

# ESEC/FSE 2007 Chairs' Welcome

After more than two years preparation and thanks to the work of a team of more than 60 people (not counting authors and external reviewers), the day has arrived and we are thrilled to welcome you to ESEC/FSE'07, the *6th joint meeting of the European Software Engineering Conference and the ACM SIGSOFT Symposium on the Foundations of Software Engineering*. We hope you will enjoy the rich and exciting program resulting from this team effort, which is conveyed in these two-volume Proceedings.

The main volume includes the traditional research track, with 42 highest quality papers selected by the ESEC/FSE Program Committee among the record number of 251 submissions (with a resulting acceptance rate of 16.7%). The selection followed a two-phase process, according to which all accepted papers passed through two consecutive review stages, receiving at least three independent reviews, in several cases four or more. For drawing final decisions, the whole PC met in Minneapolis on May 25-27, discussing around one hundred papers. Among these, the PC also selected twenty nice-idea works for Poster exhibition, two of which have then been withdrawn by the authors, resulting in the eighteen short papers included in the companion volume.

We have probably signed another record with the most dynamic PC composition: during the journey seven of the 33 originally appointed researchers left the group for differing *force-majeure* causes (the nicest ones are two new babies arriving). ESEC/FSE PC duties include the mandatory participation to the paper selection meeting, and members who could not attend it had to resign. The decrease of PC size resulted in an augmented reviewing workload for the remaining members, who reviewed up to 25 submissions each; the best gratification to this hard work are the several positive feedback messages received from authors of rejected papers for the competent and informative reviews. We are highly grateful to all PC members for their effort and dedication, and to all the many additional reviewers for their indispensable support; among the latter a special thank to Bran Selic (ex-PC member who resigned after reviewing his assigned papers in both phases).

The main volume also includes papers of the invited presentations, featuring the opening keynote talk by Roberto Siagri, President and CEO of Eurotech, who envisages how the computers of the next future will be hidden everywhere into the surrounding environment to provide us with an augmented reality, that he calls a "Computational Exoskeleton". The *2007 ACM SIGSOFT Outstanding Research Award* recipient is Elaine Weyuker from AT&T Labs-Research; based on her five-years experience with investigating fault patterns in large systems, she focuses on the complete path for doing good Software Engineering research, all along from problem inception to eventually packaging the results and making them accessible to practitioners. The main conference program also includes a tribute to Dean Rosenzweig, Professor at Zagreb University, who recently passed away, presented by Andre Scedrov from the University of Pennsylvania, and an outline of next-coming opportunities in the seventh Framework Program by Paolo Bresciani, Project Officer of the European Commission.

The companion volume to ESEC/FSE offers a rich selection of other related events. To the benefit of all ESEC/FSE attendees, we decided this year not to have as by tradition a separate tutorials track, but rather to package within the main program a series of State-of-the-Art (SOTA) presentations on up-to-date Software Engineering themes provided by leading researchers: Steffen Staab from the University of Koblenz-Landau overviews ontology technologies and the Semantic web, Marta Kwiatkowska from Oxford University presents probabilistic model checking, and Walt Scacchi from University of California, Irvine, reviews free and open source software development. Another novelty launched this year is the Widened Software Engineering (WISE) track, which explicitly aims at widening international participation. The main program is preceded by eight focused Workshops on advanced research themes, for which a short summary is

provided by the organizers of each workshop, and by the traditional Doctoral Symposium, of which we include extended abstracts.

The location of ESEC/FSE 2007 could not be more charming: we meet in Cavtat near Dubrovnik in the beautiful Croatia region. The social program includes a boat trip to the welcome reception held at the historical place Sponza Palace in the old city of Dubrovnik, a Unesco World Heritage site, and the conference dinner on the Lido terrace of the Croatia Hotel, with an astonishing view on the sea, the Cavtat peninsula and Dubrovnik on the horizon. Finally, for the many Software Engineering passionate runners, we are proud to announce a primer: the SE.run( ) 5/10k Race.

