Lecture Notes
in Business Information Processing 37

Series Editors

Wil van der Aalst
Eindhoven Technical University, The Netherlands

John Mylopoulos
University of Trento, Italy

Norman M. Sadeh
Carnegie Mellon University, Pittsburgh, PA, USA

Michael J. Shaw
University of Illinois, Urbana-Champaign, IL, USA

Clemens Szyperski
Microsoft Research, Redmond, WA, USA
Preface

Over the last few decades, business information systems have been one of the most important factors in the transition toward a knowledge-based economy. At the same time they have been subject to continuous rapid development and innovation driven both by industry and by academia. During the last 12 years these innovations were carefully observed but also shaped by researchers attending the annual International Conference on Business Information Systems (BIS).

Recently, apart from the main conference, workshops covering specific topics in the area of business information systems have been organized. In 2007 and 2008, the BIS conference featured two and three workshops, respectively. Their proceedings were published on-line and outstanding workshop papers were included in two special issues of international journals. This year nine workshops were successfully organized in conjunction with BIS 2009, covering the topics of Deep Web (ADW), applications and economics of knowledge-based technologies (AKTB, ECONOM), SOA (SDS-SOA), legal IT (LIT), social Web and Web 2.0 (SAW, Enterprise X.0), e-learning (EeLT) and enterprise systems in higher education (ESHE). This volume contains papers that were accepted and presented at the BIS 2009 workshops. Additionally it features the BIS 2009 keynote speech by Wil van der Aalst, as well as two invited speeches presented at LIT and ECONOM / Enterprise X.0 workshops.

Workshop papers included in this volume were subject to a thorough review procedure. Each submitted paper received from two up to five reviews (a total of 208 reviews were received, with an average of 2.9 reviews per paper) by over 130 members of the Program Committees of the workshops. Out of 72 full papers, demo papers and work-in-progress reports submitted, 34 were accepted and presented at the conference (accounting for 47% of all submissions). One of the papers presented at the ECONOM workshop, which received the BIS 2009 best paper award is also included here.

On this occasion, we would like to express our thanks to everyone who made the BIS 2009 workshops a success: all workshop Chairs, members of the workshop Program Committees, authors of submitted papers, invited speakers and finally all workshop participants. We cordially invite you to visit the BIS website at http://bis.kie.ue.poznan.pl/ and to join us next year at the 13th BIS Conference in Berlin.

April 2009

Witold Abramowicz
Dominik Flejter
BIS 2009 Conference Organization

Program Chair

Witold Abramowicz

Organized by:

The Poznań University of Economics, Department of Information Systems, Poland

Organizing Committee

Elżbieta Bukowska  Monika Starzecka
Dominik Flejter  Piotr Stolarski
Konstanty Haniewicz  Krzysztof Węcel
Lidia Leszczyńska  Adam Walczak
Jolanta Skorwider
BIS 2009 Workshop Organization

ADW 2009 – Second Workshop on Advances in Accessing the Deep Web

Workshop Chairs
Flejter, Dominik Poznan University of Economics, Poland
Kaczmarek, Tomasz Poznan University of Economics, Poland
Kowalkiewicz, Marek SAP Research Brisbane, Australia

Workshop Organizers
Poznan University of Economics, Department of Information Systems

Program Committee
Alvarez, Manuel University of A Coruna, Spain
Bergamaschi, Sonia University of Modena and Reggio Emilia, Italy
Bergman, Michael K. Structured Dynamics LLC, USA
Celino, Irene CEFRIEL - Politecnico di Milano, Italy
Della Valle, Emanuele CEFRIEL - Politecnico di Milano, Italy
Guerra, Francesco University of Modena and Reggio Emilia, Italy
Hornung, Thomas Albert-Ludwigs-Universität Freiburg, Germany
Lucchese, Claudio ISTI - CNR, Italy
Maurino, Andrea Università di Milano Bicocca, Italy
Raposo Santiago, Juan University of A Coruna, Spain
Shestakov, Denis University of Turku, Finland
Soares da Silva, Altigran Universidade Federal do Amazonas, Brazil
Wu, Zonghuan University of Louisiana, Lafayette, USA

