

Essen, Germany, March 19-22, 2012

# REFSQ

**18th** Intl. Working Conference  
on Requirements Engineering:  
Foundation for Software Quality **2012**



Organised by

**PALUNO**  
The Ruhr Institute for Software Technology

UNIVERSITÄT  
DUISBURG  
ESSEN

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## Imprint

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### Program Committees

Please check [www.refsq.org](http://www.refsq.org) for the full lists of the program committee members.





## Message from the Chairs

We, the General Chair and the Program Committee Co-Chairs, are delighted to welcome you to the 18th Working Conference on Requirements Engineering: Foundation for Software Quality (REFSQ 2012) and its satellite events in Essen, March 19–22, 2012.

Requirements Engineering (RE) has long been recognized as a major factor for achieving high quality of software-intensive, computer-based systems and services. Since its very beginnings in 1994, the REFSQ working conference series has steadily established itself as a leading international forum for discussing RE in its many relations to computer-based system quality. REFSQ is a vital forum for novel ideas and techniques that further improve RE processes and artifacts as well as reflecting current research and industrial practice about and in RE. Unlike most other conferences and workshops formats, the discussion session following each paper's presentation is as long as the presentation, which is one of the most appreciated characteristic of the REFSQ working conference.

A total of 103 papers of all categories were submitted, and which is an increase of 44 submissions compared to last year's REFSQ edition. After desk rejecting those papers that were late, oversized or clearly out of scope, 84 papers were reviewed by the Program Committee. Each paper received three reviews. In case of any divergence, the reviewers were asked to conduct an electronic discussion aiming for a consensus verdict proposal. Following these discussions, the Program Committee met in Essen at Dec 2nd 2011 and decided to accept 27 papers. The 14 long papers include 10

Full Research papers, and 4 Experience Report papers, whereas the 13 short papers include 9 Research Preview papers, 1 Vision paper, and 3 Problem Statement papers. This yields an overall acceptance rate of 32%, and a long-paper acceptance rate of 18%. We thank the Program Committee members for their expertise and time dedicated to achieving a high quality REFSQ in 2012!

In addition to the main working conference, five workshops will

be conducted, namely: CREARE (Creativity in Requirements Engineering), IWSPM (International Workshop on Software Product Management), RE4SuSy (Requirements Engineering for Sustainable Systems), REEW (Requirements Engineering Efficiency Workshop), and RePriCo (Requirements Prioritization for customer oriented Software Development). In order to provide support students in an early stage of their PhD, a Doctoral Symposium is going to be held in parallel to the working conference



Daniela Damian

Another specialty of REFSQ 2012 is its Industry Track that is going to be held on the middle day of the working conference. The Industry Track features invited industry keynotes and talks on agile requirements engineering and other topics. As a novelty for the Industry Track, a tutorial on Requirements Engineering Education on the CPRE (Certified Professional for Requirements Engineering) advanced level will be given.

As introduced by REFSQ 2011, we have a very exciting Empirical Track where current and future empirical research in requirements engineering is proposed, conducted and shared in the community of both researchers and practitioners. A live experiment will be conducted during the second day of the working conference. Interesting findings of last year's live experiment on requirements risks assessment are presented as a feedback to the community. Later that day, academics and practitioners will be able to exchange their interests in empirical research topics at the Empirical Research Match-Making Fair, which aims to bring together academics who are interested in conducting empirical studies in cooperation, and industry partners. As a new feature of REFSQ, three studies have been selected to conduct online questionnaires during the conference. You are all invited to participate in the studies.

Above all, REFSQ is a collaborative effort. We would like to thank Neil Maiden and Richard Berntsson Svensson for organizing the Industry Track, Barbara Paech for organizing the Doctoral Symposium, Jörg Dörr, Norbert Seyff and Daniel M. Berry for chairing the Empirical Track, Samuel Fricker for chairing the workshop selection process, the organizers of the five workshops held on the day before the conference, and Richard Berntsson Svensson for serving as Publication Chair.

We would also like to give our sincerest thanks to Vanessa Stricker, who very ably served as Organization Chair as well as her local team including André Heuer, Tobias Kaufmann and Selda Saritas for making sure that the conference is running smoothly. We thank the Steering Committee, listed here, consisting of past REFSQ Program Committee and General Chairs, for their seasoned advice.

Last but not least, we would like to thank all our sponsors for providing organizational support for this edition of the REFSQ conference: Bosch, adesso, Sophist, IREB, Logica, e-Spirit, evu-it, and paluno - The Ruhr Institute for Software Technology.

We hope you to be as excited about this year's REFSQ as we are. Once again, we are confident that you will bring home many new ideas, valuable connections and interesting findings that are aligned with REFSQ's motto: „I heard it first at REFSQ!“

**Klaus Pohl**, General Chair

**Björn Regnell** and **Daniela Damian**, Program Co-Chairs



Klaus Pohl



Björn Regnell

# Sponsors

We thank all our sponsors for supporting REFSQ 2012!

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paluno - The Ruhr Institute for Software Technology - represents a holistic development approach for flexible software applications that couples components of classical information systems intelligently with real time information of physical objects and goods.

This development approach supports an agile integration of software-based services on the Internet of Services with features of physical goods within the Internet of Things, and is aligned with business processes in general. As a result, adaptive and customizable software systems based on flexible business models arise.

The development and operation of such new types of software applications require special approaches and agile adaptation in almost all activities of software development. This comprises changing requirements, changes in system utilization, runtime adaptation, and intensive monitoring of the behavior of the system and system context as well as changes of the architecture at runtime.

The paluno approach integrates these elements and thus makes them holistically applicable. It facilitates the development of innovative, efficient and reliable software systems, overcoming the traditional development models and creating entirely new services.

