

Jürgen Münch  
Pekka Abrahamsson (Eds.)

LNCS 4589

# Product-Focused Software Process Improvement

8th International Conference, PROFES 2007  
Riga, Latvia, July 2007  
Proceedings



Springer

TP 311-53

p 964.4

2007

Jürgen Münch Pekka Abrahamsson (Eds.)

# Product-Focused Software Process Improvement

8th International Conference, PROFES 2007  
Riga, Latvia, July 2-4, 2007  
Proceedings



 Springer



## Volume Editors

Jürgen Münch  
Fraunhofer Institute for Experimental Software Engineering  
Fraunhofer-Platz 1, 67663 Kaiserslautern, Germany  
E-mail: juergen.muench@iese.fraunhofer.de

Pekka Abrahamsson  
VTT Electronics  
Kaitovayla 1, 90570 Oulu, Finland  
E-mail: pekka.abrahamsson@vtt.fi

Library of Congress Control Number: 2007929634

CR Subject Classification (1998): D.2, K.6, K.4.2, J.1

LNCS Sublibrary: SL 2 – Programming and Software Engineering

ISSN	0302-9743
ISBN-10	3-540-73459-7 Springer Berlin Heidelberg New York
ISBN-13	978-3-540-73459-8 Springer Berlin Heidelberg New York

This work is subject to copyright. All rights are reserved, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, re-use of illustrations, recitation, broadcasting, reproduction on microfilms or in any other way, and storage in data banks. Duplication of this publication or parts thereof is permitted only under the provisions of the German Copyright Law of September 9, 1965, in its current version, and permission for use must always be obtained from Springer. Violations are liable to prosecution under the German Copyright Law.

Springer is a part of Springer Science+Business Media

springer.com

© Springer-Verlag Berlin Heidelberg 2007  
Printed in Germany

Typesetting: Camera-ready by author, data conversion by Scientific Publishing Services, Chennai, India  
Printed on acid-free paper SPIN: 12086863 06/3180 5 4 3 2 1 0

*Commenced Publication in 1973*

Founding and Former Series Editors:

Gerhard Goos, Juris Hartmanis, and Jan van Leeuwen

## Editorial Board

David Hutchison

*Lancaster University, UK*

Takeo Kanade

*Carnegie Mellon University, Pittsburgh, PA, USA*

Josef Kittler

*University of Surrey, Guildford, UK*

Jon M. Kleinberg

*Cornell University, Ithaca, NY, USA*

Friedemann Mattern

*ETH Zurich, Switzerland*

John C. Mitchell

*Stanford University, CA, USA*

Moni Naor

*Weizmann Institute of Science, Rehovot, Israel*

Oscar Nierstrasz

*University of Bern, Switzerland*

C. Pandu Rangan

*Indian Institute of Technology, Madras, India*

Bernhard Steffen

*University of Dortmund, Germany*

Madhu Sudan

*Massachusetts Institute of Technology, MA, USA*

Demetri Terzopoulos

*University of California, Los Angeles, CA, USA*

Doug Tygar

*University of California, Berkeley, CA, USA*

Moshe Y. Vardi

*Rice University, Houston, TX, USA*

Gerhard Weikum

*Max-Planck Institute of Computer Science, Saarbruecken, Germany*

## Preface

The Eight International Conference on Product-Focused Software Process Improvement (PROFES 2007) brought together researchers and industrial practitioners to report new research results and exchange experiences and findings in the area of process and product improvement. The focus of the conference is on understanding, learning, evaluating, and improving the relationships between process improvement activities (such as the deployment of innovative defect detection processes) and their effects in products (such as improved product reliability and safety). Consequently, major topics of the conference include the evaluation of existing software process improvement (SPI) approaches in different contexts, the presentation of new or modified SPI approaches, and the relation between SPI and new development techniques or emerging application domains.