AKTB 2009 – First Workshop on Applications of Knowledge-Based Technologies in Business

Workshop Chairs
Kriksciuniene, Dalia Vilnius University, Lithuania
Sakalauskas, Virgilijus Vilnius University, Lithuania
Workshop Organizers
Vilnius University, Kaunas Faculty, Department of Informatics

Program Committee

Schoop, Eric
Dresden University of Technology, Germany

Gudas, Saulius
Vilnius University, Lithuania

Krebs, Irene
Potsdam University, Germany

Simutis, Rimvydas
Vilnius University, Lithuania

Meinberg, Uwe
Cottbus Technical University, Germany

Kiss, Ferenc
Foundation for Information Society, Hungary

Xavier, Adilson Elias
COPPE- Federal University of Rio de Janeiro, Brazil

Sakalauskas, Leonidas
Institute of Mathematics and Informatics, Lithuania

Bassa, Lia
Foundation for Information Society, Hungary

Augutis, Juozas
Vytautas Magnus University, Lithuania

Gustas, Remigijus
Karlstad University, Sweden

Lee, Soo-Young
KAIST, Korea

Yin, Hujun
University of Manchester, UK

Jordaan, Jaco
Tshwane University of Technology, South Africa

Zhang, Du
California State University, USA

Corchado, Emilio
University of Burgos, Spain

Shi, Yong
Graduate University of the Chinese Academy of Sciences, China

Tan, Margaret
Nanyang Technological University, Singapore

Mazeika, Arturas
Free University of Bozen-Bolzano, Italy

Bauerle, Peter
IBM Deutschland, Germany

Bergeron, Francois
Universite Laval, Canada

ECONOM 2009 – First Workshop on the Economics of Knowledge-Based Technologies

Workshop Chairs

Simperl, Elena
STI Innsbruck, Austria

Buerger, Tobias
STI Innsbruck, Austria

Filipowska, Agata
Poznan University of Economics, Poland

Tempich, Christoph
Detecon International GmbH, Germany
Workshop Organizers
Semantic Technology Institute (STI) Innsbruck, University of Innsbruck, Austria
Poznan University of Economics, Department of Information Systems, Poland
Detecon International GmbH, Germany

Program Committee

King, Nicholas  
British Telecom, UK
Gomez-Perez, Jose-Manuel  
ISOCO, Spain
Tolksdorf, Robert  
Free University Berlin, Germany
del Carmen Suarez-Figueroa, Maria  
UPM, Spain
Kowalkiewicz, Marek  
SAP Research, Australia
Lopez, Ozelin  
XimetriX Network Thoughts, Spain
Zapletal, Marco  
Vienna University of Technology, Austria
Sure, York  
SAP, Germany
Giernalczyk, Astrid  
Research Institute for Operations Management at RWTH Aachen University, Germany

Cuel, Roberta  
University of Trento, Italy
Maier, Ronald  
University of Innsbruck, Austria
Strasunskas, Darijus  
Norwegian University of Science and Technology, Norway

EeLT 2009 – Second Workshop on Emerging eLearning Web Technologies

Workshop Chairs
Grzonkowski, Slawomir  
DERI, NUI Galway, Ireland
Nagle, Tadhg  
UCC Cork, Ireland

Workshop Organizers
Digital Enterprise Research Institute, National University of Ireland, Galway

Program Committee

Dagger, Declan  
Trinity College, Ireland
McDaniel, Bill  
DERI, NUI Galway, Ireland
Westerski, Adam  
Universidad Politecnica de Madrid, Spain
Luca De Coi, Juri  
L3S and University of Hannover, Germany
First International Enterprise X.0 Workshop: From Web 2.0 in Enterprises Towards a Corporate Web X.0

Workshop Chairs

Mochol, Malgorzata  Free University of Berlin, Germany
Nixon, Lyndon JB  STI International Wien, Austria
Luczak-Roesch, Markus  Free University of Berlin, Germany