Paluno is a research institute at the University of Duisburg-Essen, Germany, that is one of the ten largest German universities with about 30,000 enrolled students and 3,400 academic and non-academic staff. Five full professors and about 60 academic staff members join forces in the research institute. Consequently, its professional competence covers several areas of software and service engineering, including software and service architectures, mobile and ubiquitous software systems, pervasive computing, quality assurance, requirements engineering, software product line engineering, variability management, security and trust, and software development methods and tools.





adesso is one of the leading IT service providers in the German-speaking area and focuses its consulting and software development activities on a company's core business processes. adesso's strategy is based on three pillars: the deep industry-specific know-how of its staff, the comprehensive expertise in technology and the application of reliable methods in software implementation projects. Following this approach, adesso develops superior IT solutions which enhance the competitive position of a company.

The adesso service portfolio is divided into four main units which are, depending on the customer's requirements, individual entry points for projects:

- \* Business Consulting, i.e. Strategy Development, Requirements Engineering, Tender Management, Process Management
- \* IT Consulting, i.e. Software Architecture, Software Processes, Technology Selection, Test Management
- \* Software Development, i.e. developing custom applications, integrating and migrating existing legacy systems, integrating and customizing standard software, designing, building and consolidating complex portal landscapes
- \* IT Management, i.e. consolidation of complex infrastructures, definition and introduction of services and products for IT organisations, support of complex sourcing projects, application management of complex application landscapes

## Key Figures

- \* Founded in 1997
- \* More than 800 employees in adesso Group
- \* 10 offices in Germany, Austria and Switzerland (headquarter: Dortmund)
- \* Sales revenues 2010: EUR 85.7 million (Expected sales revenues 2011: > EUR 100 million)
- \* Customers: i.e. Allianz, Hannover Rück, Westdeutsche Lotterie, Zurich Versicherung, DEVK, DAK

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[www.adesso.de](http://www.adesso.de)



## SOPHIST — Who we are and what we do

The SOPHISTS provide their knowledge to clients who want to organize their system and software development efficiently and effectively. We are a consulting and training company committed to help our customers to successfully specify, design and test their systems cost-effectively and in compliance with the specific contract. We are the specialists for requirements engineering, requirements management, object-oriented analysis and object-oriented design.

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As a consulting and training company we help our customers to develop technical, non-technical and commercial software or systems successfully, cost-effectively and in compliance with the terms of contracts.

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# Conference Program

## Monday, 19th of March 2012

<b>08:30</b>				<b>Doctoral Symposium</b>
<b>09:00 - 10:30</b>	IWSPM Room 7&8	CREARE Room 2	RePriCo Room 9	Room 5&6
<b>10:30 - 11:00</b>	<b>Coffee Break</b>			
<b>11:00 - 12:30</b>	IWSPM Room 7&8	CREARE Room 2	RePriCo Room 9	<b>Doctoral Symposium</b> Room 5&6
<b>12:30 - 14:00</b>	<b>Lunch</b>			
<b>14:00 - 15:30</b>	IWSPM Room 7&8	REEW Room 2	RE4SuSy Room 9	<b>Doctoral Symposium</b> Room 5&6
<b>15:30 - 16:00</b>	<b>Coffee Break</b>			
<b>16:00 - 17:30</b>	IWSPM Room 7&8	REEW Room 2	RE4SuSy Room 9	<b>Doctoral Symposium</b> Room 5&6
<b>18:30</b>	<b>Workshop Dinner</b>			

## Tuesday, 20th of March 2012

<b>08:40 - 09:00</b>	<b>Conference Opening</b>			
<b>09:00 - 10:30</b>	Keynote - „Requirements Engineering for Enterprise Systems“ Prof. Ian Sommerville, University of St Andrews, Scotland			Room 1&2
<b>10:30 - 11:00</b>	<b>Coffee Break - Doctoral Symposium Poster Presentation</b>			<b>Foyer</b>
<b>11:00 - 12:40</b>	Research Session 1 - Contractual Requirements Session Chair: Anne Persson			Room 1&2
<b>12:40 - 14:00</b>	<b>Lunch</b>			
<b>14:00 - 15:30</b>	Research Session 2 - Quality Requirements Session Chair: Barbara Paech Room 1		Research Session 3 - Collaboration, Complexity & Creativity Session Chair: Dan Berry Room 2	
<b>15:30 - 16:00</b>	<b>Coffee Break - Doctoral Symposium Poster Presentation</b>			<b>Foyer</b>
<b>16:00 - 17:30</b>	Research Session 4 - Requirements Analysis Session Chair: Maya Daneva Room 1		Research Session 5 - Templates & Heuristics Session Chair: Andreas Opdahl Room 2	
<b>17:30 - 18:20</b>	<b>Plenary Summary of Parallel Sessions</b>			Room 1
<b>18:30</b>	<b>Welcome Reception</b>			<b>Foyer</b>



# Conference Program

## Wednesday, 21st of March 2012

08:30 - 09:30	Industry Keynote - „Agile Requirements Engineering“ Rainer Grau - Zühlke Engineering		Room 1&2	
09:30 - 10:30	Industry Keynote - „Warning Signs for Requirements - On Trying to Measure the Quality of Requirements“ Chris Rupp - Sophist GmbH		Room 1&2	
10:30 - 11:00	Coffee Break			
11:00 - 12:30	Empirical Track - Live Experiment - „Do stakeholders understand feature descriptions?“ by Romyana Proynova and Barbara Paech		Room 1	
12:30 - 13:50	Lunch			
13:50 - 15:20	Invited Industrial Talks	Room 1	Tutorial	Room 2
	Can Agile RE Navigate the Scope-Cost-Time Triangle for Mobile Phones? Elisabeth Bjarnason - Sony		Requirements Engineering Education - CPRE Advanced Level examination procedure  organised by Rainer Grau, Zühlke Engineering and Stefan Sturm, IREB GmbH	
	Benchmarks, Problems and Trends in the RE Community Adrian Zwingli - SwissQ Consulting AG			
	Authoring Natural Language Requirements with the EARS Notation Alistair Mavin - Rolls-Royce			
15:20 - 15:50	Coffee Break			
15:50 - 16:20	Empirical Track - Report on 2011 Live Experiment by Andrea Herrmann	Room 1	Tutorial (continued)	Room 2
16:20 - 17:30	Empirical Track - Empirical Research Fair			Room 1
18:30	Conference Dinner			