This year's conference theme focused on global software development. More and more products are being developed in distributed, global development environments with many customer-supplier relations in the value chain. Outsourcing, off-shoring, near-shoring, and even in-sourcing aggravate this trend further. Supporting such distributed development requires well-understood and accurately implemented development process interfaces, process synchronization, and an efficient process evolution mechanisms. Overcoming cultural barriers and implementing efficient communication channels are some of the key challenges. It is clear that process improvement approaches also need to consider these new development contexts.

A second key focus of PROFES 2007 was on agile software development. Market dynamics require organizations to adapt to changes of the development environment and to enforce innovations better and faster. This often results in process changes that impose risk challenges for SPI approaches. Advanced SPI is required to support the assessment of the impact of process changes such as the introduction of agile methods. Due to the fact that software development processes are human-based and depend heavily on the development context, process changes and their resulting effects should be considered carefully. We consider the development context to include at least the domain-specific characteristics, the workforce capabilities, and the level of work distribution.

The technical program was selected by a committee of leading experts in software process modeling and SPI research. This year, 56 papers from 21 nations were submitted, with each paper receiving at least three reviews. The Program Committee met in Riga for one full day in February 2007. The Program Committee finally selected 30 technical full papers. The topics indicate that SPI remains a vibrant research discipline of high interest for industry. Emerging technologies and application domains, a paradigm shift to global software and system engineering in many domains, and the need for better decision support for SPI are reflected in these papers. The technical program consisted of the tracks global software development, software process improvement, software process modeling and evolution, industrial experiences, agile software development, software measurement, simulation and decision support, and processes and methods. We were proud to have four distinguished keynote speakers,

Carol Dekkers, Dieter Rombach, Jari Still, Guntis Urtāns, as well as interesting tutorials and a collocated workshop.

We are thankful for the opportunity to serve as Program Co-chairs for this conference. The Program Committee members and reviewers provided excellent support in reviewing the papers. We are also grateful to the authors, presenters, and session chairs for their time and effort that made PROFES 2007 a success. The General Chair, Pasi Kuvaja, and the Steering Committee provided excellent guidance. We wish to thank the University of Latvia, the Fraunhofer Institute for Experimental Software Engineering (IESE), VTT, the University of Oulu and all the other sponsors and supporters for their contributions and making the event possible. We would especially like to thank the Organizing Chairs Darja Šmite and Juris Borzovs and the Local Organizing Committee for their highly engaged organization of the conference in Riga. Last but not least, many thanks to Timo Klein at Fraunhofer IESE for copyediting this volume.

April 2007

Jürgen Münch  
Pekka Abrahamsson

# Conference Organization

## General Chair

Pasi Kuvaja, University of Oulu (Finland)

## Program Co-chairs

Jürgen Münch, Fraunhofer IESE (Germany)

Pekka Abrahamsson, VTT Technical Research Centre (Finland)

## Organizing Co-chairs

Juris Borzovs, University of Latvia (Latvia)

Darja Šmite, University of Latvia (Latvia)

## Local Organizing Committee

Dainis Dosbergs, PR-Latvia (Latvia)

Krišs Rauhvargers, University of Latvia (Latvia)

