Communications
in Computer and Information Science

Editorial Board

Simone Diniz Junqueira Barbosa
Pontifical Catholic University of Rio de Janeiro (PUC-Rio),
Rio de Janeiro, Brazil

Phoebe Chen
La Trobe University, Melbourne, Australia

Alfredo Cuzzocrea
ICAR-CNR and University of Calabria, Italy

Xiaoyong Du
Renmin University of China, Beijing, China

Joaquim Filipe
Polytechnic Institute of Setúbal, Portugal

Orhun Kara
TÜBİTAK BİLGEM and Middle East Technical University, Turkey

Igor Kotenko
St. Petersburg Institute for Informatics and Automation
of the Russian Academy of Sciences, Russia

Krishna M. Sivalingam
Indian Institute of Technology Madras, India

Dominik Śležak
University of Warsaw and Infobright, Poland

Takashi Washio
Osaka University, Japan

Xiaokang Yang
Shanghai Jiao Tong University, China
Preface

This CCIS volume contains the papers of the 7th International Conference on Evaluation of Novel Approaches to Software Engineering (ENASE) held in Wroclaw, Poland, sponsored by the Institute for Systems and Technologies of Information, Control and Communication (INSTICC) and co-organized by the Wroclaw University of Economics (WUE).

There is a well-focused research community around the ENASE conferences. The mission of ENASE is to be a prime international forum in which to discuss and publish research findings and IT industry experiences with relation to the evaluation of novel approaches to software engineering. By comparing novel approaches with established traditional practices and by evaluating them against software quality criteria, the ENASE conferences advance knowledge and research in software engineering, identify the most hopeful trends, and propose new directions for consideration by researchers and practitioners involved in large-scale software development and integration.

Overall, for the 7th ENASE in Wroclaw we received 54 papers from 27 countries, of which 11 papers were accepted for publication and presentation as full papers. The papers were submitted for blind reviews to 82 renowned ENASE 2012 Program Committee members. With multiple reviews for each paper, the final decision of acceptance/rejection was taken by the PC Chair Prof. Leszek Maciaszek. A few borderline papers were subjected to extra considerations and discussions before decisions were reached.

The ENASE 2012 acceptance ratio for full papers published in this volume was 20.4% (based on 54 submissions), but considering that 9 papers were formally submitted in the category of “position” (rather than “regular”) papers, a more truthful ratio for full papers is 24% (based on 45 submissions).

ENASE 2012 was held in conjunction with the 14th International Conference on Enterprise Information Systems ICEIS 2012. The two conferences shared in joint plenary sessions the same list of keynote speakers. The prominent list of keynotes consisted of the following professors:

- Schahram Dustdar, Vienna University of Technology, Austria
- Dimitris Karagiannis, University of Vienna, Austria
- Steffen Staab, University of Koblenz-Landau, Germany
- Pericles Loucopoulos, Loughborough University, UK
- Yannis Manolopoulos, Aristotle University, Greece

September 2013

Joaquim Filipe
Leszek Maciaszek
Organization

Conference Chair
Joaquim Filipe
Polytechnic Institute of Setúbal/INSTICC, Portugal

Program Chair
Leszek Maciaszek
Wroclaw University of Economics, Poland/Macquarie University ~ Sydney, Australia

Organizing Committee
Helder Coelhas
Andreia Costa
Patrícia Duarte
Bruno Encarnação
Raquel Pedrosa
Vitor Pedrosa
Cláudia Pinto
Susana Ribeiro
Pedro Varela
INSTICC, Portugal
INSTICC, Portugal
INSTICC, Portugal
INSTICC, Portugal
INSTICC, Portugal
INSTICC, Portugal
INSTICC, Portugal
INSTICC, Portugal

