-4

Published online and open access by

Schloss Dagstuhl – Leibniz-Zentrum für Informatik GmbH, Dagstuhl Publishing, Saarbrücken/Wadern, Germany. Online available at http://www.dagstuhl.de/dagpub/978-3-939897-48-4.

Publication date November, 2012

Bibliographic information published by the Deutsche Nationalbibliothek

The Deutsche Nationalbibliothek lists this publication in the Deutsche Nationalbibliografie; detailed bibliographic data are available in the Internet at http://dnb.d-nb.de.

License



This work is licensed under a Creative Commons Attribution-NonCommercial-NoDerivs (BY-NC-ND) license: http://creativecommons.org/licenses/by-nc-nd/3.0/legalcode

In brief, this license authorizes each and everybody to share (to copy, distribute and transmit) the work under the following conditions, without impairing or restricting the authors' moral rights:

- Attribution: The work must be attributed to its authors.
- No derivation: It is not allowed to alter or transform this work.
- Noncommercial: The work may not be used for commercial purposes.

The copyright is retained by the corresponding authors.

Digital Object Identifier: 10.4230/OASIcs.ICCSW.2012.i

ISBN 978-3-939897-48-4

ISSN 2190-6807

http://www.dagstuhl.de/oasics

OASIcs - OpenAccess Series in Informatics

OASIcs aims at a suitable publication venue to publish peer-reviewed collections of papers emerging from a scientific event. OASIcs volumes are published according to the principle of Open Access, i.e., they are available online and free of charge.

Editorial Board

- Daniel Cremers (TU München, Germany)
- Barbara Hammer (Universität Bielefeld, Germany)
- Marc Langheinrich (Università della Svizzera Italiana Lugano, Switzerland)
- Dorothea Wagner (Editor-in-Chief, Karlsruher Institut für Technologie, Germany)

ISSN 2190-6807

www.dagstuhl.de/oasics

Contents

Preface Andrew V. Jones	i
Regular Papers	
Knowledge Transformation using a Hypergraph Data Model Lama Al Khuzayem and Peter McBrien	1
A heuristic for sparse signal reconstruction Theofanis Apostolopoulos	8
Predicate Invention in Inductive Logic Programming Duangtida Athakravi, Krysia Broda, and Alessandra Russo	15
Targeting a Practical Approach for Robot Vision with Ensembles of Visual Features Emanuela Boroş	22
Incremental HMM with an improved Baum-Welch Algorithm Tiberiu S. Chis and Peter G. Harrison	29
Device specialization in heterogeneous multi-GPU environments Gabriele Cocco and Antonio Cisternino	35
Abstracting Continuous Nonpolynomial Dynamical Systems William Denman	42
Improving the Quality of Distributed Composite Service Applications Dionysios Efstathiou, Peter McBurney, Noël Plouzeau, and Steffen Zschaler	49
Fine-Grained Opinion Mining as a Relation Classification Problem Alexandru Lucian Gînscă	56
Mechanisms for Opponent Modelling Christos Hadjinikolis, Sanjay Modgil, Elizabeth Black, and Peter McBurney	62
4D Cardiac Volume Reconstruction from Free-Breathing 2D Real-Time Image Acquisitions using Iterative Motion Correction	
Martin Jantsch, Daniel Rueckert, and Jo Hajnal	69
Collecting battery data with Open Battery Gareth L. Jones and Peter G. Harrison	75
Informing Coalition Structure Generation in Multi-Agent Systems Through Emotion Modelling	
Martyn Lloyd-Kelly and Luke Riley	81
Bounded Model Checking for Linear Time Temporal-Epistemic Logic Artur Męski, Wojciech Penczek, and Maciej Szreter	88
A compositional model to characterize software and hardware from their resource usage Davide Morelli and Antonio Cisternino	95