## Thursday, 22nd of March 2012

08:30 - 09:50	Research Session 6 - Requirements Traceability Session Chair: Eric Knauss	Room 1	Research Session 7 - Tools & Quality Session Chair: Samuel Fricker	Room 2
09:50 - 10:20	Coffee Break			
10:20 - 11:20	Research Session 8 - Services & Clouds Session Chair: Kurt Schneider	Room 1	Research Session 9 - Self-Adaptivity Session Chair: Pete Sawyer	Room 2
11:20 - 12:00	Plenary Summary of Parallel Sessions			Room 1
12:00 - 12:20	Empirical Track - Report on Live Experiment			Room 1
12:20 - 13:40	Lunch			
13:40 - 15:00	Research Session 10 - Industrial Case Studies Session Chair: Alessia Knauss			Room 1
15:00 - 15:30	Closing & Outlook REFSQ'13			Room 1

# Keynote

## Requirements Engineering for Enterprise Systems

**Prof. Ian Sommerville - University of St Andrews, Scotland**

Many approaches to requirements engineering are behavioural and attempt to define required system features and functionality. They, typically, have a 'single system' focus. In this talk, I will argue that this approach to requirements engineering is inappropriate for extending 'enterprise systems' – systems of systems that support many different operations in an organization.

I will discuss an approach to requirements engineering which moves away from the behavioural approach to requirements engineering to focus on the information requirements of stakeholders in the enterprise. Information requirements are concerned with the information needed by stakeholders, the channels used to deliver that information and the issues and problems that arise if the information is not delivered in a timely manner. I will propose that a model of stakeholder responsibilities is an effective way of understanding and analyzing these information requirements.



Ian Sommerville is a Professor of Computer Science at the University of St Andrews, Scotland and was previously Professor of Software Engineering at Lancaster University. He is currently a principal investigator in the UK's Large Scale Complex IT Systems research and training programme with interests in modelling complex systems of systems and in cloud computing. He has published extensively in software and requirements engineering and is the author of a widely-used software engineering textbook. He was awarded the 2011 ACM SIGSOFT Outstanding Educator award for his work in software and requirements engineering education.



## Proceedings

REFSQ 2012 research papers are available in the conference proceedings published by Springer in the volume 7195 of the Lecture Notes in Computer Science Series.

### ***Requirements Engineering: Foundation for Software Quality***

*18th International Working Conference, REFSQ 2012*

*Essen, Germany, March 2012, Proceedings*

#### **Editors:**

Björn Regnell, Daniela Damian

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# Scientific Track

Since 1994, when the first REFSQ took place, Requirements Engineering (RE) continued to be a dominant factor influencing the quality of software, systems and services. The REFSQ working conference series has now established itself as one of the leading international forums to discuss RE in its many relations to quality.

REFSQ 2012 is organised along the following 10 sessions featuring 27 high quality papers. Each session is organised in order to provoke discussion among the presenters of papers, pre-assigned discussants, and all the other participants.

## Research Session 1: Contractual Requirements (Tuesday, 20th of March, 11:00 - 12:40, Room 1&2)

Session Chair: Anne Persson

11:00 - 12:40	<b>Experience Report: Why the Electronic Land Registry Failed</b> Soren Lauesen <i>Discussant: Nazim Madjavi</i>
	<b>Experience Report: Answering a Request for Proposal – Challenges and Proposed Solutions</b> Barbara Paech, Robert Heinrich, Gabriele Zorn-Pauli, Andreas Jung and Siamak Tadjiky <i>Discussant: Soren Lausen</i>
	<b>Research Preview: Impediments to Requirements Compliance</b> Md. Rashed I. Nekvi, Nazim H. Madhavji, Remo Ferrari and Brian Berenbach <i>Discussant: Barbara Paech</i>

## Research Session 2: Quality Requirements (Tuesday, 20th of March, 14:00 - 15:30, Room 1)

Session Chair: Barbara Paech

14:00 - 15:30	<b>Research Paper: How Architects See Non-Functional Requirements: Beware of Modifiability</b> Eltjo Poort, Nick Martens, Inge Van De Weerd and Hans Van Vliet <i>Discussant: Junjie wang</i>
	<b>Research Preview: Prioritizing Quality Requirements based on Software Architecture Evaluation Feedback</b> Anne Koziolok <i>Discussant: Inge van De veerd</i>
	<b>Research Paper: A Simulation Approach for Impact Analysis of Requirement Volatility Considering Dependency Change</b> Junjie Wang, Juan Li, Qing Wang, He Zhang and Haitao Wang <i>Discussant: Anne Koziolok</i>

## Research Session 3: Collaboration, Complexity & Creativity (Tuesday, 20th of March, 14:00 - 15:30, Room 2)

Session Chair: Dan Berry

14:00 - 15:30	<b>Research Paper: Collaborative Resolution of Requirements Mismatches when adopting Open Source Components</b> Anh Nguyen Duc, Daniela S. Cruzes, Reidar Conradi, Martin Host, Xavier Franch and Claudia Ayala <i>Discussant: Martin Mahaux</i>
	<b>Problem Statement: High-Level Requirements Management and Complexity Costs in Automotive Development Projects</b> Tim Gülke, Martin Jansen, Bernhard Rumpe and Joachim Axmann <i>Discussant: Anh Nguyen</i>
	<b>Research Paper: Choose your Creativity: Why and How Creativity in Requirements Engineering Means Different Things to Different People</b> Martin Mahaux, Alistair Mavin and Patrick Heymans <i>Discussant: Tim Guelke</i>