We would like to thank all ESEC/FSE organizers who built with us the scientific program. In particular we are grateful to the Workshop Chairs, Amy Murphy and Matthew Dwyer; the SOTA Chairs, Mehdi Jazayeri and David Rosenblum; the WISE co-Chair, Henry Muccini; the Doctoral Symposium Chair, Carlo Ghezzi; and the Posters Chair, Eda Marchetti. We would also like to thank Paola Inverardi, Chair of the ESEC Steering committee, and William Griswold, Chair of ACM SIGSOFT, for their continuous and expert backup and advice. Finally Adrienne Griscti and Lisa Tolles took care of Proceedings editing and publication.

Many people aided in the organization of the conference. Our sincere gratitude goes to the Local Chair Ivana Podnar Žarko, the Publicity Chair Stefan Biffl, the Web Masters Damir Isovici and Huseyin Aysan. Ignac Lovrek and Srećko Krile have ensured the support from the local universities and Marija Šebalj helped in many local arrangements. Richard van de Stadt provided daily (and nightly) assistance with the on-line reviewing system during the submission and review periods. Thanks to all of them.

ACM, ACM SIGSOFT and CEPIS have sponsored the conference and marked its quality. PROGRESS Research Centre at Mälardalen University, the CNR Department of ICT, the Institute of Information Science and Technologies ISTI-CNR, the Faculty of Electrical Engineering and Computing from University of Zagreb, and the University of Dubrovnik have provided support in many different ways. Finally our special appreciation goes to ESEC/FSE'07 supporters: the Croatian Ministry of Science, Education and Sport, Microsoft Research, Microsoft Croatia, ERCIM, Ericsson Nikola Tesla, Nokia, SAP Croatia, ABB, Crucial Technology, Micron and ONION.

We wish that you will enjoy participating to the event and reading the Proceedings as much as we truly enjoyed preparing them, and that you will bring back home nice memories and inspirations.

**Antonia Bertolino**

*Program Chair  
ISTI-CNR, Italy*

**Ivica Crnkovic**

*General Chair  
Mälardalen University, Sweden*

# ESEC/FSE'07 Organization

**General Chair:** Ivica Crnkovic (*Mälardalen University, Sweden*)

**Program Chair:** Antonia Bertolino (*ISTI-CNR, Italy*)

**Workshops Chairs:** Matthew Dwyer (*University of Nebraska, Lincoln, USA*)  
Amy Murphy (*FBK-IRST, Italy and University of Lugano, Switzerland*)

**WISE Chairs:** Antonia Bertolino (*ISTI-CNR, Italy*)  
Henry Muccini (*Università dell'Aquila, Italy*)

**State-of-the-Art Presentations Chairs:** Mehdi Jazayeri (*University of Lugano and Technical University of Vienna*)  
David Rosenblum (*University College London, U.K.*)

**Doctoral Symposium Chair:** Carlo Ghezzi (*Politecnico di Milano, Italy*)

**Posters Chair:** Eda Marchetti (*ISTI-CNR, Italy*)

**Local Arrangements Chair:** Ivana Podnar (*University of Zagreb, Croatia*)

**Publicity Chair:** Stefan Biffl (*Vienna University of Technology, Austria*)

**Web Chairs:** Damir Isovici (*Mälardalen University, Sweden*)  
Hüseyin Aysan (*Mälardalen University, Sweden*)

**ESEC/FSE Program Committee:** Gerardo Canfora (*University of Sannio, Italy*)  
S.C. Cheung (*Hong Kong University of Science and Technology, Hong Kong*)  
Lori Clarke (*University of Massachusetts, USA*)  
Prem Devanbu (*University of California, Davis, USA*)  
Laurie Dillon (*Michigan State University, USA*)  
Sebastian Elbaum (*University of Nebraska, Lincoln, USA*)  
Michael Ernst (*MIT, USA*)  
Jacky Estublier (*Grenoble University, France*)  
Harald Gall (*University of Zurich, Switzerland*)  
Constance Heitmeyer (*Naval Research Laboratory, USA*)  
James Herbsleb (*Carnegie Mellon University, USA*)  
Paola Inverardi (*Università dell'Aquila, Italy*)  
Ignac Lovrek (*University of Zagreb, Croatia*)  
Cecilia Mascolo (*University College London, U.K.*)  
Raffaella Mirandola (*Politecnico di Milano, Italy*)  
Kumiyo Nakakoji (*University of Tokyo and SRA-KTL Inc., Japan*)  
Alessandro Orso (*Georgia Institute of Technology, USA*)  
Corina Pasareanu (*NASA Ames, USA*)  
Sriram K. Rajamani (*Microsoft Research, India*)