2012 Imperial College Computing Student Workshop (ICCSW'12).
Editor: Andrew V. Jones
OpenAccess Series in Informatics
OASICS Schloss Dagstuhl – Leibniz-Zentrum für Informatik, Dagstuhl Publishing, Germany



vi Contents

Integration of Temporal Abstraction and Dynamic Bayesian Networks in Clinical Systems. A preliminary approach Kalia Orphanou, Elpida Keravnou, and Joseph Moutiris	102
Get started imminently: Using tutorials to accelerate learning in automated static analysis Jan-Peter Ostberg and Stefan Wagner	109
A Quantitative Study of Social Organisation in Open Source Software Communities Marcelo Serrano Zanetti, Emre Sarigöl, Ingo Scholtes, Claudio Juan Tessone, and Frank Schweitzer	116
Apply the We!Design Methodology in E-learning 2.0 System Design: A Pilot Study Lei Shi, Dana Al Qudah, and Alexandra I. Cristea	123
An Implementation Model of a Declarative Framework for Automated Negotiation Laura Surcel	129
Blurring the Computation-Communication Divide: Extraneous Memory Accesses and their Effects on MPI Intranode Communications Wilson M. Tan and Stephen A. Jarvis	135
Search-Based Ambiguity Detection in Context-Free Grammars Naveneetha Vasudevan and Laurence Tratt	142
Introduction to Team Disruption Mechanisms Andrada Voinitchi, Elizabeth Black, and Michael Luck	149
Self-Learning Genetic Algorithm For Constrains Satisfaction Problems Hu Xu and Karen Petrie	156

Preface

This volume contains the proceedings of the second Imperial College Computing Student Workshop (ICCSW'12). The workshop took place on 27th-28th September 2012 in London, UK and was hosted by Imperial College London.

ICCSW is an event organised with the "by students, for students" ethos in mind. All of the organisation of the workshop was done by the steering committee of Ph.D. students at Imperial College London, with all papers and reviews also being written by students. This year, ICCSW also introduced an "ambassador" programme for students who wished to act as external publicity chairs. The ambassadors proved to be invaluable as they helped increase the national and international visibility of the event.

These proceedings contain 24 original contributions in various fields from across computer science, including both theoretical and applied papers. The workshop received 47 submissions, and after rigorous peer review, the final selection was cut down to 24 papers (and even those 24 were difficult to schedule!). From ICCSW'11, this is a 105% increase in the number of submissions and a 41% increase in the number of accepted papers. Along with having more submissions, there was also a significant improvement in the quality of the papers – this made the committee's job in selecting the final programme very tough!

Both days of the workshop featured a keynote talk on a facet of computer science – our renewed thanks go out to our keynote speakers. The talks were titled:

- Cloud Centric Networking, by Greg Page (Cisco Systems, Inc.); and
- The Art of Programming Language Design: Confessions of a Connoisseur, by Gilad Bracha (Google Inc.)

ICCSW'12 once again proved to be an international event, attracting both submissions and attendees from the UK and the rest of Europe. The workshop was pleased to host in excess of 100 participants from the following countries: Cyprus, France, Germany, Italy, Poland, Romania, Switzerland and the United Kingdom. Furthermore, the workshop also received submissions from: Greece, Ireland, the Netherlands, Saudi Arabia, Slovakia and Taiwan!

We wish to thank all authors, accepted or not, who acted as reviewers, plus the handful of external reviewers. Furthermore, our thanks also go out to our sponsors: Imperial College London, who provided us with more than just financial support; Google and Cisco for their gold-level sponsorship; and, finally, HP for providing travel bursaries to numerous authors. Without the continual confidence and financial support of these organisations, ICCSW'12 would not have been possible. For this support we are truly grateful!

