2012 20th IEEE International Requirements Engineering Conference

(RE 2012)

Chicago, Illinois, USA
24-28 September 2012
Contents

Preface

Message from the Chairs ................................................................. iii
Committees ........................................................................... v
Additional Reviewers ................................................................. viii
Sponsors ............................................................................... ix

Main Research Track

Handling Uncertainty
Managing Requirements Uncertainty with Partial Models
  Rick Salay, Marsha Chechik, and Jennifer Horkoff — University of Toronto, Canada ................ 1
Speculative Requirements: Automatic Detection of Uncertainty in Natural Language Requirements
  Hui Yang, Anne De Roeck, Vincenzo Gervasi, Alistair Willis, and Bashar Nuseibeh — Open University, UK; University of Pisa, Italy; Lero, Ireland ................................................................. 11
Resolving Uncertainty in Automotive Feature Interactions
  Silky Arora, Prahladavaradan Sampath, and Ramesh S — General Motors, India .................... 21

Requirements Processes
Process Improvement for Traceability: A Study of Human Fallibility
  Wei-Keat Kong, Jane Huffman Hayes, Alex Dekhtyar, and Olga Dekhtyar — University of Kentucky, USA; Cal Poly, USA 31
How do Software Architects Consider Non-functional Requirements: An Exploratory Study
  David Ameller, Claudia Ayala, Jordi Cabot, and Xavier Franch — Universitat Politècnica de Catalunya, Spain; INRIA, France 41
Evaluating the Software Product Management Maturity Matrix
  Willem Bekkers, Sjaak Brinkkemper, Lucas van den Bemd, Frederik Mijnhardt, Christoph Wagner, and Inge van de Weerd — Utrecht University, Netherlands; VU University Amsterdam, Netherlands 51

Requirements Management and Tracing 1
Identifying Outdated Requirements Based on Source Code Changes
  Eya Ben Charrada, Anne Koziolek, and Martin Glinz — University of Zurich, Switzerland 61
The Quest for Ubiquity: A Roadmap for Software and Systems Traceability Research
  Olrena C. Z. Gotel, Jane Cleland-Huang, Jane Huffman Hayes, Andrea Zisman, Alexander Egyed, Paul Grünbacher, and Giuliano Antonioli — DePaul University, USA; University of Kentucky, USA; City University London, UK; JKU Linz, Austria; École Polytechnique de Montréal, Canada 71
Enhancing Candidate Link Generation for Requirements Tracing: The Cluster Hypothesis Revisited
  Nan Niu and Anas Mahmoud — Mississippi State University, USA 81

