

# **Lecture Notes in Business Information Processing**

**264**

## Series Editors

Wil M.P. van der Aalst

*Eindhoven Technical University, Eindhoven, The Netherlands*

John Mylopoulos

*University of Trento, Trento, Italy*

Michael Rosemann

*Queensland University of Technology, Brisbane, QLD, Australia*

Michael J. Shaw

*University of Illinois, Urbana-Champaign, IL, USA*

Clemens Szyperski

*Microsoft Research, Redmond, WA, USA*

More information about this series at <http://www.springer.com/series/7911>

Stanislaw Wrycza (Ed.)

# Information Systems: Development, Research, Applications, Education

9th SIGSAND/PLAIS EuroSymposium 2016  
Gdansk, Poland, September 29, 2016  
Proceedings

*Editor*  
Stanislaw Wrycza  
Department of Business Informatics  
University of Gdansk  
Sopot  
Poland

ISSN 1865-1348                      ISSN 1865-1356 (electronic)  
Lecture Notes in Business Information Processing  
ISBN 978-3-319-46641-5              ISBN 978-3-319-46642-2 (eBook)  
DOI 10.1007/978-3-319-46642-2

Library of Congress Control Number: 2016951708

© Springer International Publishing AG 2016

This work is subject to copyright. All rights are reserved by the Publisher, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, reuse of illustrations, recitation, broadcasting, reproduction on microfilms or in any other physical way, and transmission or information storage and retrieval, electronic adaptation, computer software, or by similar or dissimilar methodology now known or hereafter developed.

The use of general descriptive names, registered names, trademarks, service marks, 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.

The publisher, the authors and the editors are safe to assume that the advice and information in this book are believed to be true and accurate at the date of publication. Neither the publisher nor the authors or the editors give a warranty, express or implied, with respect to the material contained herein or for any errors or omissions that may have been made.

Printed on acid-free paper

This Springer imprint is published by Springer Nature  
The registered company is Springer International Publishing AG  
The registered company address is: Gewerbestrasse 11, 6330 Cham, Switzerland

# Preface

Systems analysis and design (SAND) is the classic field of research and education in the area of management information systems (MIS) or, as it is called more frequently in Europe – business informatics, almost from its origins. SAND continuously attracts the attention of both academia and business. The rapid and natural progress of ICT has generated the requirements for the new generation of methods, techniques, and tools of SAND, adequate for modern IS challenges. Therefore, international thematic conferences and symposia have become widely accepted forums for the exchange of concepts, solutions, and experiences in SAND. In particular, the Association for Information Systems (AIS) is undertaking the initiatives towards SAND's international development.

The objective of the EuroSymposium on Systems Analysis and Design is to promote and develop high-quality research on all issues related to SAND. It provides a forum for SAND researchers and practitioners in Europe and beyond to interact, collaborate, and develop their field. The Eurosymposia were initiated by Prof. Keng Siau as the SIGSAND – Europe Initiative. Previous EuroSymposia were held at:

- University of Galway, Ireland – 2006
- University of Gdansk, Poland – 2007
- University of Marburg, Germany – 2008
- University of Gdansk, Poland – 2011
- University of Gdansk, Poland – 2012
- University of Gdansk, Poland – 2013
- University of Gdansk, Poland – 2014
- University of Gdansk, Poland – 2015

The accepted papers of Gdansk EuroSymposia were published in:

- 2nd EuroSymposium 2007: A. Bajaj, S. Wrycza (eds), Systems Analysis and Design for Advanced Modeling Methods: Best Practises, Information Science Reference, IGI Global, Hershey, New York, 2009
- 4th EuroSymposium 2011: S. Wrycza (ed) 2011, Research in Systems Analysis and Design: Models and Methods, series: LNBIP 93, Springer, Berlin 2011
- Joint Working Conferences EMMSAD/EuroSymposium 2012 held at CAiSE'12: I. Bider, T. Halpin, J. Krogstie, S. Nurcan, E. Proper, R. Schmidt, P. Soffer, S. Wrycza (eds.) 2012, Enterprise, Business-Process and Information Systems Modeling, series: LNBIP 113, Springer, Berlin 2012
- 6th SIGSAND/PLAIS EuroSymposium 2013: S. Wrycza (ed.), Information Systems: Development, Learning, Security, Series: Lecture Notes in Business Information Processing 161, Springer, Berlin 2013
- 7th SIGSAND/PLAIS EuroSymposium 2014: S. Wrycza (ed.), Information Systems: Education, Applications, Research, Series: Lecture Notes in Business Information Processing 193, Springer, Berlin 2014

