# Table of Contents

**Preface**

**Program Committee**

**Reviewers**

## Expert Panel

Long-Term Perspective of Agile Methods .................................................................1  
* Mira Kajko-Mattsson, Ademar Aguiar, Kenneth Boness, Hermann Kaindl,  
  Rob Pooley, and Andreas Tael

## ICSEA 1: Advances in Fundamentals for Software Development I

Bridging the Gap between the Quality Requirements and Implementation .........................3  
* Janne Merilinna and Tomi Räty

Relating Security Requirements and Design Patterns: Reducing Security Requirements Implementation Impacts with Design Patterns .................................................................9  
* Felipe Silva Ferraz, Rodrigo Elia Assad, and Silvio Romero Lemos Meira

Challenges in Deployment of Model Driven Development ..................................................15  
* Susanna Teppola, Päivi Parviainen, and Juha Takalo

CMS-Based Web-Application Development Using Model-Driven Languages ............................21  
* João de Sousa Saraiva and Alberto Rodrigues da Silva

## ICSEA 2: Advances in Fundamentals for Software Development II

Deriving Normalized Systems Elements from Business Process Models ...............................27  
* Dieter Van Nuffel, Herwig Mannhaert, Carlos De Backer, and Jan Verelst

Building a Service-Oriented ERP from an Open Source Software .......................................33  
* Georges Edouard Kouamou

UML Specification and Correction of Object-Oriented Anti-patterns ................................39  
* María Teresa Llano and Rob Pooley
A Unification of the Essence of Goal-Oriented Requirements Engineering ........................................45
Hermann Kaindl and Patrick Wagner

ICSEA 3: Advances in Fundamentals for Software Development III

A Software Requirements Change Source Taxonomy .................................................................51
Sharon McGee and Des Greer

Handling Non-functional Requirements in Information System Architecture
Design ........................................................................................................................................59
Anargyros Tsadimas, Mara Nikolaidou, and Dimosthenis Anagnostopoulos

Reuse-Oriented Deployment of Software Components: Congregation
in Service-Oriented Development ............................................................................................65
Colin Atkinson, Philipp Bostan, and Frederic Fink

Virtualization Techniques for Cross Platform Automated Software Builds, Tests
and Deployment .....................................................................................................................73
Thomas Müller and Alois Knoll

ICSEA 4: Advances in Fundamentals for Software Development IV

Symbolic Execution Techniques Extended to Systems .............................................................78
Christophe Gaston, Marc Aiguier, Diane Bahrami, and Arnault Lapitre

Integrating Formal Methods with Model-Driven Engineering ...............................................86
Angelo Gargantini, Elvinia Riccobene, and Patrizia Scandurra

Incentive Systems in Software Organizations .........................................................................93
Felipe Santana Furtado Soares, Gibeon Soares de Aquino Júnior, and Silvio Romero de Lemos Meira

Requirements Engineering by Connecting Requirements Directly to Data
and Operations during Modeling ............................................................................................100
Sukhamay Kundu

ICSEA 5: Advances in Software Testing I

MFQ & PPDCS - Test Analysis and Test Design for Large Embedded
Software Systems ....................................................................................................................108
Xiaomei Tai

Program Comprehension for User-Assisted Test Oracle Generation .......................................118
Teemu Kanstrén

Analysis of the Introduction of Testability Antipatterns during the Development
Process ....................................................................................................................................128
Muhammad Rabee Shaheen and Lydie du Bousquet

Combinatorial Approach for Automated Platform Diversity Testing .....................................134
Rajendra Singh Sisodia and Vijaykumar Channakeshava
ICSEA 6: Advances in Software Testing II

A Comparative Study on Automated Software Test Oracle Methods .................................................. 140
Seyed Reza Shahamiri, Wan Mohd Nasir Wan Kadir, and Siti Zaiton Mohd-Hashim

Mutation Analysis for SQL Database Applications ...................................................................................... 146
Andrea Gonçalves Cabeça, Mario Jino, and Plinio S. Leitao-Junior