## Research Session 4: Requirements Analysis (Tuesday, 20th of March, 16:00 - 17:30, Room 1)

Session Chair: Maya Daneva

16:00 - 17:30	<b>Research Paper: Supporting Failure Mode and Effect Analysis: A Case Study with Failure Sequence Diagrams</b> Christian Raspotnig and Andreas L Opdahl <i>Discussant: Nicolas Genon</i>
	<b>Research Preview: Aligning Mal-Activity Diagrams and Security Risk Management for Security Requirements Definitions</b> Mohammad Javed Morshed Chowdhury, Raimundas Matulevicius, Guttorm Sindre and Peter Karpati <i>Discussant: Christian Raspotnig</i>
	<b>Research Review: Towards a More Semantically Transparent i* Visual Syntax</b> Nicolas Genon, Patrice Caire, Hubert Toussaint, Patrick Heymans and Daniel Moody <i>Discussant: Raimundas Matulevicius</i>

# Scientific Track

## Research Session 5: Templates & Heuristics (Tuesday, 20th of March, 16:00 - 17:30, Room 2)

Session Chair: Andreas Opdahl

16:00 - 17:30	<b>Research Paper: Providing SPL Knowledge to Requirements Engineers – A Template for Elicitation Instructions</b> Sebastian Adam <i>Discussant: Nauman Qureshi</i>
	<b>Research Preview: Supporting Learning Organisations in Writing Better Requirements Documents based on Heuristic Critiques</b> Eric Knauss and Kurt Schneider <i>Discussant: Olawande Daramola</i>
	<b>Research Preview: Managing Implicit Requirements Using Semantic Case-Based Reasoning</b> Olawande Daramola, Thomas Moser, Guttorm Sindre and Stefan Biffl <i>Discussant: Sebastian Adam</i>

## Research Session 6: Requirements Traceability (Thursday, 22nd of March, 08:30 - 09:50, Room 1)

Session Chair: Eric Knauss

08:30 - 09:50	<b>Research Paper: Trace Queries Safety Requirements in High Assurance Systems</b> Jane Cleland-Huang, Mats Heimdahl, Jane Huffman Hayes, Robyn Lutz and Patrick Mäder <i>Discussant: Yang Li</i>
	<b>Research Paper: Which Traceability Visualization is Suitable in this Context? A Comparative Study</b> Yang Li and Walid Maalej <i>Discussant: Patrick Mader</i>

## Research Session 7: Tools & Quality (Thursday, 22nd of March, 08:30 - 09:50, Room 2)

Session Chair: Samuel Fricker

08:30 - 09:50	<b>Vision Paper: The Case for Dumb Requirements Engineering Tools</b> Daniel Berry, Ricardo Gacitua, Pete Sawyer and Sri Fatimah Tjong <i>Discussant: Norbert Seyff</i>
	<b>Research Preview: Automatic Analysis of Multimodal Requirements</b> Elia Bruni, Alessio Ferrari, Norbert Seyff and Gabriele Tolomei <i>Discussant: Lukasz Radkinski</i>
	<b>Problem Statement: 10 Myths of Software Quality</b> Elke Hochmüller <i>Discussant: Dan Berry and Pete Sawyer</i>
	<b>Research Preview: Empirical Analysis of the Impact of Requirements Engineering on Software Quality</b> Lukasz Radlinski <i>Discussant: Elke Hochmueller</i>

## Research Session 8: Services & Clouds (Thursday, 22nd of March, 10:20 - 11:20, Room 1)

Session Chair: Kurt Schneider

10:20 - 11:20	<b>Research Paper: A Systematic Literature Review on Service Description Methods</b> Abelneh Teka, Nelly Condori-Fernández and Brahmananda Sapkota <i>Discussant: Stephan Fassbender</i>
	<b>Research Preview: A Pattern-Based Method for Identifying and Analysing Laws in the Field of Cloud Computing Compliance</b> Kristian Beckers, Stephan Faßbender, Jan-Christoph Küster and Holger Schmidt <i>Discussant: Nelly Condori-Fernandez</i>

## Research Session 9: Self-Adaptivity (Thursday, 22nd of March, 10:20 - 11:20, Room 2)

Session Chair: Pete Sawyer

10:20 - 11:20	<b>Research Paper: Towards a Requirements Modeling Language for Self-Adaptive Systems</b> Nauman A. Qureshi, Ivan J. Jureta and Anna Perini <i>Discussant: Marc Oriol</i>
	<b>Research Preview: Requirements Monitoring for Adaptive Service-Based Applications</b> Marc Oriol, Nauman A. Qureshi, Xavier Franch, Anna Perini and Jordi Marco <i>Discussant: Erik Knauss</i>

## Research Session 10: Industrial Case Studies (Thursday, 22nd of March, 13:40 - 15:00, Room 1)

Session Chair: Alessia Knauss

13:40 - 15:00	<b>Experience Report: Release Planning with Feature Trees</b> Samuel Fricker and Susanne Schumacher <i>Discussant: Roel Wieringa</i>
	<b>Experience Report: Goal-Oriented Requirements Engineering and Enterprise Architecture: Two case studies and some lessons learned</b> Wilco Engelsman and Roel Wieringa <i>Discussant: Samuel Friker</i>

## Industry Keynotes

The REFSQ working conference series has since 1994 established itself as one of the leading international forums to discuss RE in its many relations to quality. Since 2010 REFSQ consolidates as a stand-alone conference and, in addition, offers a dedicated Industry Track. Requirements engineering is recognized in industry as one of the most critical parts of the life cycle. Challenges such as new business models, system development with many stakeholders, service delivery, collaboration, or eco-systems provide an exciting context for this new Industry Track. It offers a unique opportunity for sharing best practices, innovations and ideas with peers and experts in the field.

## Agile Requirements Engineering

**Rainer Grau, Zühlke Engineering AG**



Organizations work on different context levels. The project context targets the goal to develop the next version of product P or service. The portfolio context above projects defines the product or service roadmap and thus initiates the projects.