- 8th SIGSAND/PLAIS EuroSymposium 2015: S. Wrycza (ed.), Information Systems: Development, Applications, Education, Series: Lecture Notes in Business Information Processing 232, Springer, Berlin 2015

There were three organizers of the 9<sup>th</sup> EuroSymposium on Systems Analysis and Design:

- SIGSAND – Special Interest Group on Systems Analysis and Design of AIS
- PLAIS – Polish Chapter of AIS
- Department of Business Informatics of University of Gdansk, Poland

SIGSAND is one of the most active SIGs with a substantial record of contributions for AIS. It provides services such as annual American and European Symposia on SIGSAND, research and teaching tracks at major IS conferences, listserv, and special issues in journals.

The Polish Chapter of the Association for Information Systems (PLAIS) was established in 2006 as the joint initiative of Prof. Claudia Loebbecke, former president of AIS and Prof. Stanislaw Wrycza, University of Gdansk, Poland. PLAIS co-organizes international and domestic IS conferences.

The Department of Business Informatics of the University of Gdansk conducts intensive teaching and research activities. Some of its academic manuals are bestsellers in Poland and the department is active internationally. The most significant conferences organized by the department were: the Xth European Conference on Information Systems ECIS 2002 and the International Conference on Business Informatics Research, BIR 2008. The department is a partner of the ERCIS consortium – European Research Center for Information Systems.

EuroSymposium 2016 had an acceptance rate of 40 %, with submissions divided into the following three groups:

- Information Systems Development
- Information Systems Management
- Information Systems Learning

The accepted papers reflect the current trends in the field of systems analysis and design.

I would like to express my thanks to all authors, reviewers, advisory board, international Program Committee, and Organizing Committee members for their support, efforts, and time. They made possible the successful accomplishment of EuroSymposium 2016.

August 2016

Stanislaw Wrycza  
General Chair

# Organization

## General Chair

Stanisław Wrycza                      University of Gdansk, Poland

## Program Chairs

Stanisław Wrycza                      University of Gdansk, Poland

## Advisory Board

Wil van der Aalst	Eindhoven University of Technology, The Netherlands
David Avison	ESSEC Business School, France
Joerg Becker	University of Muenster, Germany
Jane Fedorowicz	Bentley University, USA
Dimitris Karagiannis	University of Vienna, Austria
Julie Kendall	Rutgers University, USA
Helmut Krcmar	Technische Universität Muenchen, Germany
Claudia Loebbecke	University of Cologne, Germany
Keng Siau	Missouri University of Science and Technology, USA

## International Program Committee

Stanisław Wrycza	University of Gdansk, Poland - chairman
Eduard Babkin	Higher School of Economics, Moscow, Russia
Akhilesh Bajaj	University of Tulsa, USA
Palash Bera	Saint Louis University, USA
Patrick Y.K. Chau	The University of Hong Kong, China
Petr Doucek	University of Economics, Prague, Czech Republic
Rolf Granow	Luebeck University of Applied Sciences, Germany
Bjoern Johansson	Lund University, Sweden
Kalinka Kaloyanova	Sofia University, Bulgaria
Vijay Khatri	Indiana University Bloomington, USA
Marite Kirikova	Riga Technical University, Latvia
Jolanta Kowal	University of Wroclaw, Poland
Tuomo Lindholm	Lapland University of Applied Sciences, Finland
Tim Majchrzak	University of Agder, Norway
Yannis Manolopoulos	University of Thessaloniki, Greece
Nikolaus Obwegeser	Aarhus University, Denmark
Jinsoo Park	Seoul National University, Korea
Nava Pliskin	Ben-Gurion University of the Negev, Israel