Program Committee

Berrueta, Diego  CTIC, Spain
Bussler, Christoph  Merced Systems, Inc., USA
Erling, Orri  OpenLink Software, UK
de Francisco, David  Telefonica, Spain
Filipowska, Agata  Poznan University of Economics, Poland
Grobelnik, Marko  Josef Stefan Institute, Slovenia
Groza, Tudor  DERI Galway, Ireland
Hoppe, Thomas  Ontonym GmbH, Germany
Lassila, Ora  Nokia, USA
Leger, Alain  France Telecom, France
Lucose, Dickson  MIMOS, Malaysia
Nowack, Benjamin  semsol web semantics, Germany
Pan, Jeff  University of Aberdeen, UK
Pellegrini, Tassilo  Semantic Web Company, Austria
Schmidt, Kai-Uwe  SAP, Germany
Shvaiko, Pavel  TasLab, Informatica Trentina, Italy
Svatek, Vojtech  University of Economics Prague, Czech Republic
Tolksdorf, Robert  Free University Berlin, Germany
Werthner, Hannes  Technical University of Vienna, Austria

ESHE 2009 – First Workshop on Enterprise Systems in Higher Education

Workshop Chairs

Gomez, Jorge Marx  University Oldenburg, Germany
Haak, Liane  University Oldenburg, Germany
Peters, Dirk  University Oldenburg, Germany
Workshop Organizers

Carl von Ossietzky University Oldenburg, Department of Computer Science, Chair of Business Informatics I / Very Large Business Applications

Program Committee

Cruz-Cunha, Maria Manuela
Polytechnic Institute of Câvado and Ave School of Technology, Portugal

Davcev, Danco
Sts. Cyril and Methodius University, F.Y.R.O. Macedonia

Juell-Skielse, Gustaf
Royal Institute of Technology, Sweden

Kolokythta, Elpida
Aristotle University of Thessaloniki, Greece

Magnusson, Johan
University of Gothenburg, Sweden

Mylopoulos, Yannis
Aristotle University of Thessaloniki, Greece

Varajao, Joao Eduardo
University of Trás-os-Montes e Alto Douro, Portugal

LIT 2009 – Second Workshop on Legal Informatics and Legal Information Technology

Workshop Chairs

Stolarski, Piotr
Poznan University of Economics, Poland

Tomaszewski, Tadeusz
Poznan University of Economics, Poland

Workshop Organizers

Poznan University of Economics, Department of Information Systems

Program Committee

Bellucci, Emilia
Victoria University, Australia

D’Agostini Bueno, Tania Cristina
Presidente da Diretoria Executiva IJURIS, Brazil

Hoeschl, Hugo
IJURIS Research Group, Brazil

Lodder, Arno
Free University of Amsterdam, The Netherlands

Morek, Rafal
University of Warsaw, Poland

Schweighofer, Erich
University of Vienna, Austria, Austria

Stranieri, Andrew
University of Ballarat, Australia
SAW 2009 – Third Workshop on Social Aspects of the Web

Workshop Chairs

Flejter, Dominik  
Poznan University of Economics, Poland
Kaczmarek, Tomasz  
Poznan University of Economics, Poland
Kowalkiewicz, Marek  
SAP Research Brisbane, Australia

Workshop Organizers

Poznan University of Economics, Department of Information Systems

Program Committee

Balog, Krisztian  
University of Amsterdam, The Netherlands
Braun, Simone  
FZI Karlsruhe, Germany
Breslin, John  
DERI, NUI Galway, Ireland
Coenen, Tanguy  
Vrije Universiteit Brussel, Belgium
Dietzold, Sebastian  
University of Leipzig, Germany
Eynard, Davide  
Politecnico di Milano, Italy
Jatowt, Adam  
Kyoto University, Japan
Paprzycki, Marcin  
Polish Academy of Science, Poland
Picard, Willy  
Poznan University of Economics, Poland
Siorpaes, Katharina  
STI, University of Innsbruck, Austria
Tang, Jie  
Tshingua University, China
van Damme, Celine  
Vrije Universiteit Brussel, Belgium
Zacharias, Valentin  
FZI Karlsruhe, Germany

SDS-SOA 2009 – First Workshop on Service Discovery and Selection in SOA Ecosystems

Workshop Chairs

Haniewicz, Konstanty  
Poznan University of Economics, Poland
Kaczmarek, Monika  
Poznan University of Economics, Poland
Zaremba, Maciej  
DERI Galway, Ireland
Zyskowski, Dominik  
Poznan University of Economics, Poland