Automatic Test Data Generation for Multiple Condition and MCDC Coverage ...................................... 152
Kamran Ghani and John A. Clark

Automation Test Method for Automotive Embedded Software Based on AUTOSAR ........................................ 158
Huichoun Moon, Gwanghun Kim, Yeongyun Kim, Seokkyoo Shin, Kyoung Kim, and Sanggui Im

ICSEA 7: Specialized Software Advanced Applications I

Risk Management through Real-Time Wearable Services ................................................................................ 163
Maria Grazia Fugini, Piercarlo Maggiolini, Claudia Raibulet, and Luigi Ubezio

Testing of Image Processing Algorithms on Synthetic Data ........................................................................ 169
Kilian von Neumann-Cosel, Erwin Roth, Daniel Lehmann, Johannes Speth, and Alois Knoll

Building a Canonical Language for Distributed System Repository ........................................................ 173
Landry Engelbert Tongo and Georges Edouard Kouamou

Software Requirements for Ubiquitous Ad Hoc Mobile Networks: An Example of a Bluetooth Application .............................................................................................................................. 179
Raquel Lacuesta, Lourdes Peñalver, Luis Fernández-Sanz, Jaime Lloret, and Miguel Garcia

ICSEA 8: Open Source Software & Agile Software Techniques

Model-Driven Open Source Software Development - The Open Models Approach .............................................. 185
Pekka Aho, Janne Merilinna, and Eila Ovaska

A Case Study of Developing an IDE for Embedded Software Using Open Source ........................................ 191
Dominik Ertl and Harald Krapfenbauer

Semantic Interoperability Problem of OSS Forges ......................................................................................... 197
Alicja Ciemniewska, Pawel Kedziora, Bartosz Lewandowski, and Cezary Mazurek

Goal Sketching and the Business Case ............................................................................................................. 203
Kenneth Boness and Rachel Harrison
ICSEA 9: Software Deployment and Maintenance

Are There Language Specific Bug Patterns? Results Obtained from a Case
Syed Nadeem Ahsan, Javed Ferzund, and Franz Wotawa .................................................. 210

Automatic Software Bug Triage System (BTS) Based on Latent Semantic Indexing and Support Vector Machine
Syed Nadeem Ahsan, Javed Ferzund, and Franz Wotawa .................................................. 216

Service System Development Based on Web Process Ontology
Noriaki Izumi, Osamu Takaki, and Kôiti Hasida ................................................................. 222

An Anonymous Social Network Site to Share Pictures
Miguel Garcia, Sandra Sendra, Jordi Girones, and Jaime Lloret ........................................... 229

ICSEA 10: Software Engineering Techniques, Metrics, and Formalisms I

Preserving Cohesive Structures for Tool-Based Modularity Reengineering
Kai Spichale, Oleksandr Panchenko, Anja Bog, and Alexander Zeier .................................. 235

Towards Effective Productivity Measurement in Software Projects
Gibeon Soares de Aquino Júnior and Silvio Romero de Lemos Meira .................................. 241

Validation of Scenario-Based Business Requirements with Coloured Petri Nets
Óscar R. Ribeiro and João M. Fernandes .................................................................................. 250

Framework Characteristics - A Starting Point for Addressing Reuse Difficulties
Sérgio F. Lopes, Francisco Afonso, Adriano Tavares, and João Monteiro .............................. 256

ICSEA 11: Software Engineering Techniques, Metrics, and Formalisms II

Integration of PECOS into MARMOT for Embedded Real Time Software
Suzila Sabil and Dayang Norhayati Abang Jawawi ................................................................. 265

Rule-Based Service Modeling
Michael Gebhart and Sebastian Abeck .................................................................................... 271

Evaluation of Convertibility Issues between IFPUG and COSMIC Function
Md. Forhad Rabbi, Shailendra Natraj, and Olorisade Babatunde Kazeem ............................ 277

Functional Size of Use Case Diagrams: A Fine-Grain Measurement
Asma Sellami and Hanene Ben-Abdallah ................................................................................. 282