Jolita Ralyte	University of Geneva, Switzerland
Michael Rosemann	Queensland University of Technology, Australia
Isabel Ramos	The University of Minho, Portugal
Kurt Sandkuhl	The University of Rostock, Germany
Thomas Schuster	Forschungszentrum Informatik, Karlsruhe, Germany
Marcin Sikorski	Gdansk University of Technology, Poland
Piotr Soja	Cracow University of Economics, Poland
Angelos Stefanidis	University of Glamorgan, UK
Reima Suomi	University of Turku, Finland
Janice C. Sipior	Villanova University, USA
Pere Tumbas	University of Novi Sad, Serbia
Yinglin Wang	Shanghai University of Finance and Economics, China
H. Roland Weistroffer	Virginia Commonwealth University, USA
Carson Woo	Sauder School of Business, Canada
Jelena Zdravkovic	Stockholm University, Sweden
Iryna Zolotaryova	Kharkiv National University of Economics, Ukraine
Joze Zupancic	University of Maribor, Slovenia

## Organizing Committee

Anna Studzińska	University of Gdansk, Poland
Dorota Buchnowska	University of Gdansk, Poland
Bartłomiej Gawin	University of Gdansk, Poland
Bartosz Marcinkowski	University of Gdansk, Poland
Jacek Maślankowski	University of Gdansk, Poland
Przemysław Jatkiewicz	University of Gdansk, Poland
Michał, Kuciapski	University of Gdansk, Poland



# Contents

## Information Systems Development

Contractual Specification of Communication Tools in Outsourced ISD Projects . . . . .	3
<i>Sonia Gantman and Jane Fedorowicz</i>	
Weighted Evaluation Framework for Cross-Platform App Development Approaches. . . . .	18
<i>Christoph Rieger and Tim A. Majchrzak</i>	
Exploring an Ontological Approach for User Requirements Elicitation in the Design of Online Virtual Agents . . . . .	40
<i>Katarzyna Ossowska, Liliana Szewc, Paweł Weichbroth, Igor Garnik, and Marcin Sikorski</i>	
Documenting Agile Architecture: Practices and Recommendations . . . . .	56
<i>Mirjana Maric, Predrag Matkovic, Pere Tumbas, and Veselin Pavlicevic</i>	
Architectural Element Points: Estimating Software Development Effort by Analysis of Logical Architectures . . . . .	72
<i>Luís M. Alves, Pedro Ribeiro, and Ricardo J. Machado</i>	
Business Models of Internet of Things. . . . .	85
<i>Dariusz Krąkowski</i>	
Towards De-duplication Framework in Big Data Analysis. A Case Study . . .	104
<i>Jacek Maślankowski</i>	

## Information Systems Management

Mapping Between Artefacts and Portfolio Processes from the PMI Standard for Portfolio Management . . . . .	117
<i>Ana Lima, Paula Monteiro, Gabriela Fernandes, and Ricardo J. Machado</i>	
Solving Problems During an Enterprise System Adoption: Does Employees' Age Matter? . . . . .	131
<i>Ewa Soja, Piotr Soja, and Grażyna Paliwoda-Pękosz</i>	
Project Management in International IT Ventures – Does the Practice Go Hand in Hand with Theory? . . . . .	144
<i>Bartosz Marcinkowski and Bartłomiej Gawin</i>	

**Information Systems Learning**

Students Acceptance of m-Learning for Higher Education – UTAUT Model Validation . . . . .	155
<i>Michał Kuciapski</i>	
Computer Science Studies in English from the Perspective of Students and Business . . . . .	167
<i>Marek Milosz and Elzbieta Milosz</i>	
Does Human Potentiality Affect IT Professionals’ Organizational Behavior? An Experimental Study in Poland and Germany . . . . .	179
<i>Jolanta Kowal, Alicja Keplinger, Juho Mäkiö, and Ralph Sonntag</i>	
Information Society in Poland - Similarities and Differences in the Perception of ICT Between Generations . . . . .	195
<i>Jacek Wachowicz</i>	
<b>Author Index</b> . . . . .	205