# Table of Contents

- Message from the General Chair ................................................................. x
- Message from the Program Chair ................................................................. xi
- Conference Organization ...................................................................... xii
- Organizing Committee ........................................................................ xv
- Reviewers ................................................................................................ xvi
- Sponsors ..................................................................................................... xvii
- Keynote 1 .................................................................................................. xviii
- Keynote 2 ................................................................................................... xix

---

## Session 1: Security & Service Testing

A Hybrid Approach to Detecting Security Defects in Programs .......................... 1  
*Lian Yu, Jun Zhou, Yue Yi, Jianchu Fan, and Qianxiang Wang*

Security Metrics for Object-Oriented Class Designs ...................................... 11  
*Bandar Alshammari, Colin Fidge, and Diane Corney*

Tag-Based Techniques for Black-Box Test Case Prioritization for Service Testing ................................................................. 21  
*Lijun Mei, W. K. Chan, T. H. Tse, and Robert G. Merkel*

## Session 2: Test Data Selection

Towards Selecting Test Data Using Topological Structure of Boolean Expressions .................................................................................. 31  
*Lian Yu, Wei-Tek Tsai, Wei Zhao, Jun Zhu, and Qianxing Wang*

On the Coverage of Program Code by Specification-Based Tests .................. 41  
*Y. T. Yu, Eric Y. K. Chan, and P.-L. Poon*

An Indepth Study of Mirror Adaptive Random Testing .................................. 51  
*Fei-Ching Kuo*

An Innovative Approach to Randomising Quasi-random Sequences and Its Application into Software Testing .................................................. 59  
*Huai Liu and Tsong Yueh Chen*
Session 3: Verification

Interactive Specification and Verification of Behavioural Adaptation Contracts ........................................65
  Javier Cámara, Gwen Salaün, Carlos Canal, and Meriem Ouederni
A Verification-Centric Software Development Process for Java ..............................................................76
  Daniel M. Zimmerman and Joseph R. Kiniry
Modelling and Verification of Port Based Component Composition .........................................................86
  Zuohua Ding and Mingyue Jiang
Timed Modeling and Verification of BPEL Processes Using Time Petri Nets .........................................92
  Wei Song, Xiaoxing Ma, Chunyang Ye, Wanchun Dou, and Jian Lü

Session 4: Web Testing

Web Traversal with a History Stack ............................................................................................................98
  Samaneh Navabpour, Lihua Duan, and Jessica Chen
Automatic Generation of Normal Forms for Testing Object-Oriented Software ........................................108
  Huo Yan Chen and T. H. Tse
SQuaRE-Aligned Data Quality Model for Web Portals .............................................................................117
  Carmen Moraga, Mª Ángeles Moraga, Coral Calero, and Angélica Caro
ADAM: Web Anomaly Detection Assistant Based on Feature Matrix .....................................................123
  Sungdeok Cha, Junsup Lee, Sangrok Kim, and Sanghyun Cho
Synchronization of Multi-window Requests for Server-Side Regression Test of Web Applications ........129
  Takao Shimomura, Kenji Ikeda, and Muneo Takahashi

Session 5: Model-Based Test

Application of Metamorphic Testing to Supervised Classifiers ...............................................................135
  Xiaoyuan Xie, Joshua Ho, Christian Murphy, Gail Kaiser, Baowen Xu, and Tsong Yueh Chen
Supporting the Extraction of Timed Properties for Passive Testing by Using Probabilistic User Models .................................................................145
  César Andrés, Mercedes G. Merayo, and Manuel Núñez
Towards Adaptive Test Code Generation for Service Oriented Systems .............................................155
  Michael Felderer, Philipp Zech, Frank Fiedler, Joanna Chimiak-Opoka, and Ruth Breu
GARDIAN: A Tool for Validating Rule-Based Modeling Methods .........................................................161
  Suntae Kim, Jintae Kim, Sooyong Park, and Dae-Kyoo Kim
A Survey of Model-Driven Testing Techniques .........................................................................................167
  Mohamed Mussa, Samir Ouchani, Waseem Al Sammane, and Abdelwahab Hamou-Lhadj
Session 6: Embedded SW Test
From UML Statecharts to LOTOS: A Semantics Preserving Model Transformation .................................................................173
  Valentin Chimisliu, Christian Schwarzl, and Bernhard Peischl
Practice Patterns to Improve the Quality of Design Model in Embedded Software Development ..............................................................179
  Doo-Hwan Kim, Jong-Phil Kim, and Jang-Eui Hong
A Model-Based Testing for AADL Model of Embedded Software ..................................................185
  Yun-wei Dong, Geng Wang, and Hong-bing Zhao
Building Automotive Software Component within the AutoSAR Environment - A Case Study .................................................................191
  Gia Nghia Vo, Richard Lai, and Mohit Garg
An Adapter Framework for Keyword-Driven Testing ..................................................................................201
  Tommi Takala, Mika Maunumaa, and Mika Katara

Session 7: Test Coverage
Increasing Diversity in Coverage Test Suites Using Model Checking .........................................................211
  Gordon Fraser and Franz Wotawa
Improving Coverage Based Test Purposes ..................................................................................................219
  Martin Weiglhofer and Franz Wotawa
Are Fault Failure Rates Good Estimators of Adequate Test Set Size? ..........................................................229
  Vidroha Debroy and W. Eric Wong