## Program Committee

Pekka Abrahamsson, VTT Electronics, Finland

Bente Anta, Simula Research Laboratory, Norway

Andreas Birk, Software Process Management, Germany

Mark van den Brand, HvA & CWI, The Netherlands

Gerardo Canfora, University of Sannio at Benevento, Italy

Reidar Conradi, NTNU, Norway

Torgeir Dingsøy, Sintef, Norway

Tore Dybå, SINTEF, Norway

Jens Heidrich, Fraunhofer IESE, Germany

Martin Höst, Lund University, Sweden

Frank Houdek, DaimlerChrysler, Germany

Tua Huomo, VTT Electronics, Finland

Hajimu Iida, Nara Institute of Science and Technology, Japan

Katsuro Inoue, Osaka University, Japan

Yasushi Ishigai, IPA and Mitsubishi Research Institute, Japan

Janne Järvinen, Solid Information Technology, Finland

Erik Johansson, Q-Labs, Sweden

Philip Johnson, University of Hawaii, USA

Natalia Juristo, Universidad Politecnica de Madrid, Spain  
Tuomo Kähkönen, Nokia, Finland  
Haruhiko Kaiya, Shinshu University, Japan  
Kari Kansälä, Nokia Research Center, Finland  
Masafumi Katahira, JAXA, Japan  
Pasi Kuvaja, University of Oulu, Finland  
Makoto Matsushita, Osaka University, Japan  
Kenichi Matsumoto, NAIST, Japan  
Maurizio Morisio, University of Turin, Italy  
Mark Müller, Bosch, Germany  
Jürgen Münch, Fraunhofer IESE, Germany  
Paolo Nesi, University of Florence, Italy  
Risto Nevalainen, STTF, Finland  
Mahmood Niazi, Keele University, UK  
Hideto Ogasawara, Toshiba, Japan  
Dietmar Pfahl, University of Calgary, Canada  
Teade Punter, LAQUSO, The Netherlands  
Karl Reed, La Tobe University, Australia  
Günther Ruhe, University of Calgary, Canada  
Ioana Rus, Honeywell Aerospace, USA  
Outi Salo, VTT Electronics, Finland  
Kurt Schneider, University of Hannover, Germany  
Carolyn Seaman, UMBC, Baltimore, USA  
Michael Stupperich, DaimlerChrysler, Germany  
Markku Tukiainen, University of Joensuu, Finland  
Rini van Solingen, LogicaCMG, The Netherlands  
Matias Vierimaa, VTT Electronics, Finland  
Hironori Washizaki, National Institute of Informatics, Japan  
Claes Wohlin, Blekinge Institute of Technology, Sweden  
Bernard Wong, University of Technology Sydney, Australia

## External Reviewers

Nicola Boffoli, Software Engineering Research Laboratory, Italy  
Kyohei Fushida, Software Design Laboratory, Japan  
Ahmed Al-Emran, University of Calgary, Canada  
Maria Alaranta, Turku School of Economics, Finland  
Martin Solari, ORT University, Uruguay