October, 2012 Andrew V. Jones London



Conference Organisation

Programme Committee

Feryal Mehraban Pour Behbahani Imperial College London Marcel Chris Guenther Imperial College London Petr Hosek Imperial College London Andrew Vaughan Jones Imperial College London Roman Kolcun Imperial College London Nicholas Ng Imperial College London Maria Nika Imperial College London Irvna Tsimashenka Imperial College London Calin-Rares Turliuc Imperial College London

Ambassadors

Shaswar Baban King's College London

Helen Bolke-Hermanns RWTH Aachen

Alessandra Debenedictis George Mason University

Hans Decker TU Dortmund Marco Diciolla University of Oxford Matthew Forshaw Newcastle University Alex Ginsca Iasi University

Evgenios Hadjisoterio University of Cyprus Jesus Omana Iglesias Trinity College Dublin University of Rennes Konstantinos Kloudas

Michał Knapik Polish Academy of Sciences Alexandru Matei University College London

Artur Męski University of Łódź

Qais Noorshams Karlsruhe Institute of Technology

Oliver Perks University of Warwick Hubert Plociniczak University of Lausanne Alireza Pourranjbar University of Edinburgh Sören Preibusch University of Cambridge Philipp Reinecke Freie Universität Berlin Luke Riley University of Liverpool

Ivan Shcherbakov Technische Universität Kaiserslautern

Son Tran City University London

Max Tschaikowski Ludwig Maximilian University of Munich

External Reviewers

Kamarul Abdul-Basit Newcastle University Lama Al Khuzayem Imperial College London

2012 Imperial College Computing Student Workshop (ICCSW'12).

Editor: Andrew V. Jones

OpenAccess Series in Informatics

OASICS Schloss Dagstuhl – Leibniz-Zentrum für Informatik, Dagstuhl Publishing, Germany



x Conference Organisation

Xiuyi Fan

Abeer Al-Humaimeedy King's College London
Theofanis Apostolopoulos King's College London
Duangtida Athakravi Imperial College London
Michaela Bacikova Technical University of Košice
Emanuela Boros Alexandru Ioan Cuza University

Kleopatra Chatziprimou King's College London
Tib Chis Imperial College London
Gabriele Cocco University of Pisa
William Denman University of Cambridge
Antoine Desmet Imperial College London
Dionysios Efstathiou King's College London

Valentina Fedorova Royal Holloway, University of London

Imperial College London

Daniele Filaretti Imperial College London

Alexandru Lucian Ginsca Alexandru Ioan Cuza University

Christos Hadjinikolis King's College London

Peter Ivancak Technical University of Košice
Martin Jantsch Imperial College London
Gareth Jones Imperial College London
Dominik Lakatos Technical University of Košice

Martyn Lloyd-Kelly University of Liverpool
Daniel Lorencik Technical University of Košice
Michal Malohlava Charles University, Prague
Artur Meski Polish Academy of Sciences

Rabih Mohsen Imperial College London Davide Morelli University of Pisa Antonis Mouhtaropoulos University of Warwick

Milan Nosal Technical University of Košice

Kalia Orphanou University of Cyprus
Jan-Peter Ostberg University of Stuttgart
Mert Ozkaya City University London
Martin Pala Technical University of Košice

Oliver Perks University of Warwick Alan Perotti University of Turin

Hubert Plociniczak École Polytechnique Fédérale de Lausanne

Luke Riley University of Liverpool

Marcelo Serrano Zanetti ETH Zurich

Lei Shi University of Warwick Laura Surcel University of Craiova Wilson Tan University of Warwick

Daniel Telgen University of Applied Sciences Utrecht

Martin Varga Technical University of Košice

Naveneetha Vasudevan King's College London

Maria Vircikova Technical University of Košice

Andrada Voinitchi King's College London
Wenlong Wang Imperial College London
Hu Xu University of Dundee
Jian Zhang University of Dundee

Supporters and Sponsors

Supporting Scientific Institutions

Imperial College London

Imperial College London http://www.imperial.ac.uk/

Sponsors





Cisco Systems, Inc. http://www.cisco.com/



Hewlett-Packard Company http://www.hp.com/