Portfolio management still often is bound to yearly strategy happenings and budgeting, based on track & control and insufficient feedback from projects. Typically a strict top down strategy implementation with all its drawbacks and impediments is established in organizations. This classical portfolio management nowadays crashes with the mindset of agile development applied in projects. And how surprising: The link between these two context areas are requirements. This talk proposes a lean and agile approach focusing on requirements engineering (RE). The merge of best and proven practices in RE with a lean and agile mindset while overcoming misunderstandings in agile development like “no documentation anymore” opens the chance to optimize the requirements-time-cost triangle – in close collaboration on both context levels, project context and the project roadmap context.

**Rainer Grau** has been working in IT for 22 years. His career steps are software engineer, software architect, project manager, requirements engineer, process consultant, instructor, coach, mentor, evangelist, supporter of the community. He is member of the Executive Management Board at Zühlke in the role as distinguished consultant. In addition to his job, he teaches Scrum, Lean Management and Requirements Engineering and Product Management at various universities, travels as a speaker at conferences, acts as 2nd Chairman of the International Requirements Engineering Board IREB and board member of the International Software Product Management Association, ISPMA.

Rainer Grau spends the remainder of his time with family, on racing or mountain bikes, and occasionally wind surfing, rock climbing or reading the latest novels by T.C. Boyle and Haruki Murakami.

## Warning Signs for Requirements - On Trying to Measure the Quality of Requirements...

**Chris Rupp, SOPHIST GmbH**

Requirements specifications must be of sufficient quality, as they are the foundation for further work in the project. Misunderstandings in this early phase of a project have drastic consequences for nearly all subsequent activities in regards to costs and quality. Therefore, you have to be able to define and assess the quality of requirements and of a specification without doubt. But what is the best way to do so? Particularly for specifications that consist of natural-language requirements, it seems difficult to make a definite statement about their unambiguity, consistency, identifiability or necessity. Exactly this problem is solved by an approach that packs the quality of natural-language requirements into metrics and focuses on linguistic quality while doing so. The lecture addresses the following questions and offers possible solutions:

- \* How can the quality of a requirement be measured?
- \* Which metrics exist in this field and which target values are good?
- \* Which sample sizes make sense for specifications?
- \* Do I have to measure and assess different types of requirements (e. g. non-functional requirements, general requirements) differently?
- \* How to introduce an approach based on metrics in a company?

Using specific examples, solutions will be presented and discussed in an argumentative manner.

**Chris Rupp** Head SOPHIST (officially: founder and CEO), chief consultant, coach and trainer. After 20 years of active



involvement in the field of systems engineering I have gathered quite a nice collection: ... a company ... 7 books ... 40 employees ... innumerable articles and lectures ... and a lot of experience. This is presumably due to my passion for consulting - I've not only been managing personnel, challenging them and helping them develop their strengths, but I have also actively stayed in touch with the

customer by working in and leading projects. It might also be due to a talent to gather the right team members around me. The vision that drives me is to put good ideas into practice in a way that gives developers, contract partners and users the certainty that they are dealing with a valuable, elaborate and beneficial product.



## Tutorial

### Requirements Engineering Education – CPRE Advanced Level examination procedure

*Rainer Grau, Stefan Sturm*

Certification models are important instruments for standardization. The three level CPRE certification model addresses the discipline of requirements engineering. The Foundation Level started in 2006 is international well established. In 2011 the two Advanced Level modules “Requirements Elicitation and Consolidation” and “Requirements Modeling” have been published.

CPRE AL modules focus on the application of best practices. Consequently the examination consists of a small MC questionnaire and an intensive case study elaborated by the candidate as homework. This tutorial introduces to the procedure of the homework to give an insight into the practical part of the examination.

This session works with the attendees as following:

- \* Introduction
- \* Setup of working groups
- \* Elaboration of a partial case study for a sample homework
- \* Vernissage of results
- \* Wrap-up and Q&A



**Stefan Sturm** has been in the field of software and system development for 20 years, starting from basic writing source code in more than 5 programming languages and technologies including Java and Microsoft .NET. His career path covered business analyst, requirements engineer, architect, project lead to the definition of systems and development processes to create these systems.

From 1999 to 2011 Stefan was Managing Director of a SoU-Con GmbH Software und Consulting located in Karlsruhe, Germany. With his team he created individual software applications for global players as well as for small companies in many different industrial sectors. Requirements Engineering and Business Analysis played a major role in these projects and are amongst his core skills.

In April 2010 he started as a project manager for the international Requirements Engineering Board (IREB) e.V., the holder of the “Certified Professional for Requirements Engineering” (CPRE) certificate. At April 1st 2011 he was appointed as Managing Director of IREB GmbH the operating company of IREB. In this position he is responsible for all the numerous activities resulting from the worldwide growing success of the CPRE certificate.

## Invited Industrial Talks

### Authoring Natural Language Requirements with the Easy Approach to Requirements Syntax Plus (EARS+) Notation

*Alistair Mavin, Rolls Royce*

Black box system requirements are often written in unconstrained natural language, which is inherently imprecise. During system development, any problems in system requirements inevitably propagate to lower levels. This creates unnecessary volatility and risk, which impact programme schedule and cost. To mitigate this problem, there is a need to provide simple, practical guidance for authors of natural language requirements. Easy Approach to Requirements Syntax (EARS) is a philosophy for authoring natural language requirements through the application of a template with an underlying ruleset. EARS has proved popular with practitioners because it is lightweight, there is little training overhead, and the resultant requirements are easy to read.



In practice, requirements authoring is usually an iterative process; first-pass requirements can be quite a simple description of required system behaviour, whilst subsequent iterations are used to add detail. EARS is an effective mechanism for the expression of simple requirements, but does not adequately define precise, rigorous requirements. To address these shortcomings, the enhanced EARS+ template has been developed. EARS+ provides a mechanism to vary the level of detail in natural language requirements during iterative requirements authoring. The requirement author can add attributes such as stakeholder, action and object, which have defined syntax. This produces a precise description of the required system behaviour. The practitioner can choose which clauses to apply, thereby tailoring each requirement to the appropriate level of detail, whilst maintaining the readability of natural language.