# Lecture Notes in Computer Science

For information about Vols. 1–4488

please contact your bookseller or Springer

- Vol. 4600: H. Comon-Lundh, C. Kirchner, H. Kirchner (Eds.), *Rewriting, Computation and Proof*. XVI, 273 pages. 2007.
- Vol. 4595: D. BošnaĽvcki, S. Edelkamp (Eds.), *Model Checking Software*. X, 285 pages. 2007.
- Vol. 4592: Z. Kedad, N. Lammari, E. Métais, F. Meziane, Y. Rezgui (Eds.), *Natural Language Processing and Information Systems*. XIV, 442 pages. 2007.
- Vol. 4591: J. Davies, J. Gibbons (Eds.), *Integrated Formal Methods*. IX, 660 pages. 2007.
- Vol. 4590: W. Damm, H. Hermanns (Eds.), *Computer Aided Verification*. XV, 562 pages. 2007.
- Vol. 4589: J. Münch, P. Abrahamsson (Eds.), *Product-Focused Software Process Improvement*. XII, 414 pages. 2007.
- Vol. 4588: T. Harju, J. Karhumäki, A. Lepistö (Eds.), *Developments in Language Theory*. XI, 423 pages. 2007.
- Vol. 4587: R. Cooper, J. Kennedy (Eds.), *Data Management*. XIII, 259 pages. 2007.
- Vol. 4584: N. Karssemeijer, B. Lelieveldt (Eds.), *Information Processing in Medical Imaging*. XIII, 775 pages. 2007.
- Vol. 4583: S.R. Della Rocca (Ed.), *Typed Lambda Calculi and Applications*. X, 397 pages. 2007.
- Vol. 4582: J. Lopez, P. Samarati, J.L. Ferrer (Eds.), *Public Key Infrastructure*. XI, 375 pages. 2007.
- Vol. 4581: A. Petrenko, M. Veanes, J. Tretmans, W. Grieskamp (Eds.), *Testing of Software and Communicating Systems*. XII, 379 pages. 2007.
- Vol. 4578: F. Masulli, S. Mitra, G. Pasi (Eds.), *Fuzzy Logic and Applications*. XVIII, 693 pages. 2007. (Sublibrary LNAI).
- Vol. 4577: N. Sebe, Y. Liu, Y. Zhuang (Eds.), *Multimedia Content Analysis and Mining*. XIII, 513 pages. 2007.
- Vol. 4576: D. Leivant, R. de Queiroz (Eds.), *Logic, Language, Information, and Computation*. X, 363 pages. 2007.
- Vol. 4574: J. Derrick, J. Vain (Eds.), *Formal Techniques for Networked and Distributed Systems – FORTE 2007*. XI, 375 pages. 2007.
- Vol. 4573: M. Kauers, M. Kerber, R. Miner, W. Windsteiger (Eds.), *Towards Mechanized Mathematical Assistants*. XIII, 407 pages. 2007. (Sublibrary LNAI).
- Vol. 4572: F. Stajano, C. Meadows, S. Capkun, T. Moore (Eds.), *Security and Privacy in Ad-hoc and Sensor Networks*. X, 247 pages. 2007.
- Vol. 4570: H.G. Okuno, M. Ali (Eds.), *New Trends in Applied Artificial Intelligence*. XXI, 1194 pages. 2007. (Sublibrary LNAI).
- Vol. 4569: A. Butz, B. Fisher, A. Krüger, P. Olivier, S. Owada (Eds.), *Smart Graphics*. IX, 237 pages. 2007.
- Vol. 4566: M.J. Dainoff (Ed.), *Ergonomics and Health Aspects of Work with Computers*. XVIII, 390 pages. 2007.
- Vol. 4565: D.D. Schmorow, L.M. Reeves (Eds.), *Foundations of Augmented Cognition*. XIX, 450 pages. 2007. (Sublibrary LNAI).
- Vol. 4564: D. Schuler (Ed.), *Online Communities and Social Computing*. XVII, 520 pages. 2007.
- Vol. 4561: V.G. Duffy (Ed.), *Digital Human Modeling*. XXIII, 1068 pages. 2007.
- Vol. 4560: N. Aykin (Ed.), *Usability and Internationalization, Part II*. XVIII, 576 pages. 2007.
- Vol. 4559: N. Aykin (Ed.), *Usability and Internationalization, Part I*. XVIII, 661 pages. 2007.
- Vol. 4549: J. Aspnes, C. Scheideler, A. Arora, S. Madden (Eds.), *Distributed Computing in Sensor Systems*. XIII, 417 pages. 2007.
- Vol. 4548: N. Olivetti (Ed.), *Automated Reasoning with Analytic Tableaux and Related Methods*. X, 245 pages. 2007. (Sublibrary LNAI).
- Vol. 4547: C. Carlet, B. Sunar (Eds.), *Arithmetic of Finite Fields*. XI, 355 pages. 2007.
- Vol. 4546: J. Kleijn, A. Yakovlev (Eds.), *Petri Nets and Other Models of Concurrency – ICATPN 2007*. XI, 515 pages. 2007.
- Vol. 4545: H. Anai, K. Horimoto, T. Kutsia (Eds.), *Algebraic Biology*. XIII, 379 pages. 2007.
- Vol. 4544: S. Cohen-Boulakia, V. Tannen (Eds.), *Data Integration in the Life Sciences*. XI, 282 pages. 2007. (Sublibrary LNBI).
- Vol. 4543: A.K. Bandara, M. Burgess (Eds.), *Inter-Domain Management*. XII, 237 pages. 2007.
- Vol. 4542: P. Sawyer, B. Paech, P. Heymans (Eds.), *Requirements Engineering: Foundation for Software Quality*. IX, 384 pages. 2007.
- Vol. 4541: T. Okadome, T. Yamazaki, M. Makhtari (Eds.), *Pervasive Computing for Quality of Life Enhancement*. IX, 248 pages. 2007.
- Vol. 4539: N.H. Bshouty, C. Gentile (Eds.), *Learning Theory*. XII, 634 pages. 2007. (Sublibrary LNAI).
- Vol. 4538: F. Escolano, M. Vento (Eds.), *Graph-Based Representations in Pattern Recognition*. XII, 416 pages. 2007.
- Vol. 4537: K.C.-C. Chang, W. Wang, L. Chen, C.A. Ellis, C.-H. Hsu, A.C. Tsoi, H. Wang (Eds.), *Advances in Web and Network Technologies, and Information Management*. XXIII, 707 pages. 2007.