Legal and Regulatory Requirements
Reconciling Multi-jurisdictional Legal Requirements: A Case Study in Requirements Water Marking
  David G. Gordon and Travis D. Breaux — CMU, USA 91
<table>
<thead>
<tr>
<th>Topic</th>
<th>Title</th>
<th>Authors</th>
<th>Affiliations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Managing Changing Compliance Requirements by Predicting Regulatory Evolution: An Adaptability Framework</td>
<td>Jeremy C. Maxwell, Annie I. Antón, and Peter Swire</td>
<td>North Carolina State University, USA; Allscripts Healthcare Solutions, USA; Georgia Tech, USA; Ohio State University, USA</td>
<td></td>
</tr>
<tr>
<td>RE@Runtime</td>
<td>Requirements-Driven Adaptive Security: Protecting Variable Assets at Runtime</td>
<td>Mazeiar Salehie, Liliana Pasquale, Inah Omoronyia, Raian Ali, and Bashar Nuseibeh</td>
<td>Lero, Ireland; Bournemouth University, UK; Open University, UK</td>
</tr>
<tr>
<td></td>
<td>Stateful Requirements Monitoring for Self-Repairing Socio-Technical Systems</td>
<td>Lingxiao Fu, Xin Peng, Yijun Yu, John Mylopoulos, and Wenyun Zhao</td>
<td>Fudan University, China; Open University, UK; University of Trento, Italy</td>
</tr>
<tr>
<td>Privacy Arguments: Analysing Selective Disclosure Requirements for Mobile Applications</td>
<td>Thein Than Tun, Arosha K. Bandara, Blaine A. Price, Yijun Yu, Charles Haley, Inah Omoronyia, and Bashar Nuseibeh</td>
<td>Open University, UK; Frogfish Technologies, UK; Lero, Ireland</td>
<td></td>
</tr>
<tr>
<td>Feature Models</td>
<td>Mining Binary Constraints in the Construction of Feature Models</td>
<td>Li Yi, Wei Zhang, Haiyan Zhao, Zhi Jin, and Hong Mei</td>
<td>Peking University, China</td>
</tr>
<tr>
<td></td>
<td>A Feature-Oriented Requirements Modelling Language</td>
<td>Pourya Shaker, Joanne M. Atlee, and Shige Wang</td>
<td>University of Waterloo, Canada; General Motors, USA</td>
</tr>
<tr>
<td></td>
<td>Efficient Consistency Checking of Scenario-Based Product-Line Specifications</td>
<td>Joel Greenyer, Amir Molzam Sharifloo, Maxime Cordy, and Patrick Heymans</td>
<td>Politecnico di Milano, Italy; University of Namur, Belgium</td>
</tr>
<tr>
<td>Requirements Communication</td>
<td>What You Need Is What You Get! The Vision of View-Based Requirements Specifications</td>
<td>Anne Gross and Joerg Doerr</td>
<td>Fraunhofer ISE, Germany</td>
</tr>
<tr>
<td></td>
<td>The Impact of Domain Knowledge on the Effectiveness of Requirements Idea Generation during Requirements Elicitation</td>
<td>Ali Niknafs and Daniel M. Berry</td>
<td>University of Waterloo, Canada</td>
</tr>
<tr>
<td></td>
<td>Using Collective Intelligence to Detect Pragmatic Ambiguities</td>
<td>Alessio Ferrari and Stefania Gnesi</td>
<td>ISTI-CNR, Italy</td>
</tr>
<tr>
<td>Goal Modeling</td>
<td>A Probabilistic Framework for Goal-Oriented Risk Analysis</td>
<td>Antoine Cailliau and Axel van Lamsweerde</td>
<td>Université Catholique de Louvain, Belgium</td>
</tr>
<tr>
<td></td>
<td>Requirements Analysis for a Product Family of DNA Nanodevices</td>
<td>Robyn R. Lutz, Jack H. Lutz, James I. Lathrop, Titus H. Klinge, Divita Mathur, D. M. Stull, Taylor G. Bergquist, and Eric R. Henderson</td>
<td>Iowa State University, USA; Jet Propulsion Laboratory, USA</td>
</tr>
<tr>
<td></td>
<td>On Eliciting Contribution Measures in Goal Models</td>
<td>Sotirios Liaskos, Rina Jalman, and Jorge Aranda</td>
<td>York University, Canada; University of Victoria, Canada</td>
</tr>
<tr>
<td>Requirements Management and Tracing 2</td>
<td>Breaking the Big-Bang Practice of Traceability: Pushing Timely Trace Recommendations to Project Stakeholders</td>
<td>Jane Cleland-Huang, Patrick Mäder, Mehdi Mirakhorli, and Sorawit Amornborvornwong</td>
<td>DePaul University, USA; JKU Linz, Austria</td>
</tr>
<tr>
<td></td>
<td>Characterization of Functional Software Requirements Space: The Law of Requirements Taxonomic Growth</td>
<td>Arbi Ghazarian</td>
<td>Arizona State University, USA</td>
</tr>
<tr>
<td></td>
<td>Detecting and Classifying Patterns of Requirements Clarifications</td>
<td>Eric Knauss, Daniela Damian, Germán Poo-Caamaño, and Jane Cleland-Huang</td>
<td>University of Victoria, Canada; DePaul University, USA</td>
</tr>
</tbody>
</table>
## Industrial Track

### Product Management Concerns

**What Do Practitioners Mean When They Talk about Product Management?**
Andrey Maglyas, Uolevi Nikula, and Kari Smolander — *Lappeenranta University of Technology, Finland*

**Towards Outcome-Based Regulatory Compliance in Aviation Security**
Rasha Tawhid, Edna Braun, Nick Cartwright, Mohammad Alhaj, Gunter Mussbacher, Azalia Shamsaei, Daniel Amyot, Saeed Ahmadi Behnam, and Greg Richards — *Transport Canada, Canada; Carleton University, Canada; University of Ottawa, Canada*

---

**261**

### Aspect Oriented RE

**Requirements Composition Table Explained**
Yuri Chernak — *Valley Forge Consulting, USA*

**Categorizing Requirements for a Contract-Based System Integration Project**
Xiping Song and Beatrice Hwong — *Siemens, USA*

---

**273**

### Natural Language vs. Formalized Specification

**The Use of a Requirements Modeling Language for Industrial Applications**
Brian Berenbach, Florian Schneider, and Helmut Naughton — *Siemens, USA; TU Munich, Germany*