This presentation will introduce the EARS+ template, illustrate with examples of both simple and detailed requirements and discuss the benefits of adopting the approach.

**Alistair Mavin** (Mav) is a requirements specialist at Rolls-Royce PLC based in Derby, UK. Prior to joining Rolls-Royce he carried out systems engineering and requirements engineering projects in a range of industries including defence, aerospace, rail and automotive. He has experience in the development and delivery of requirements engineering training. Mav has published many papers on requirements engineering and is a regular contributor to the IEEE “RE” conference series. He is a member of the “RE” conference series Industry Committee, a member of the British Computer Society’s Requirements Engineering Specialist Group Committee and is a chartered engineer.

## Can Agile RE Navigate the Scope-Time-Cost Triangle for Mobile Phones?

*Elisabeth Bjarnson, Sony*

The mobile phone market is highly competitive. Market success requires both selecting the 'right' product scope, and developing that scope quickly and efficiently. Time to market is vital.



In addition, the fast moving pace of the market requires an ability to quickly adapt and redirect projects and engineers to new and changed requirements. To match these challenges and enable a shorter turn-around time from request to launch, principles from agile development methods are often adopted, also for large and complex development involving both software and hardware.

But, are the agile methods sufficient to handle the complexity of multiple hardware and software parts and layers in a cost efficient way and against firm deadlines of factory production lines and launch campaigns planned many months in advance? In particular, are agile requirements engineering practices sufficient to guide and support phone development, while managing a large number of both internal and external stakeholders? The scope needs to be defined to satisfy the market. The lead times need to be short and both fit and ensure delivery within the time lines defined by the product plans. Furthermore, scope and time needs to be optimized while keeping the cost of development under control. I.e. are the practices and principles of agile RE sufficient to navigate the aspects of scope, lead time and cost of development?

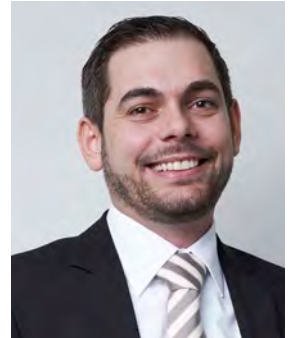
**Elisabeth Bjarnson** is a process engineer at Sony. She is part of the process team responsible for the processes for developing software for Sony's Xperia phones, and mainly responsible for the requirements aspects of those processes. She has a long and wide experience within the company's software development organization and has worked with software design, programming, project management, standardization, as well as, requirements for the software of mobile phones. Prior to joining Sony (previously Sony Ericsson and Ericsson Mobile Communications), she worked with developing educational software and smaller database applications, as well as, doing research into tool support for domain-specific languages. Through her experience of working with requirements as an integrated part of large-scale software development she has become interested in the area of Requirements Engineering and is currently working with the Software Engineering Research Group (SERG) at Lund University. Her main research interests are integrated and agile requirements engineering, including alignment between requirements and verification & validation.

## Benchmarks, Problems, and Trends in the RE Community

*Adrian Zwingli, SwissQ Consulting AG*

Many executives and organizations have realized and acknowledged the importance of requirements engineering (RE). First steps have been taken, but many more hurdles have to be overcome.

This talk looks at the current state of RE from a practitioner's point of view, analyzes the problems industry has to take on, and shows what the trends and needs of the RE community are. SwissQ's recent community survey with 300 respondents, enhanced with 25 interviews with IT executives, gives interesting insights into the actual state of practice. We investigate why only 25% of the respondents see RE in their projects as good, how much effort is spent on RE in relation to the total project cost, and why acceptance of RE is still low. We discuss the expectations of stakeholders towards the RE community, how they affect the success of projects and organizations, and what academia can contribute to improve the state of RE practice.



**Adrian Zwingli** has been working in IT for over 13 years. Adrian pioneered the Swiss Requirements Day in Zurich, a community-driven not-for-profit one-day event with over 550 attendees, and the Swiss Requirements Nights held in several cities over the year. Being the local publicity coordinator of ICSE 2012, which will take place in Zurich June 2 – 9 2012, he serves to bridge the gap between the academic and practice world. Adrian is Chairman of the Swiss Requirements Day and Swiss Testing Day and founder and CEO of SwissQ. He holds an MBA in General Management.

Last year's edition of REFSQ, in 2011, featured a new Empirical Track, during which a Live Experiment on Risk-Esimation was conducted. The detailed results of this experiment will be reported at this year's REFSQ on wednesday. In addition, the Empirical Fair tried to match (1) industry partners that were intested in conducting experiments in cooperation with researchers, and (2) researchers who proposed paritular experiments which required an industry setting. After the success of last year, we decided to repeat the Empirical Track this year and to expand it. Therefore, we issued a call for the following kinds of submissions:

- \* **Alive Empirical Study:** a controlled experiment, requiring no more than 90 minutes, that involves all REFSQ participants who want to participate, and
- \* **Online Questionnaire:** an online questionnaire (survey), designed to require no more than 30 minutes, that is promoted at REFSQ and that can be filled out by all interested REFSQ participants, in their spare time at the conference.
- \* **Empirical Research Fair Proposal:** an empirical study that a researcher would like to conduct in an industrial setting or vice versa.

## Alive Empirical Study

The discussion at recent REFSQs have confirmed the strong need for empirical validation of the effectiveness for our RE methods, but the literature to date, including that of REFSQ, could show more of this validation. This lack is assumed to be at least partly due to the difficulty of finding and persuading the participation of a sufficient number of suitable experimental subjects. Therefore, REFSQ 2012 issued a call that offers an opportunity to conduct an empirical study during the conference itself. The goals of this opportunity, besides that of permitting to conduct the experiment, are to raise awareness for the necessity and benefits of empirical studies and to show that participating in them is not dangerous to one's health. Furthermore, we want to bring together the community of researchers and practitioners who are interested in empirical studies.