- Vol. 4536: G. Concas, E. Damiani, M. Scotto, G. Succi (Eds.), *Agile Processes in Software Engineering and Extreme Programming*. XV, 276 pages. 2007.
- Vol. 4534: I. Tomkos, F. Neri, J. Solé Pareta, X. Masip Bruin, S. Sánchez Lopez (Eds.), *Optical Network Design and Modeling*. XI, 460 pages. 2007.
- Vol. 4531: J. Indulska, K. Raymond (Eds.), *Distributed Applications and Interoperable Systems*. XI, 337 pages. 2007.
- Vol. 4530: D.H. Akehurst, R. Vogel, R.F. Paige (Eds.), *Model Driven Architecture- Foundations and Applications*. X, 219 pages. 2007.
- Vol. 4529: P. Melin, O. Castillo, L.T. Aguilar, J. Kacprzyk, W. Pedrycz (Eds.), *Foundations of Fuzzy Logic and Soft Computing*. XIX, 830 pages. 2007. (Sublibrary LNAI).
- Vol. 4528: J. Mira, J.R. Álvarez (Eds.), *Nature Inspired Problem-Solving Methods in Knowledge Engineering*, Part II. XXII, 650 pages. 2007.
- Vol. 4527: J. Mira, J.R. Álvarez (Eds.), *Bio-inspired Modeling of Cognitive Tasks*, Part I. XXII, 630 pages. 2007.
- Vol. 4526: M. Malek, M. Reitenspieß, A. van Moorsel (Eds.), *Service Availability*. X, 155 pages. 2007.
- Vol. 4525: C. Demetrescu (Ed.), *Experimental Algorithms*. XIII, 448 pages. 2007.
- Vol. 4524: M. Marchiori, J.Z. Pan, C.d.S. Marie (Eds.), *Web Reasoning and Rule Systems*. XI, 382 pages. 2007.
- Vol. 4523: Y.-H. Lee, H.-N. Kim, J. Kim, Y. Park, L.T. Yang, S.W. Kim (Eds.), *Embedded Software and Systems*. XIX, 829 pages. 2007.
- Vol. 4522: B.K. Ersbøll, K.S. Pedersen (Eds.), *Image Analysis*. XVIII, 989 pages. 2007.
- Vol. 4521: J. Katz, M. Yung (Eds.), *Applied Cryptography and Network Security*. XIII, 498 pages. 2007.
- Vol. 4519: E. Franconi, M. Kifer, W. May (Eds.), *The Semantic Web: Research and Applications*. XVIII, 830 pages. 2007.
- Vol. 4517: F. Boavida, E. Monteiro, S. Mascolo, Y. Koucheryavy (Eds.), *Wired/Wireless Internet Communications*. XIV, 382 pages. 2007.
- Vol. 4516: L. Mason, T. Drwiega, J. Yan (Eds.), *Managing Traffic Performance in Converged Networks*. XXIII, 1191 pages. 2007.
- Vol. 4515: M. Naor (Ed.), *Advances in Cryptology - EUROCRYPT 2007*. XIII, 591 pages. 2007.
- Vol. 4514: S.N. Artemov, A. Nerode (Eds.), *Logical Foundations of Computer Science*. XI, 513 pages. 2007.
- Vol. 4513: M. Fischetti, D.P. Williamson (Eds.), *Integer Programming and Combinatorial Optimization*. IX, 500 pages. 2007.
- Vol. 4511: C. Conati, K. McCoy, G. Paliouras (Eds.), *User Modeling 2007*. XVI, 487 pages. 2007. (Sublibrary LNAI).
- Vol. 4510: P. Van Hentenryck, L. Wolsey (Eds.), *Integration of AI and OR Techniques in Constraint Programming for Combinatorial Optimization Problems*. X, 391 pages. 2007.