**ESEC/FSE Program Committee**

**(continued):** Wilhelm Schäfer (*University of Paderborn, Germany*)  
Heinz Schmidt (*RMIT University, Australia*)  
Sebastian Uchitel (*University of Buenos Aires, Argentina and Imperial College London, U.K.*)  
André van der Hoek (*University of California, Irvine, USA*)  
Claes Wohlin (*Blekinge Institute of Technology, Sweden*)  
Alexander Wolf (*University of Lugano, Switzerland*)  
Apostolos Zarras (*University of Ioannina, Greece*)

**WISE Program Committee:** Judith Bishop (*University of Pretoria, South Africa*)  
Alan Hartman (*IBM Research, Israel*)  
Zhiming Liu (*United Nations University, Macao*)  
Ignac Lovrek (*University of Zagreb, Croatia*)  
Mary Lou Soffa (*University of Virginia, USA*)  
R. Venkatesh (*TATA Consultancy Services, India*)  
Marlon Vieira (*Siemens Corporate Research, USA*)  
Dany Yankelevich (*Pragma Consultores, Argentina*)  
Jian Zhang (*Chinese Academy of Sciences, China*)

**Doctoral Symposium Committee:** Lee Osterweil (*University of Massachusetts, Amherst, USA*)  
Richard A. Kemmerer (*University of California, Santa Barbara, USA*)  
Jeff Kramer (*Imperial College London, U.K.*)  
Axel van Lamsweerde (*Université Catholique de Louvain, Belgium*)

**Supporting Staff:** Srećko Krile (*University of Dubrovnik*)  
Harriet Ekwall (*Mälardalen University, Sweden*)  
Daniela Mulas (*ISTI-CNR, Italy*)  
Alberto Ribolini (*ISTI-CNR, Italy*)  
Marija Sebalj (*Hotel Croatia, Cavtat, Croatia*)  
Monica Wasell (*Mälardalen University, Sweden*)