Workshop Organizers

Poznan University of Economics, Department of Information Systems
### Program Committee

<table>
<thead>
<tr>
<th>Name</th>
<th>Institution and Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kokash, Natalia</td>
<td>CWI Amsterdam, The Netherlands</td>
</tr>
<tr>
<td>Kuster, Ulrich</td>
<td>Friedrich Schiller University of Jena, Germany</td>
</tr>
<tr>
<td>Ludwig, Andre</td>
<td>University of Leipzig, Germany</td>
</tr>
<tr>
<td>Markovic, Ivan</td>
<td>SAP Research Centre, Karlsruhe</td>
</tr>
<tr>
<td>Palma, Raul</td>
<td>Universidad Politecnica de Madrid, Spain</td>
</tr>
<tr>
<td>Vasiliu, Laurentiu</td>
<td>DERI Galway, Ireland</td>
</tr>
<tr>
<td>Vitvar, Tomas</td>
<td>STI2 Innsbruck, Austria</td>
</tr>
<tr>
<td>Zaharia, Raluca</td>
<td>DERI Galway, Ireland</td>
</tr>
</tbody>
</table>
# Table of Contents

## BIS 2009 Keynote Speech

*Using Process Mining to Generate Accurate and Interactive Business Process Maps* ................................................................. 1  

*W.M.P. van der Aalst*

## ADW Workshop

*ADW 2009 Chairs’ Message* ............................................................. 15  

*Dominik Flejter, Tomasz Kaczmarek, and Marek Kowalkiewicz*

*Improving Database Retrieval on the Web through Query Relaxation* . . 17  

*Markus Pfuhl and Paul Alpar*

*Using Semantics to Personalize Access to Data-Intensive Web Sources* ................................................................. 28  

*Monika Starzecka and Adam Walczak*

*Deep Web Queries in a Semantic Web Environment* ....................... 39  

*Thomas Hornung and Wolfgang May*

## AKTB Workshop

*AKTB Workshop Chairs’ Message* .................................................. 51  

*Virgilijus Sakalauskas and Dalia Kriksciuniene*

*Identification of Unexpected Behavior of an Automatic Teller Machine*  

*Using Principal Component Analysis Models* ................................. 53  

*Rimvydas Simutis, Darius Dilijonas, and Lidiya Bastina*


*Dhrupad Mathur*

*Research of the Calendar Effects in Stock Returns* ............................ 69  

*Virgilijus Sakalauskas and Dalia Kriksciuniene*

*The Issues Concerning the Application of Multiple Evaluation Methods for the Projects in Lithuanian Companies* .............................. 79  

*Gerda Zigiene and Egle Fiodoroviene*

*Control View Based Elicitation of Functional Requirements* ............... 91  

*Audrius Lopata and Saulius Gudas*
Market-Driven Software Project through Agility: Requirements Engineering Perspective ........................................... 103
Deepti Mishra and Alok Mishra

On the Adaptation of Foreign Language Speech Recognition Engines for Lithuanian Speech Recognition ............................. 113
Vytautas Rudzionis, Rytis Maskeliunas, Algimantas Rudzioius, and Kastytis Ratkevicius

Analysis of the Share Price Bubbles in the Baltic Countries ........... 119
Marius Dubnikovas, Vera Moskaliova, and Stasys Girdziakuskas

Data Quality Issues and Duel Purpose Lexicon Construction for Mining Emotions .............................................................. 130
Rajib Verma

ECONOM / Enterprise X.0 Workshop

Enterprise X.0 and ECONOM Workshops Chairs’ Message ............. 139
Malgorzata Mochol, Tobias Bürger, Markus Luczak-Rösch, Elena Simperl, Lyndon JB Nixon, Agata Filipowska, and Christoph Tempich

From Research to Business: The Web of Linked Data ..................... 141
Irene Celino, Emanuele Della Valle, and Dario Cerizza

Framework for Value Prediction of Knowledge-Based Applications..... 153
Ali Imtiaz, Tobias Bürger, Igor O. Popov, and Elena Simperl