- Vol. 4509: Z. Kobti, D. Wu (Eds.), *Advances in Artificial Intelligence*. XII, 552 pages. 2007. (Sublibrary LNAI).
- Vol. 4508: M.-Y. Kao, X.-Y. Li (Eds.), *Algorithmic Aspects in Information and Management*. VIII, 428 pages. 2007.
- Vol. 4507: F. Sandoval, A. Prieto, J. Cabestany, M. Graña (Eds.), *Computational and Ambient Intelligence*. XXVI, 1167 pages. 2007.
- Vol. 4506: D. Zeng, I. Gotham, K. Komatsu, C. Lynch, M. Thurmond, D. Madigan, B. Lober, J. Kvach, H. Chen (Eds.), *Intelligence and Security Informatics: Bio-surveillance*. XI, 234 pages. 2007.
- Vol. 4505: G. Dong, X. Lin, W. Wang, Y. Yang, J.X. Yu (Eds.), *Advances in Data and Web Management*. XXII, 896 pages. 2007.
- Vol. 4504: J. Huang, R. Kowalczyk, Z. Maamar, D. Martin, I. Müller, S. Stoutenburg, K.P. Sycara (Eds.), *Service-Oriented Computing: Agents, Semantics, and Engineering*. X, 175 pages. 2007.
- Vol. 4501: J. Marques-Silva, K.A. Sakallah (Eds.), *Theory and Applications of Satisfiability Testing - SAT 2007*. XI, 384 pages. 2007.
- Vol. 4500: N. Streitz, A. Kameas, I. Mavrommati (Eds.), *The Disappearing Computer*. XVIII, 304 pages. 2007.
- Vol. 4499: Y.Q. Shi (Ed.), *Transactions on Data Hiding and Multimedia Security II*. IX, 117 pages. 2007.
- Vol. 4498: N. Abdennahder, F. Kordon (Eds.), *Reliable Software Technologies - Ada Europe 2007*. XII, 247 pages. 2007.
- Vol. 4497: S.B. Cooper, B. Löwe, A. Sorbi (Eds.), *Computation and Logic in the Real World*. XVIII, 826 pages. 2007.
- Vol. 4496: N.T. Nguyen, A. Grzech, R.J. Howlett, L.C. Jain (Eds.), *Agent and Multi-Agent Systems: Technologies and Applications*. XXI, 1046 pages. 2007. (Sublibrary LNAI).
- Vol. 4495: J. Krogstie, A. Opdahl, G. Sindre (Eds.), *Advanced Information Systems Engineering*. XVI, 606 pages. 2007.
- Vol. 4494: H. Jin, O.F. Rana, Y. Pan, V.K. Prasanna (Eds.), *Algorithms and Architectures for Parallel Processing*. XIV, 508 pages. 2007.
- Vol. 4493: D. Liu, S. Fei, Z. Hou, H. Zhang, C. Sun (Eds.), *Advances in Neural Networks - ISNN 2007, Part III*. XXVI, 1215 pages. 2007.
- Vol. 4492: D. Liu, S. Fei, Z. Hou, H. Zhang, C. Sun (Eds.), *Advances in Neural Networks - ISNN 2007, Part II*. XXVII, 1321 pages. 2007.
- Vol. 4491: D. Liu, S. Fei, Z.-G. Hou, H. Zhang, C. Sun (Eds.), *Advances in Neural Networks - ISNN 2007, Part I*. LIV, 1365 pages. 2007.
- Vol. 4490: Y. Shi, G.D. van Albada, J. Dongarra, P.M.A. Sloot (Eds.), *Computational Science - ICCS 2007, Part IV*. XXXVII, 1211 pages. 2007.
- Vol. 4489: Y. Shi, G.D. van Albada, J. Dongarra, P.M.A. Sloot (Eds.), *Computational Science - ICCS 2007, Part III*. XXXVII, 1257 pages. 2007.