<b>ESEC/FSE additional reviewers:</b>	Saswat Anand	Martin Hirsch	Jeff Rose
	Taweessup Apiwattanapong	Yi Huang	Matthew Rutherford
	Myla Archer	Darko Huljenic	Joseph Ruthruff
	Shay Artzi	Michel Jaring	Antonino Sabetta
	Björn Axenath	Ralph D. Jeffords	Mehrdad Sabetzadeh
	George Baah	Johan Jeuring	Michele Sama
	Ramesh Bharadwaj	Gordan Jezic	Raul Santelices
	Christian Bimmermann	Lingxiao Jiang	Beata Sarna-Starosta
	Chris Bird	James A. Jones	Zach Saul
	Bruno Blaskovic	Damir Kalpic	Fernando Schapachnik
	Nikola Bogunovic	Toshihiro Kamiya	David Schmelter
	Victor Braberman	Peter Kampstra	Bran Selic
	Zeljka Car	Nicolas Kicillof	Daniel Skrobo
	Wing-Kwong Chan	Gregor Kiczales	Yannis Smaragdakis
	Bin Chen	Adam Kiezun	Sinisa Sribljic
	James Clause	Sunghun Kim	Christian Stefansen
	Myra Cohen	Patrick Knab	Sarah Thompson
	Vittorio Cortellessa	Alex Kinneer	Matthias Tichy
	Antiniscia Di Marco	Rene Krikhaar	Massimo Tivoli
	Massimiliano Di Penta	Erald Kulk	Dietrich Travkin
	Davide Di Ruscio	Krishna Kumar Mehra	Luigi Troiano
	Damiano Distanto	Mario Kusek	Krunoslav Trzec
	Matthew Dwyer	Lukasz Kwiatkowski	Pieter van der Spek
	Laurenz Eveleens	Elizabeth I. Leonard	Adam Vanya
	Jean-Marie Favre	Emmanuel Letier	Panos Vassiliadis
	Dario Fischbein	Christian Lindig	Kapil Vaswani
	Gerhard Fischer	Eda Marchetti	Niels Veerman
	Marc Fisher	Andy Maule	German Vega
	Scott D. Fleming	Matthias Meier	Lakshmisubrahmanyam Velaga
	Beat Fluri	Paul S. Miner	Zhimin Wang
	Franca Garzotto	Osamu Mizuno	Bruno Wassermann
	Matthias Gehrke	Prasad G. Naldurg	Gary Wasserman
	Mihaela Gheorghiu Bobaru	Aditya V. Nori	Michael Würsch
	Emanuel Giger	Johann Oberleitner	Tao Xie
	Ryan M. Golbeck	Masao Ohira	Yunwen Ye
	Madhu Gopinathan	Ronald Olsson	Yuen-Tak Yu
	Vincenzo Grassi	Robert Palmer	Vadim Zaytsev
	Joel Greenyer	Patrizio Pelliccione	Charles Zhang
	Bhargav S. Gulavani	Suzette Person	Jianjun Zhao
	William Halfond	Milos Prvulovic	Yoav Zibin
	Cyrus Hall	Franco Raimondi	Eugenio Zimeo
	Madeline Hardojo Diep	Hridesh Rajan	
	Stefan Henkler	Gerald Reif	

# ESEC/FSE 2007

Dubrovnik, Croatia

September 3 - 7, 2007



The 6th Joint Meeting of the European Software Engineering Conference and the ACM SIGSOFT Symposium on the Foundations of Software Engineering

## ESEC-FSE 2007 Companion Table of Contents

### ESEC/FSE 2007 Chairs' Welcome

A. Bertolino (*Program Chair / ISTI-CNR, Italy*)

I. Crnkovic (*General Chair / Mälardalen University, Sweden*)

### ESEC/FSE'07 Organization

### ESEC/FSE'07 Additional Reviewers

### State-of-the-Art Presentations

#### Foreword to State-of-the-Art Presentations (Page 437)

SoTA Co-Chairs: M. Jazayeri (*University of Lugano & Technical University of Vienna*) and D. S. Rosenblum (*University College London*)

#### On Marrying Ontological and Metamodeling Technical Spaces (Page 439)

F. Silva Parreiras (*University of Koblenz-Landau*)

S. Staab (*University of Koblenz-Landau*)

A. Winter (*Johannes-Gutenberg-University Mainz*)

#### Quantitative Verification: Models, Techniques and Tools (Page 449)

M. Kwiatkowska (*Oxford University*)

#### Free/Open Source Software Development: Recent Research Results and Emerging Opportunities (Page 459)

W. Scacchi (*University of California at Irvine*)

### Widened Software Engineering

#### Welcome to the WISE Track (Page 469)

WISE Program Co-chairs: A. Bertolino (*ISTI-CNR*) & H. Muccini (*Università dell'Aquila*)

#### Practicum in Software Project Management – An Endeavor to Effective and Pragmatic Software Project Management Education (Page 471)

M.-e. Maqsood (*National University of Computer & Emerging Sciences*)