Program Committee
Guglielmo De Angelis, Italy
Colin Atkinson, Germany
Costin Badica, Romania
Ghassan Beydoun, Australia
María Bielikova, Slovak Republic
Piotr Bubacz, Poland
Dumitru Burdescu, Romania
Wojciech Cellary, Poland
Rebeca Cortazar, Spain
Massimo Cossentino, Italy
Bernard Coulette, France
Marcelo d’Amorim, Brazil
Philippe Dugerdil, Switzerland
Angelina Espinoza, Spain
Joerg Evermann, Canada
Maria João Ferreira, Portugal
Agata Filipowska, Poland
Maria Ganzha, Poland
Juan Garbajosa, Spain
Alessandro García, Brazil
Cesar Gonzalez-Perez, Spain
Jeff Gray, USA
Hans-Gerhard Gross, The Netherlands
Rene Hxel, Australia
Emily Hill, USA
Benjamin Hirsch, UAE
Charlotte Hug, France
Bernhard G. Humm, Germany
Zbigniew Huzar, Poland
Akira Imada, Belarus
Stefan Jablonski, Germany
Slinger Jansen, The Netherlands
Monika Kaczmarek, Poland
Robert S. Laramee, UK
Xabier Larrucea, Spain
George Lepouras, Greece
Francesca Lonetti, Italy
Pericles Loucopoulos, UK
Graham Low, Australia
Jian Lu, China
André Ludwig, Germany
Ivan Lukovic, Serbia
Leszek Maciaszek, Poland/Australia
Lech Madeyski, Poland
Leonardo Mariani, Italy
Sascha Mueller-Feuerstein, Germany
Johannes Müller, Germany
Anne Hee Hiong Ngu, USA
Andrzej Niesler, Poland
Janis Osis, Latvia
Marcin Paprzycki, Poland
Oscar Pastor, Spain
Dana Petcu, Romania
Naveen Prakash, India
Lutz Prechelt, Germany
Elke Pulvermueller, Germany
Rick Rabiser, Austria
Lukasz Radlinski, Poland
Gil Regev, Switzerland
Artur Rot, Poland
Radoslaw Rudek, Poland
Francisco Ruiz, Spain
Krzysztof Sacha, Poland
Motoshi Saeki, Japan
Sreedevi Sampath, USA
Heiko Schuldt, Switzerland
Onn Shehory, Israel
Jerzy Surma, Poland
Jakub Swacha, Poland
Stephanie Teufel, Switzerland
Rainer Unland, Germany
Olegas Vasilecas, Lithuania
Krzysztof Wecel, Poland
Michael Whalen, USA
Igor Wojnicki, Poland
Kang Zhang, USA

Auxiliary Reviewers

Fabiano Ferrari, Brazil
Stefan Hanenberg, Germany
Reinhold Kloos, Germany
Ioan Lazar, Romania
Otavio Lemos, Brazil

Invited Speakers

Schahram Dustdar
Dimitris Karagiannis
Steffen Staab
Pericles Loucopoulos
Yannis Manolopoulos
Vienna University of Technology, Austria
University of Vienna, Austria
University of Koblenz-Landau, Germany
Loughborough University, UK
Aristotle University, Greece
# Table of Contents

## Papers

<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dynamic Symbolic Execution Guided by Data Dependency Analysis</td>
<td>3</td>
</tr>
<tr>
<td>for High Structural Coverage</td>
<td></td>
</tr>
<tr>
<td><em>The Anh Do, A.C.M. Fong, and Russel Pears</em></td>
<td></td>
</tr>
<tr>
<td>Using Roles as Units of Composition</td>
<td>16</td>
</tr>
<tr>
<td><em>Fernando Barbosa and Ademar Aguiar</em></td>
<td></td>
</tr>
<tr>
<td>Extending Service Selection Algorithms with Interoperability Analysis</td>
<td>33</td>
</tr>
<tr>
<td><em>Paweł Kaczmarek</em></td>
<td></td>
</tr>
<tr>
<td>Correlation of Business Activities Executed in Legacy Information Systems</td>
<td>48</td>
</tr>
<tr>
<td><em>Ricardo Pérez-Castillo, Barbara Weber, and Mario Piattini</em></td>
<td></td>
</tr>
<tr>
<td>Detection of Infeasible Paths: Approaches and Challenges</td>
<td>64</td>
</tr>
<tr>
<td><em>Sun Ding and Hee Beng Kuan Tan</em></td>
<td></td>
</tr>
<tr>
<td>A Formal Monitoring Technique for SIP Conformance Testing</td>
<td>79</td>
</tr>
<tr>
<td><em>Xiaoping Che, Felipe Lalanne, and Stephane Maag</em></td>
<td></td>
</tr>
<tr>
<td>Unified Modeling of Static Relationships between Program Elements</td>
<td>95</td>
</tr>
<tr>
<td><em>Ioana Șora</em></td>
<td></td>
</tr>
<tr>
<td>Social Adaptation at Runtime</td>
<td>110</td>
</tr>
<tr>
<td><em>Raian Ali, Carlos Solis, Inah Omoronyia, Mazeiar Salehie, and Bashar Nuseibeh</em></td>
<td></td>
</tr>
<tr>
<td>An Agent Oriented Development Process for Multimedia Systems</td>
<td>128</td>
</tr>
<tr>
<td><em>Alma M. Gómez-Rodríguez, Juan Carlos González-Moreno,</em></td>
<td></td>
</tr>
<tr>
<td><em>David Ramos-Valcárcel, and Francisco Javier Rodriguez-Martinez</em></td>
<td></td>
</tr>
<tr>
<td>A Semi-automated Approach towards Handling Inconsistencies in Software Requirements</td>
<td>142</td>
</tr>
<tr>
<td><em>Richa Sharma and K.K. Biswas</em></td>
<td></td>
</tr>
<tr>
<td>Deduction-Based Formal Verification of Requirements Models with</td>
<td>157</td>
</tr>
<tr>
<td>Automatic Generation of Logical Specifications</td>
<td></td>
</tr>
<tr>
<td><em>Radosław Klimek</em></td>
<td></td>
</tr>
</tbody>
</table>

## Author Index

<table>
<thead>
<tr>
<th>Author</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Author Index</em></td>
<td>173</td>
</tr>
</tbody>
</table>