# Table of Contents

## Keynote Addresses

Software Development and Globalization (Abstract) .....	1
<i>H. Dieter Rombach</i>	
Software Development Globalization from the Baltic Perspective (Abstract) .....	2
<i>Guntis Urtāns</i>	
Experiences in Applying Agile Software Development in F-Secure (Abstract) .....	3
<i>Jari Still</i>	
People Side of IT Globalization (Abstract) .....	4
<i>Carol Dekkers</i>	

## Global Software Development

An Industrial Survey of Software Outsourcing in China .....	5
<i>Jianqiang Ma, Jingyue Li, Weibing Chen, Reidar Conradi, Junzhong Ji, and Chunnian Liu</i>	
Understanding Lacking Trust in Global Software Teams: A Multi-Case Study .....	20
<i>Nils Brede Moe and Darja Šmite</i>	
Utilization of a Set of Software Engineering Roles for a Multinational Organization .....	35
<i>Claude Y. Laporte, Mikel Doucet, Pierre Bourque, and Youssef Belkébir</i>	

## Software Process Improvement

Software Verification Process Improvement Proposal Using Six Sigma...	51
<i>Tihana Galinac and Željka Car</i>	
Software Development Improvement with SFIM .....	65
<i>René Krikhaar and Martin Mermans</i>	
SPI-KM - Lessons Learned from Applying a Software Process Improvement Strategy Supported by Knowledge Management .....	81
<i>Gleison Santos, Mariano Montoni, Sávio Figueiredo, and Ana Regina Rocha</i>	

Organisational Readiness and Software Process Improvement .....	96
<i>Mahmood Niazi, David Wilson, and Didar Zowghi</i>	
Software Process Improvement Through Teamwork Management .....	108
<i>Esperança Amengual and Antònia Mas</i>	
De-motivators of Software Process Improvement: An Analysis of Vietnamese Practitioners' Views .....	118
<i>Mahmood Niazi and Muhammad Ali Babar</i>	

**Software Process Modeling and Evolution**

Defining Software Processes Through Process Workshops: A Multicase Study .....	132
<i>Finn Olav Bjørnson, Tor Stålhane, Nils Brede Moe, and Torgeir Dingsøy</i>	
Improving an Industrial Reference Process by Information Flow Analysis: A Case Study .....	147
<i>Kai Stapel, Kurt Schneider, Daniel Lübke, and Thomas Flohr</i>	
Connecting the Rationale for Changes to the Evolution of a Process ...	160
<i>Alexis Ocampo and Martin Soto</i>	

**Industrial Experiences**

Use of Non-IT Testers in Software Development.....	175
<i>Vineta Arnican</i>	
Requirements Management Practices as Patterns for Distributed Product Management.....	188
<i>Antti Välimäki and Jukka Kääräinen</i>	
SPI Consulting in a Level 1 Company: An Experience Report .....	201
<i>Tomas Schweigert and Michael Philipp</i>	

**Agile Software Development**

On the Effects of Pair Programming on Thoroughness and Fault-Finding Effectiveness of Unit Tests .....	207
<i>Lech Madeyski</i>	
An Agile Toolkit to Support Agent-Oriented and Service-Oriented Computing Mechanisms .....	222
<i>Asif Qumer and Brian Henderson-Sellers</i>	
Achieving Success in Supply Chain Management Software by Agility ...	237
<i>Deepti Mishra and Alok Mishra</i>	