T. Javed (*National University of Computer & Emerging Sciences*)

#### A Survey of Web Engineering Practice in Small Jordanian Web Development Firms (Page 481)

A. El Sheikh (*The Arab Academy for Banking and Financial Sciences*)

H. Tarawneh (*The Arab Academy for Banking and Financial Sciences*)

#### Building a Research University Ecosystem: The Case of Software Engineering Education at Sofia University (Page 491)

R. Nikolov (*Sofia University*)

S. Ilieva (*Sofia University*)

### ESEC/FSE'07 Posters

#### Exploring Motivational Differences between Software Developers and Project Managers (Page 501)

H. Sharp (*Open University*)

T. Hall (*University of Hertfordshire*)

N. Baddoo (*University of Hertfordshire*)

S. Beecham (*University of Hertfordshire*)

#### Product Integration Improvement Based on Analysis of Build Statistics (Page 505)

S. Larsson (*Mälardalen University*)  
P. Myllyperikö (*ABB Distribution Automation*)  
F. Ekdahl (*ABB Robotics*)

**A Case Study in Assessing and Improving Capacity Using an Anatomy of Good Practice** (Page 509)

M. Patel (*Ericsson AB*)  
A. Borg (*Linköping University*)  
K. Sandahl (*Linköping University*)

**Efficient Token Based Clone Detection with Flexible Tokenization** (Page 513)

H. A. Basit (*Lahore University of Management Sciences*)  
S. J. Puglisi (*Curtin University of Technology*)  
W. F. Smyth (*McMaster University*)  
A. Turpin (*RMIT University*)  
S. Jarzabek (*National University of Singapore*)

**A Segment-based Approach for Reconcilable Model Transformation** (Page 517)

X. Zhou (*IBM China Research Laboratory*)  
Y. Liu (*IBM China Research Laboratory*)  
J. Zhu (*IBM China Research Laboratory*)

**A Behavioural Model for Product Families** (Page 521)

A. Fantechi (*Università degli Studi di Firenze*)  
S. Gnesi (*ISTI-CNR*)

**A Specification-based Approach to Testing Software Product Lines (Poster Paper)** (Page 525)

E. Uzuncaova (*The University of Texas at Austin*)  
D. Garcia (*The University of Texas at Austin*)  
S. Khurshid (*The University of Texas at Austin*)  
D. Batory (*The University of Texas at Austin*)

**A Profile-Driven Statistical Analysis Framework for the Design Optimization of Soft Real-Time Applications** (Page 529)

T. Kumar (*Georgia Institute of Technology*)  
J. Sreeram (*Georgia Institute of Technology*)  
R. Cledat (*Georgia Institute of Technology*)  
S. Pande (*Georgia Institute of Technology*)

**A Study of Interleaving Coverage Criteria** (Page 533)

S. Lu (*University of Illinois at Urbana-Champaign*)  
W. Jiang (*University of Illinois at Urbana-Champaign*)  
Y. Zhou (*University of Illinois at Urbana-Champaign*)

**An Iterative, Multi-Level, and Scalable Approach to Comparing Execution Traces** (Page 537)

A. V. Miransky (*University of Western Ontario*)  
N. H. Madhavji (*University of Western Ontario*)  
M. S. Gittens (*IBM Canada Ltd.*)  
M. Davison (*University of Western Ontario*)  
M. Wilding (*IBM Canada Ltd.*)  
D. Godwin (*IBM Canada Ltd.*)

**State Coverage: A Structural Test Adequacy Criterion for Behavior Checking** (Page 541)

K. Koster (*Agitar Software Laboratories*)  
D. Kao (*Agitar Software Laboratories*)

**Quantifying the Effectiveness of Testing via Efficient Residual Path Profiling** (Page 545)

T. M. Chilimbi (*Microsoft Research Redmond*)  
A. V. Nori (*Microsoft Research India*)  
K. Vaswani (*Indian Institute of Science*)