Session 8: Measurement I
Model-Driven Software Measurement Framework: A Case Study ......................................................................239
  Beatriz Mora, Felix Garcia, Francisco Ruiz, and Mario Piattini
Improving Software Testing Cost-Effectiveness through Dynamic Partitioning ...........................................249
  Zhi Quan Zhou, Armando Sinaga, Lei Zhao, Willy Susilo, and Kai-Yuan Cai
Quality Assessment of Mission Critical Middleware System Using MEMS .....................................................259
  Yan Liu, Kate Foster, Thong Nguyen, and Jacky W. Keung

Session 9: Requirements
Towards Optimising Non-functional Requirements ......................................................................................269
  Christopher Burgess, Aneesh Krishna, and Li Jiang
Improving the Quality of Agent-Based Systems: Integration of Requirements Modeling into Gaia ..................278
  Lorena Rodriguez, Alethia Hume, Luca Cernuzzi, and Emilio Insfrán
Improvement of Quality of Software Requirements with Requirements Ontology ........................................284
  Dang Viet Dzung and Atsushi Ohnishi
Evaluating the Ability of Novice Analysts to Understand Requirements Models ......................................290
  Silvia Abrahão, Emilio Insfran, José A. Carsí, Marcela Genero, and Mario Piattini
Session 10: Fault Detection I
A Robot Fault-Tolerance Approach Based on Fault Type .................................................................296
  Bingu Shim, Beomho Baek, Suntae Kim, and Sooyong Park
A Bayesian Approach for the Detection of Code and Design Smells ..............................................305
  Foutse Khomh, Stéphane Vaucher, Yann-Gaël Guéhéneuc, and Houari Sahraoui
A Neural Network Approach to Forecasting Computing-Resource Exhaustion with Workload ..............................................................315
  Ke-Xian Xue, Liang Su, Yun-Fei Jia, and Kai-Yuan Cai
Reuse Strategies in Distributed Complex Event Detection ...............................................................325
  Zhenyue Long, Beihong Jin, Fengliang Qi, and Donglei Cao

Session 11: Test Generation
Generating Effective Test Sequences for BPEL Testing ..................................................................331
  Shan-Shan Hou, Lu Zhang, Qian Lan, Hong Mei, and Jia-Su Sun
Resource-Aware Test Suite Optimization .......................................................................................341
  Xiaofang Zhang, Huamao Shan, and Ju Qian
Building Prioritized Pairwise Interaction Test Suites with Ant Colony Optimization ........................347
  Xiang Chen, Qing Gu, Xin Zhang, and Daoxu Chen
Towards Scalable Compositional Test Generation .........................................................................353
  Tao Sun, Zheng Wang, Geggwang Pu, Xiao Yu, Zongyan Qiu, and Bin Gu

Session 12: Fault Detection II
Change Impact Analysis of a Software Process Using Process Slicing ............................................359
  Seunghun Park, Hyeonjeong Kim, and Doo-Hwan Bae
Localizing Software Faults Simultaneously ....................................................................................367
  Rui Abreu, Peter Zoeteweij, and Arjan J. C. van Gemund

Session 13: Measurement II
RiTMO: A Method for Runtime Testability Measurement and Optimisation ....................................377
  Alberto Gonzalez-Sanchez, Eric Piel, and Hans-Gerhard Gross
An Approach to Measure Value-Based Productivity in Software Projects ......................................383
  Gibeon Soares de Aquino Júnior and Silvio Romero de Lemos Meira
Software Quality Model for Consumer Electronics Product ...........................................................390
  Chanwook Kim and Keun Lee

Session 14: Design
A Constraint-Oriented Approach to Software Architecture Design ..............................................396
  Mark van den Berg, Antony Tang, and Rik Farenhorst
Modular Implementation of a Translator from Behavioral Specifications to Rewrite Theory Specifications ........................................................................406
  Min Zhang and Kazuhiro Ogata
Constructing Feature Models Using Goal-Oriented Analysis ................................................................. 412
Kohei Uno, Shinpei Hayashi, and Motoshi Saeki
An Intuitive Approach for Specifying Interface Constraint ................................................................. 418
Qianxiang Wang

Session 15: Quality Model

An Embedded Software Component Maturity Model ........................................................................ 426
Fernando Carvalho, Silvio R. L. Meira, Elyda Xavier, and João Eulino
A Test Process Improvement Model for Embedded Software Developments ..................................... 432
Eun Jung
Performance Evaluation Framework for Software Quality Engineering ........................................ 438
Joon-Sang Lee, Oksoon Jeong, and Jewhi Ryu
Non-homogeneous Inverse Gaussian Software Reliability Models ................................................. 444
Lin-Zhu Jin and Tadashi Dohi

Workshop on Data Quality for Software Engineering

SmartClean: An Incremental Data Cleaning Tool ............................................................................ 452
Paulo Oliveira, Fátima Rodrigues, and Pedro Henriques
Developing Data Quality Aware Applications .................................................................................. 458
Ricardo Pérez, César Guerra-García, Mario Piattini, and Ma Ángeles Moraga
Quality of the Source Code for Design and Architecture Recovery Techniques:
Utilities are the Problem .................................................................................................................. 465
Heidar Pirzadeh, Luay Alawneh, and Abdelwahab Hamou-Lhadj

Author Index ........................................................................................................................................ 471