## Do stakeholders understand feature descriptions?

Wednesday, 28th of March date

*Organised by Romyana Proynova and Barbara Paech, Software Engineering Group, University of Heidelberg, Germany*

This experiment aims to show how well a stakeholder can understand feature descriptions, and whether different forms of feature descriptions lead to different levels of understanding. With the experiment, the following hypotheses should be confirmed or rejected:

**Hypothesis 1:** Stakeholders are able to understand concise verbal descriptions of software features and build a reasona-

bly accurate mental model of a software system containing these features.

**Hypothesis 2:** Some forms of verbal descriptions of software features are more easily understood than others.

**Benefits to Participants:** The main benefit for the subjects will be new experience and new knowledge. As requirements engineers, they have a preset role in software development projects. By experiencing the role of stakeholders, they will be able to better understand their project partners. Also, due to the real-time evaluation, they will immediately see the feasibility of collecting requirements feedback with questionnaires.

## Online Questionnaires

This is a new kind of empirical study in the REFSQ Empirical Track, inspired by submissions we received last year. An online questionnaire (survey) is designed to be filled out by all interested REFSQ participants, in their spare time at the conference (breaks, etc.). It will require no more than 30 minutes to participate.

The URLs for accessing the online questionnaire will be provided in the plenary session, on posters at the conference, and on additional sheets in your bag.

The following online questionnaires were selected for REFSQ 2012:

### Reliability and Perceived Efficacy of a Checklist for Experimental Reports in Requirements Engineering

Nelly Condori-Fernandez, Maya Daneva

### Requirements Engineering Techniques and Methods: An Online Questionnaire determining actual use in industry

Richard Berntsson Svensson, Tony Gorschek

### A Survey on Requirements Engineering for Variability-intensive Software Systems

Matthias Galster, Paris Avgeriou, Christian Manteuffel





# Empirical Track & Doctoral Symposium

## Empirical Research Fair

Wednesday, 21st of March, 16:20 - 17:30

It is clearly understood in the Requirements Engineering (RE) community that case studies of industry projects are critical for our in-depth understanding of both: (a) the phenomena occurring in projects, processes, systems, and services and (b) the impact of our RE methods on the quality, cost, and deliverability of systems. Therefore, in the Empirical Fair, practitioners can propose studies that their organizations would like to have conducted, and researchers can propose studies that they would like to conduct in industry. The Empirical Fair is a meeting point to match the demand and supply of empirical studies among researchers and practitioners. To encourage industry participation, the format of this session is a match-making session in which the authors of the accepted proposals present posters on their intended case studies and the audience can view them and enter a good discussion on the studies goals, benefits, and procedure. Seven proposals have been selected to be presented on posters during the fair. The posters will also be displayed throughout.

Tracing Requirements Interdependencies in Agile Teams Indira Nurdiani, Samuel Fricker, Jürgen Börstler
Applying Creativity Techniques to Requirements Elicitation: Defining an Enhanced EPMCreate Luisa Mich, Daniel Berry, Victoria Sakhnini
Using E-mails and Phone Calls to Resolve Requirements Engineering Issues: Which Works Best and for Which Type of Issue? Maya Daneva
Requirements Elicitation Driven by End-Users Alessia Knauss, Daniela Damian
What do you expect from Requirements Specifications? An Empirical Investigation of Information Needs Anne Gross
Supporting Client-Developer Feedback Loops in Agile Requirements Engineering by means of a Mobile Requirements Engineering Tool Maya Daneva, Nelly Condori-Fernandez, Norbert Seyff
Patterns of Requirements-Related Communication Eric Knauss, Daniela Damian

## Doctoral Symposium

Monday, 19th of March, 08:30 - 17:30

REFSQ2012 will host a Doctoral Symposium for PhD students whose research area includes elements of Requirements Engineering.

The Symposium is intended to bring together PhD students, facilitate the establishment of links among them and with senior researchers, and give students the opportunity to present and discuss their research among colleagues in a constructively critical atmosphere. A number of senior researchers will attend the event.

Following the time-honoured tradition of REFSQ, the Symposium will revolve around structured presentations and matching discussions, with ample time devoted to comments from the floor. Posters of the Doctoral Symposium presentations will be displayed throughout Tuesday in the conference foyer.

## Doctoral Symposium Chair

Prof. Dr. Barbara Paech, University of Heidelberg, Germany

08:30 - 08:50	Welcome and Introduction
08:50 - 09:40	Cristina Ribeiro: The Severity of Undetected Ambiguity in Software Engineering Requirements
09:40 - 10:30	Cyril Mauger: Method for the conceptual phase of an Integrated Product and Service Design applied to Construction Project
10:30 - 11:00	Coffee Break
11:00 - 11:50	Elizabeth Bjarnason: Integrating and Aligning Requirements Engineering with Software Development
11:50 - 12:40	Hajar Kashfi: Engineering User Experience Requirements – An Incremental Approach
12:40 - 13:50	Lunch
13:50 - 14:40	Noorihan Abdul Rahman: Requirements Elicitation Technique for Social Presence in Collaborative Activities in Support of E-learning Domain
14:40 - 15:30	Marko Komssi: Strategic Changes and Requirements Engineering
15:30 - 16:00	Coffee Break
16:00 - 16:50	Alexander Delater: Traceability between System Model, Project Model and Source Code
16:50 - 17:40	Summary, Discussion

## **CREATE: Creativity in Requirements Engineering**

Monday, 19th of March 2012, 09:00-12:30

Requirements Engineering not only demands a systematic approach for eliciting, operationalizing and documenting requirements and for solving their conflicts, but requirements engineering also is a creative activity. It demands the stakeholders to create visions of a future software system and to imagine all its implications. Creativity techniques can support this creative part of requirements engineering. This workshop brings together requirements engineers from industry and researcher who are interested in discussing the role of creativity in requirements engineering and how and which creativity techniques can be applied to requirements engineering. The workshop is a forum for the interchange of experience and research results. It also aims at raising awareness in the RE community for the importance of creativity and creativity techniques.