**Defects in Natural Language Requirement Specifications at Mercedes-Benz: An Investigation Using a Combination of Legacy Data and Expert Opinion**
Daniel Ott — *Daimler, Germany*

---

**285**

### Prioritization

**Log-Based Approach for Performance Requirements Elicitation and Prioritization**
Odorico Machado Mendizabal, Martin Spier, and Rodrigo Saad — *FURG, Brazil; Expedia, USA; Dell, Brazil*

**Selecting an Appropriate Framework for Value-Based Requirements Prioritization: A Case Study**
Nupul Kukreja, Sheetal Swaroop Payyavula, Barry Boehm, and Srinivas Padmanabhan — *University of Southern California, USA; Infosys Technologies, India*

**Requirements Reuse at Danfoss**
Dagny Hauksdottir, Arne Vermehren, and Juha Savolainen — *Danfoss Power Electronics, Denmark*

---

**297**

### Posters and Tool Demonstrations

**ArchiTech: Tool Support for NFR-Guided Architectural Decision-Making**
David Ameller, Oriol Collell, and Xavier Franch — *Universitat Politècnica de Catalunya, Spain*

**CoFM: An Environment for Collaborative Feature Modeling**
Li Yi, Haiyan Zhao, Wei Zhang, and Zhi Jin — *Peking University, China*

**Concern-Driven Development with jUCMNav**
Daniel Amyot, Stéphane Leblanc, Jason Kealey, and Jörg Kienzle — *University of Ottawa, Canada; JUCM Software, Canada; McGill University, Canada*

**Facilitating Transition from Requirements to Code with the ReDSeeDS Tool**
Michal Śmiałek and Tomasz Straszak — *Warsaw University of Technology, Poland*

**Flexible, Lightweight Requirements Modeling with FlexiSketch**
Dustin Wüest, Norbert Seyff, and Martin Glinz — *University of Zurich, Switzerland*

**MbFM: A Matrix-Based Tool for Modeling and Configuring Feature Models**
Long Li, Haiyan Zhao, and Wei Zhang — *Peking University, China*

**ReCVisu: A Tool for Clustering-Based Visual Exploration of Requirements**
Sandeep Reddivari, Zhangji Chen, and Nan Niu — *Mississippi State University, USA*

**Run-Time Model Evaluation for Requirements Model-Driven Self-Adaptation**
Kristopher Welsh and Nelly Bencomo — *University of Kent, UK; INRIA, France*
## Doctoral Symposium

<table>
<thead>
<tr>
<th>Title</th>
<th>Authors</th>
<th>Institution(s)</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>STS-Tool: Socio-technical Security Requirements through Social Commitments</td>
<td>Elda Paja, Fabiano Dalpiaz, Mauro Poggianella, Pierluigi Roberti, and Paolo Giorgini</td>
<td>University of Trento, Italy</td>
<td>331</td>
</tr>
<tr>
<td>The RE-Tools: A Multi-notational Requirements Modeling Toolkit</td>
<td>Sam Supakkul and Lawrence Chung</td>
<td>Sabre, USA; University of Texas at Dallas, USA</td>
<td>333</td>
</tr>
<tr>
<td>Tool Support for Combined Rule-Based and Goal-Based Reasoning in Context-Aware Systems</td>
<td>Mira Vrbaski, Dorina Petriu, and Daniel Amyot</td>
<td>Carleton University, Canada; University of Ottawa, Canada</td>
<td>335</td>
</tr>
<tr>
<td>Model-Based Prioritization in Business-Process-Driven Software Development</td>
<td>Norman Riegel</td>
<td>Fraunhofer IESE, Germany</td>
<td>349</td>
</tr>
<tr>
<td>StakeCloud: Stakeholder Requirements Communication and Resource Identification in the Cloud</td>
<td>Irina Todoran</td>
<td>University of Zurich, Switzerland</td>
<td>353</td>
</tr>
<tr>
<td>Business Requirements Analysis and Development for Legacy System Replacement Projects in Government Organizations</td>
<td>Assia Alexandrova</td>
<td>Open University, UK</td>
<td>337</td>
</tr>
<tr>
<td>A Pattern-Based Approach for Analysing Requirements in Socio-technical Systems Engineering</td>
<td>Axel Hoffmann</td>
<td>University of Kassel, Germany</td>
<td>341</td>
</tr>
<tr>
<td>On the Usage of Context for Requirements Elicitation: End-User Involvement in IT Ecosystems</td>
<td>Alessia Knauss</td>
<td>University of Victoria, Canada</td>
<td>345</td>
</tr>
</tbody>
</table>