**Differential Testing: A new approach to change detection** (Page 549)

R. B. Evans (*Agitar Software Laboratories*)  
A. Savoia (*Agitar Software Laboratories*)

**Directed Test Generation using Symbolic Grammars** (Page 553)

R. Majumdar (*University of California at Los Angeles*)  
R.-G. Xu (*University of California at Los Angeles*)

**Towards Incremental Adaptive Covering Arrays** (Page 557)

S. Fouché (*University of Maryland*)  
M. B. Cohen (*University of Nebraska-Lincoln*)

A. Porter (*University of Maryland*)

**Predictive Testing: Amplifying the Effectiveness of Software Testing** (Page 561)

P. Joshi (*University of California at Berkeley*)

K. Sen (*University of California at Berkeley*)

M. Shlimovich (*University of California at Berkeley*)

**Using Groupings of Static Analysis Alerts to Identify Files Likely to Contain**

**Field Failures** (Page 565)

M. S. Sherriff (*North Carolina State University*)

S. Smith Heckman (*North Carolina State University*)

J. M. Lake (*IBM*)

L. A. Williams (*North Carolina State University*)

**On Impact-Oriented Automatic Resolution of Pervasive Context**

**Inconsistency** (Page 569)

C. Xu (*The Hong Kong University of Science and Technology*)

S. C. Cheung (*The Hong Kong University of Science and Technology*)

W. K. Chan (*City University of Hong Kong*)

C. Ye (*The Hong Kong University of Science and Technology*)

## Doctoral Symposium

**Foreword to the Doctoral Symposium** (Page 573)

C. Ghezzi (*DEI-Politecnico di Milano*)

**Visualising Exemplary Program Values** (Page 575)

M. Stefaniak (*Warsaw University*)

**An Analysis of Developers' Tasks using Low-Level, Automatically Collected Data** (Page 579)

I. D. Coman (*Free University of Bolzano/Bozen*)

**Composition and Tradeoff of Non-Functional Attributes in Software Systems: Research Directions** (Page 583)

P. Potena (*Università "G.D'Annunzio"*)

**Model-Driven Test-Case Construction** (Page 587)

S. Baerisch (*University of Oldenburg & GESIS*)

**SLEDE: Lightweight Verification of Sensor Network Security Protocol Implementations** (Page 591)

Y. Hanna (*Iowa State University*)

**Analysis of a Deployed Software** (Page 595)

M. M. Diep (*University of Nebraska-Lincoln*)

**Component Airbag: a Novel Approach to Develop Dependable Component-Based Applications** (Page 599)

R. Pietrantuono (*Università degli Studi di Napoli Federico II*)

**A Model-Driven Approach to Generating User Interfaces** (Page 603)

S. Kavaldjian (*Vienna University of Technology*)

## Workshops Summaries

**SYANCO 2007: International Workshop on Synthesis and Analysis of Component Connectors** (Page 607)

F. Arbab (*Centre for Mathematics and Computer Science (CWI)*)

C. Baier (*Technische Universität Dresden*)

**Specification and Verification of Component-Based Systems 2007** (Page 609)

J. Aldrich (*Carnegie Mellon University*)

M. Barnett (*Microsoft Research*)

D. Giannakopoulou (*RIACS/NASA Ames Research Center*)

G. T. Leavens (*Iowa State University*)

N. Sharygina (*University of Lugano*)

**IWPSE 2007 – 9th International Workshop on Principles of Software Evolution** (Page 611)

M. Di Penta (*University of Sannio*)

M. Lanza (*University of Lugano*)

**2nd International Workshop on Service Oriented Software Engineering (IW-SOSWE 2007)** (Page 613)

E. Di Nitto (*Politecnico di Milano*)

A. Polini (*Università di Camerino*)

A. Zisman (*City University*)



**SOQUA 2007 4th International Workshop on Software Quality Assurance** (Page 615)

G. Denaro (*University of Lugano & University of Milano-Bicocca*)

M. Pezzè (*University of Milano-Bicocca*)

O. Shehory (*Haifa University*)

**EFTS 2007 – the 2nd International Workshop on Engineering Fault Tolerant Systems** (Page 617)

N. Guelfi (*University of Luxembourg*)

H. Muccini (*University of L'Aquila*)

P. Pelliccione (*University of L'Aquila*)

A. Romanovsky (*Newcastle University*)

**Engineering Software Services for Pervasive Environments** (Page 619)

A. L. Wolf (*Imperial College London*)

**Domain Specific Approaches to Software Test Automation** (Page 621)

A. Hartman (*Haifa University*)

M. Katara (*Tampere University of Technology*)

A. Paradkar (*IBM Watson Research Laboratory*)