**Organisers:** Andrea Hermann, Joerg Doerr, Kurt Schneider, Maya Daneva

## **REEW 2012: International Workshop on Requirements Engineering Efficiency**

Monday, 19th of March 2012, 14:00-17:30

Requirements engineering research has focused on specification quality for a long time, leading to recommendations of how to engineer high quality requirements specifications. Practitioners, however, do not have the time and resources for developing theoretically best requirements. Rather, many situations call for short-cuts that allow investing effort in those concerns that are critical for success, while reducing effort in other areas where risk is comparably smaller. The social context, smart collaboration processes, and novel ways of looking at the interface between stakeholders and the supplier can be a basis to increase the yield of requirements engineering, while reducing required effort.

The Requirements Engineering Efficiency Workshop (REEW 2012) aims at initiating, facilitating, and nurturing the discussion on efficient approaches to engineer fitting, good-enough requirements. Requirements engineering is here seen as a means that can be combined with other practices to achieve a successful system in an economically efficient manner. REEW 2012 will provide a platform for the community of practitioners and research experts that are interested in efficient and pragmatic approaches to requirements engineering.

**Organisers:** Norbert Seyff, Nazim H. Madhavji

## **RE4SuSy: Social Fire on Green Wire: First International Workshop on Requirements Engineering for Sustainable Systems**

Monday, 19th of March 2012, 14:00-17:30

Researchers have recently started to explore how to support the elicitation and documentation of sustainability requirements. In the mean time, ubiquitous socio-technical sys-

tems alter the way we live, and consequently have a potentially huge impact on sustainability. As sustainability is one of the biggest challenges facing humanity in the coming decades, we must reinforce research in this direction and ensure it is appropriately rooted in the practice. We believe that the RE discipline should collaborate with other disciplines interested in that matter, for example, social sciences, psychology, economics, systems engineering, etc.

This workshop will provide an interactive stage to collaboratively define a research agenda in RE for sustainable systems, and also to jumpstart collaboration through the live creation of teams that commit to work together on concrete points of this agenda.

**Organisers:** Birgit Penzenstadler, Martin Mahaux, Camille Salinesi

## **IWSPM'12: Sixth International Workshop on Software Product Management**

Monday, 19th of March 2012, 09:00-17:30

Product success depends on skilled and competent product management. In essence, a product manager decides what functionality and quality a product should offer, to which customers, while minimizing the time-to-market and assuring a winning business case. Software product management includes working with requirements, release definitions, product lifecycles, the creation and interpretation of product strategies, balancing long-term technology push with shorter-term market-pull, and assuring a successful business case by selecting the right requirement for realization.

After the success of the previous workshops this workshop aims at bringing practitioners and research experts together for exchanging ideas, knowledge, and experience, and for setting a research agenda based on industry needs.

**Organisers:** Richard Berntsson Svensson, Marjo Kauppinen, Inge van de Weerd

## **RePriCo'12: 3rd Workshop on Requirements Prioritization for customer oriented Software Development**

Monday, 19th of March 2012, 09:00-12:30

The workshop will serve as a platform for the presentation and discussion of new and innovative approaches to prioritization issues focusing requirements engineering in the context of customer oriented software development (not meaning bespoke software only but standard software also). Topics can either carry out new research approaches with a fundamental theoretical background or best-practices from practitioners.

A high rate of active participation and intense exchange of ideas and experiences shall encourage researchers as well as software developers, requirements engineers or consultants to absorb new ideas and to carry them out into their daily work and research projects.

**Organisers:** Georg Herzwurm, Benedikt Krams, Wolfram Pietsch, Sixten Schockert



# Social Activities

## Workshop Dinner

*Monday, 19th of March 2012, at 18:30*

*Extra workshop dinner ticket needs to be purchased (Costs: 45 Euros).*

A workshop dinner will be arranged for the workshops on the 19th of March. The workshop dinner will take place at the restaurant Cuxx in the Conference Hotel. Additional tickets can still be purchased at the registration desk.



## Welcome Reception

*Tuesday, 20th of March 2012, at 18:30*

*Included in registration fee of the main conference (except for 1 day tickets)*

On the first conference day, REFSQ 2012 welcomes you with a reception in the Atlantic Congress Hotel. It offers a great opportunity to meet colleagues and to share ideas. The welcome reception will take place in the foyer of the Conference Hotel.

## Conference Dinner

*Wednesday, 21st of March 2012, at 18:30*

*Included in registration fee of the main conference (except for 1 day tickets)*

The REFSQ 2012 conference dinner will take place at the industrial museum Henrichshütte ironworks, which was established in 1854. The evening will start with an English speaking sightseeing tour before a delicious and diverse menu will be served on a buffet.

Vegetarian participants will also be well catered. A band will take care of the entertainment in this comfortable and historical atmosphere. We hope you will enjoy the evening!

## How to Get There

After the last session busses will pick you up at the Atlantic Congress Hotel and directly go to the social dinner location. After the event, busses will pick you up again and take you back to the Atlantic Congress Hotel with an additional stop at Essen Main Station from where you have best access to the public transport system.

**Shuttle Busses will head from the Atlantic Congress Hotel at 18:15/18:30 and back at 23:00 and 00:00**

If you cannot or do not want to take the bus you can either use the public transport system (about one hour) or come by car (about 30 km and 30 min).

## How to Get There by Public Transport

From Messe Ost/Gruga take the underground U11 (direction: Gelsenkirchen Buerer Str.) from platform 1. It will only take about 5 minutes to Essen Main Station where you have to leave the underground. Go on with the train S3 to Hattingen Mitte (direction: Hattingen Mitte). It will take you about 20 minutes. From the Station Hattingen Mitte please take the Bus CE31 or SB37 to Hattingen Henrichshütte (direction: Bochum Hbf). It will only take about 5 minutes. The Restaurant Henrichs and the industrial museum Henrichshütte will be directly in front of you.



We are looking forward to see you again next year at REFSQ 2013 in Essen, Germany