ICSEA 12: Software Engineering Techniques, Metrics, and Formalisms III & Software Performance

Historical Perspective of Two Process Transitions
Natalja Nikitina and Mira Kajko-Mattsson ........................................................................... 289

An Ontology Based Approach to Non-functional Requirements
Conceptualization
M. Kassab, O. Ormandjieva, and M. Daneva ........................................................................ 299
Frameworks for the Development of Adaptive Systems: Evaluation of Their Adaptability Feature through Software Metrics ................................................................. 309
   Laura Masciadri and Claudia Raibulet
Flexible Persistence Support for State Machine-Based Workflow Engines ........................................ 313
   Thomas Weigold, Thorsten Kramp, and Peter Buhler

ICSEA 13: Advanced Design Tools for Developing Software I
Effective Recognition of Patterns in Object-Oriented Designs ........................................................................ 320
   Trung Nguyen and Rob Pooley
An Emulator for Debugging Service Programs in Ad Hoc Networks ........................................................ 326
   Koji Kawada and Tadashi Ohta
Developing Aspect-Oriented Software Architectures: A Framework Definition ........................................... 331
   Amparo Navasa, Miguel A. Perez-Toledano, and Juan M. Murillo
Towards a Meta-model for Problem Frames: Conceptual Issues and Tool Building Support ................................ 339
   P. Colombo, L. Lavazza, A. Coen-Porisini, and V. del Bianco

ICSEA 14: Advanced Design Tools for Developing Software II
A Monolithic Program vs. Modifiability: Enhancing a Visual Data Flow Program with Object-Oriented Techniques ........................................................................... 346
   Maija Marttila-Kontio, Marko Hassinen, and Mikko Kontio
Process-Based Approach for Developing Automotive Embedded Software Supporting Tool .................................................. 353
   JungEun Cha, DongSun Lim, and Chaedeok Lim
Wiki-Based Tool for Requirements Engineering According to the ProjectIT Approach ............................................................ 359
   David de Almeida Ferreira and Alberto Rodrigues da Silva
Integrating Quality Modeling with Feature Modeling in Software Product Lines ........................................... 365
   Joerg Bartholdt, Marcel Medak, and Roy Oberhauser

ICSEA 15: Specialized Software Advanced Applications II & Software Economics, Adoption, and Education
Enhancements in the Orphan Process for Wireless Personal Area Networks: Real Implementation Scenarios ...................................................................................... 371
   Antonio-Javier Garcia-Sanchez, Felipe Garcia-Sanchez, and Joan Garcia-Haro
Ontology Driven E-Government .................................................................................................................. 378
   Peter Salhofer, Bernd Stadlhofer, and Gerald Tretter
   Latifa Al-Abdulkarim and Maha Al-Yahya
A Practical Course on Mobile-Software Engineering: Mobile Solutions Laboratory ...................................................... 389
   Alireza Hashemi Nekoo and Kaveh Vakili
ICSEA 16: Software Security, Privacy and Safeness
Enhancement of Use Case Diagram to Capture Authorization Requirements ..................................................394
   Khaled Alghathbar
Polymorphic Worm Detection Using Double-Honeynet ..................................................................................401
   Mohssen M.Z.E. Mohammed, H. Anthony Chan, Neco Ventura, Mohsin Hashim, and Izzeldin Amin
Identifying Security Requirements Hybrid Technique ....................................................................................407
   Vandana Gandotra, Archana Singhal, and Punam Bedi
A Methodological Tool for Asset Identification in Web Applications: Security Risk Assessment ..................413
   Brunil D. Romero M., Hisham M. Haddad, and Jorge E. Molero A.
Introducing Vulnerability Awareness to Common Criteria’s Security Targets ..............................................419
   Shanai Ardi and Nahid Shahmehri