In Quest of ICT Value through Integrated Operations: Assessment of Organisational – Technological Capabilities ...................... 159
Darijus Strasunskas and Asgeir Tomassgærd

e-Business in the Construction Sector: A Service Oriented Approach.... 171
Valentín Sánchez, Iñaki Angulo, and Sonia Bilbao

Business Patterns in Ontology Design ...................................... 183
Freek van Teeseling and Ronald Heller

Towards Models for Judging the Maturity of Enterprises for Semantics ................................................................. 190
Marek Nekvasil and Vojtěch Svátek

EeLT Workshop

EeLT 2009 Workshop Chairs’ Message ..................................... 200
Sławomir Grzonkowski and Tadhg Nagle
eLearning in the Web 2.0 Era – Lessons from the Development of the Lingro.com Language Learning Environment ........................... 201

Artur Janc, Łukasz Olejnik, and Paul Kastner

ESHE Workshop

ESHE 2009 Workshop Chairs’ Message ................................. 212

Jorge Marx Gómez, Liane Haak, and Dirk Peters

Process Methodology in ERP-Related Education: A Case from Swedish Higher Education .................................................. 214

Johan Magnusson, Bo Oskarsson, Anders Gidlund, and Andrea Wetterberg

Using FERP Systems to Introduce Web Service-Based ERP Systems in Higher Education .......................................................... 220

Nico Brehm, Liane Haak, and Dirk Peters

Applied Business Intelligence in the Making: An Inter-University Case from Swedish Higher Education ................................. 226

Urban Ask, Johan Magnusson, Håkan Enquist, and Gustaf Juell-Skielse

Case Study-Design for Higher Education - A Demonstration in the Data Warehouse Environment ............................................. 231

Daniela Hans, Jorge Marx Gómez, Dirk Peters, and Andreas Solsbach

Off-the-Shelf Applications in Higher Education: A Survey on Systems Deployed in Germany ................................................... 242

Henry Schilbach, Karoline Schönbrunn, and Susanne Strahringer

LIT Workshop

LIT 2009 Workshop Chairs’ Message ................................. 254

Piotr Stolarski and Tadeusz Tomaszewski

The Need to Incorporate Justice into Negotiation Support Systems ........ 256

John Zeleznikow

Building-Up a Reference Generic Regulation Ontology: A Bottom-Up Approach ............................................................ 268

Marwane El Kharbili and Piotr Stolarski

Legal Aspects of Functioning of the Social Network Sites ................. 280

Sylwia Nawrot
A Support System for the Analysis and the Management of Complex Ruling Documents ........................................... 292
Marco Bianchi, Mauro Draoli, Giorgio Gambosi, and Giovanni Stilo

Legal Advisory System for the Agricultural Tax Law ................. 304
Tomasz Zurek and Emil Kruk

Identifying the Content Zones of German Court Decisions ............ 310
Manfred Stede and Florian Kuhn

SAW Workshop

SAW 2009 Workshop Chairs’ Message ............................................. 316
Dominik Flejter, Tomasz Kaczmarek, and Marek Kowalkiewicz

Guideline for Evaluating Social Networks ..................................... 318
Peter Schnitzler, Marius Feldmann, Maximilian Walther, and Alexander Schill

Connected Traveller, Social Web and Energy Efficiency in Mobility .... 330
Mikhail Simonov and Gary Bridgeman

Designing Social Support Online Services for Communities of Family Caregivers ...................................................... 336
Matthieu Tixier and Myriam Lewkowicz

SDS-SOA Workshop

SDS-SOA 2009 Workshop Chairs’ Message ..................................... 348
Konstanty Haniewicz, Monika Kaczmarek, Maciej Zaremba, and Dominik Zyskowski

Towards High Integrity UDDI Systems ......................................... 350
Colin Atkinson, Philipp Bostan, Gergana Deneva, and Marcus Schumacher

QoS-Aware Peer Services Selection Using Ant Colony Optimisation .... 362
Jun Shen and Shuai Yuan

Supporting Service Level Agreement Creation with Past Service Behavior Data ......................................................... 375
André Ludwig and Marek Kowalkiewicz

Author Index .......................................................... 387