## Software Measurement

Software Measurement Programs in SMEs – Defining Software Indicators: A Methodological Framework .....	247
<i>María Díaz-Ley, Félix García, and Mario Piattini</i>	
Smart Technologies in Software Life Cycle .....	262
<i>Zane Bičevska and Jānis Bičevskis</i>	
Convertibility Between IFPUG and COSMIC Functional Size Measurements .....	273
<i>Juan Jose Cuadrado-Gallego, Daniel Rodríguez, Fernando Machado, and Alain Abran</i>	
A Framework for Measuring and Evaluating Program Source Code Quality .....	284
<i>Hironori Washizaki, Rieko Namiki, Tomoyuki Fukuoka, Yoko Harada, and Hiroyuki Watanabe</i>	
Software Fault Prediction with Object-Oriented Metrics Based Artificial Immune Recognition System .....	300
<i>Cagatay Catal and Banu Diri</i>	

## Simulation and Decision Support

Operational Planning, Re-planning and Risk Analysis for Software Releases .....	315
<i>Ahmed Al-Emran and Dietmar Pfahl</i>	
Project Cost Overrun Simulation in Software Product Line Development .....	330
<i>Makoto Nonaka, Liming Zhu, Muhammad Ali Babar, and Mark Staples</i>	
E-Service Architecture Selection Based on Multi-criteria Optimization .....	345
<i>Edzus Zeiris and Maris Zieme</i>	

## Processes and Methods

A Component-Based Process for Developing Automotive ECU Software .....	358
<i>Jin Sun Her, Si Won Choi, Du Wan Cheun, Jeong Seop Bae, and Soo Dong Kim</i>	
A Systematic Approach to Service-Oriented Analysis and Design .....	374
<i>Soo Ho Chang and Soo Dong Kim</i>	

Improving the Problem Management Process from Knowledge  
Management Perspective ..... 389  
    *Marko Jäntti, Aki Miettinen, Niko Pykkänen, and  
    Tommi Kainulainen*

**Workshop**

Experience on Applying Quantitative and Qualitative Empiricism to  
Software Engineering (Workshop Description) ..... 402  
    *Marcus Ciolkowski and Andreas Jedlitschka*

**Tutorials**

Using Metrics to Improve Software Testing (Tutorial Description) ..... 405  
    *Alfred Sorkowitz*

Increase ICT Project Success with Concrete Scope Management  
(Tutorial Description) ..... 407  
    *Carol Dekkers and Pekka Forselius*

Agile Software Development: Theoretical and Practical Outlook  
(Tutorial Description) ..... 410  
    *Pekka Abrahamsson and Jari Still*

**Author Index** ..... 413

# **Software Development and Globalization**

H. Dieter Rombach

Chairman, ICT Group, Fraunhofer Gesellschaft e.V.,  
Executive Director, Fraunhofer IESE, Kaiserslautern,  
Software Engineering Chair, CS Dept., University of Kaiserslautern

Developing software across borders has become an emerging area of software engineering. It is one of the important competitive advantages in today's industry. However, the increased globalization of software development creates many challenges brought by distribution of software life cycle activities among teams separated by various boundaries, such as contextual, organizational, cultural, temporal, geographical, and political.

# **Software Development Globalization from the Baltic Perspective**

Guntis Urtāns

President of SWH Technology

Future predictions say that together with its neighbors Estonia and Lithuania, Latvia will be a major outsourcing center for Northern / continental Europe. The Baltic region is known for its well-educated and multinational workforce, one of the most efficient tax systems in Europe, a liberal economy, great affinity with Nordics, and identical legislation. So, where have we been 15 years ago and where are we now?



# **Experiences in Applying Agile Software Development in F-Secure**

Jari Still

F-Secure Oy's Oulu Office site manager

To develop security software is clearly one of the most challenging software development areas. The challenges are both technical and business based. From the business point of view, the security market is mature and highly competitive, although market needs can change even daily and there is no room for mistakes. Technically, the challenge is the ability to find and catch the threats as soon as they arise.

F-Secure has been one of the leading companies in applying agile software development methods, even though F-Secure works with most challenging requirements like security criticality, short time-to-market, frequently changing requirements, and high quality. At the moment, F-Secure has a software product life cycle process, which is built on agile methods. The difference to the earlier process, which was based on "mature" models, is significant. This keynote speech will address those differences and describe the experiences F-Secure has made with agile methods.