ICSEA 17: Advanced Mechanisms for Software Development I
Comparative Evaluation of the State-of-the Art on Approaches to Software Adaptation ..................................425
   Nor Hazilawati Awang, Wan M.N. Wan Kadir, and Shamsul Shahibuddin
Exploiting Adaptive Mechanisms to Enhance Functionalities: ABC4All - A Case Study ..............................431
   Fabio Bolis and Claudia Raibulet
Scenario-Based Genetic Synthesis of Software Architecture ...........................................................................437
   Outi Räihä, Kai Koskimies, and Erkki Mäkinen
Discussing the Difference between Model Driven Architecture and Model Driven Development in the Context of Supporting Tools .................................................................446
   Oksana Nikiforova, Antons Cemickins, and Natalja Pavlova

ICSEA 18: Advanced Mechanisms for Software Development II
Towards Simulation-Based Design of the Software Systems ...........................................................................452
   Radek Koci and Vladimir Janoušek
BIRF: Keeping Software Development under Control across the Organization ..............................................458
   Paulo Marques, Paulo Gomes, Marco Vieira, Juan Prieto, Vicente Navarro, and Mauro Pecchioli
Towards End-to-End Traceability: Insights and Implications from Five Case Studies .....................................465
   Lars Klimpke and Tobias Hildenbrand
Integrating Context-Aware and Fuzzy Rule to Data Mining Model for Supply Chain Finance Cooperative Systems ..................................................................................................................471
   Liu Xiang
ICSEA 19: Advanced Facilities for Accessing Software & Work In Progress

Evaluation and Optimisation of e-Learning Software Packages: Learning Object Repositories ..........................................................477
Eugenijus Kurilovas

Goal-Oriented Service Selection in Business Processes .........................................................484
Roland Ukor and Andy Carpenter

Towards Resource Consumption-Aware Programming ........................................................................490
Andreas Holzer, Visar Januzaj, and Stefan Kugele

Checking Component Assembly in Acme: An Approach Applied on UML 2.0 Components Model ..................................................................494
Mourad Kmimech, Mohamed Tahar Bhiri, and Phillipe Aniorté

SEDES 1: Software Engineering I

Development of CMS-Based Web-Applications Using a Model-Driven Approach ................................................500
João de Sousa Saraiva and Alberto Rodrigues da Silva

Managing Features and Aspect Interactions in Software Product Lines ........................................506
Jorge Barreiros and Ana Moreira

Software Process Improvement in Multimodel Environments ...................................................512
Andre Ferreira and Ricardo Machado

SEDES 2: Software Engineering II

A Controlled Natural Language Approach for Integrating Requirements and Model-Driven Engineering ........................................................................518
David de Almeida Ferreira and Alberto Rodrigues da Silva

Patterns and Tools for Improving Framework Understanding: A Collaborative Approach ........................................................................................................524
Nuno Flores and Ademar Aguiar

Adaptive Object-Modelling: Patterns, Tools and Applications ..................................................530
Hugo Sereno Ferreira, Ademar Aguiar, and João Pascoal Faria

SEDES 3: Software Engineering III

Inception of Software Validation and Verification Practices within CMMI Level 2 ..........................................................536
Paula Monteiro, Ricardo J. Machado, and Rick Kazman

Software Knowledge Capture and Acquisition: Tool Support for Agile Settings ........................................542
Filipe Figueiredo Correia and Ademar Aguiar

Testing for Unexpected Interactions in AOP ........................................................................548
André Restivo and Ademar Aguiar
SEDES 4: Software Engineering IV

Integrating IT Service Management within the Enterprise Architecture .........................................................553
   Anacleto Correia and Fernando Brito e Abreu
An Ontology-Based Approach to Model-Driven Software Product Lines .........................................................559
   Nuno Ferreira, Ricardo J. Machado, and Dragan Gaševic
Multistage Model Transformations in Software Product Lines .................................................................565
   Sofia Azevedo, Ricardo J. Machado, and Dirk Muthig
Strengthening Refactoring: Towards Software Evolution with Quantitative and Experimental Grounds .................................................................570
   Sérgio Bryton and Fernando Brito e Abreu
Exploring and Overcoming Major Challenges in IT Infrastructures Faced by IT Executives .........................................................576
   Luís Alexandre Ferreira da Silva and Fernando Brito e Abreu

Author Index