

# Raffaella Mirandola: curriculum vitæ et studiorum

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*Institution* Politecnico di Milano, Dipartimento di Elettronica, Informazione e Bioingegneria  
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## EDUCATION

- Ph.D. in Computer Science, University of Roma Tor Vergata, Italy, 1994.
- M.Sc. in Computer Science University of Pisa, Italy, 1989.

## ACADEMIC EXPERIENCE

I am Associate Professor at Dipartimento di Elettronica, Informazione e Bioingegneria, Politecnico di Milano. I annually teach basic and advanced courses on software engineering and on computer systems. I am an active member of the scientific community and I regularly serve in international program committees and as a referee for top-ranked journals. I'm a member of the editorial board of the IEEE Transactions of Software Engineering and of the Journal of System and Software (Elsevier). I also organized several international conferences and workshops as Program Chair or General Chair and co-organized two Dagstuhl Seminars.

## RESEARCH AREAS

My main research interests are in:

- Software quality requirements modeling, analysis and verification
- Formal methods for (self-)adaptive dependable IT systems
- Model- driven software engineering

and the application of the theories, approaches and techniques specific to the above research areas to *service-oriented* and *component-based* systems, *adaptive systems*, *mobile systems*, and *cloud computing*. My research has been funded by several national and international projects, among which the FP7 European project Q-ImPrESS: Quality Impact Prediction for Evolving Service-Oriented Software, for which I was Scientific Responsible and also local responsible for Politecnico.

## SCIENTIFIC RESULTS

- Co-author of 28 top-ranked journal publications;
- Co-author of 13 chapters in scientific books;
- Co-author of 87 scientific publications on peer-reviewed conferences/workshops (with one Best Paper Award).
- Based on Google Scholar (03/11/2015), my h-index is 289 with 3967 as a total number of citations.

Specifically, an important research contribution concerns the definition of formal models at runtime and their usage in the area of service-oriented application. The obtained results are widely cited in the literature, see for example the citations of Google Scholar for the *ICSE paper* [IC.34], the *IEEE Transaction on Software Engineering paper* [JR.15], the *Communication of the ACM paper* [JR.11] and the *IEEE Transaction on Software Engineering paper* [JR.14]. Besides, the research result concerning the definition and generation of quality models at design time, with the definition of PRIMA-UML represents a seminal work in this area, widely cited in the reading list of academic courses and in the literature, see for example the citations of Google Scholar for the *WOSP paper* [IC.64] and the *Science of Computer Programming paper* [JR.21]. A contribution in the area of Model Driven Engineering has been the definition of the pivot language KLAPER, which is widely cited in the literature, see for example the citations of Google Scholar for the *Journal of System and Software paper*

[JR.18]. Besides, for component-based systems a common case study has been defined and presented in the *Springer Book* [BK.1], which is becoming a baseline for this research area (see for example the citations of Google Scholar).

# Position and Education

## RECORD OF EMPLOYMENT

*August 2011 – present*

Associate Professor at Dipartimento di Elettronica, Informazione e Bioingegneria, Politecnico di Milano

*November 2005 – July 2011*

Assistant Professor at Dipartimento di Elettronica e Informazione, Politecnico di Milano

*November 1997 – October 2005*

Assistant Professor at the Computer Science Department, University of Rome Tor Vergata

*November 1995 – October 1997*

Post-Doc Fellow at the Computer Science Department, University of Rome Tor Vergata

## EDUCATION

- Ph.D. in Computer Science, University of Roma Tor Vergata, Italy, 1994.  
Title: *Hierarchical models for performance evaluation of computer and communication systems*
- M.Sc. in Computer Science University of Pisa, Italy, 1989.  
(Thesis title: *Hybrid simulation and variance reduction methods for performance evaluation of queueing network models*)

# Research interests

My main research interests are in:

- Software quality requirements modeling, analysis and verification
- Formal methods for (self-)adaptive dependable IT systems
- Model- driven software engineering

and the application of the theories, approaches and techniques specific to the above research areas to *service-oriented* and *component-based* systems, *adaptive systems*, *mobile systems*, and *cloud computing*.

## SOFTWARE QUALITY REQUIREMENTS MODELING, ANALYSIS AND VERIFICATION

A key requirement for software is becoming the capability to keep providing the required quality of service (QoS), in terms of performance, dependability and operating cost (e.g., energy consumption). To this end, quality goals must be carefully and continuously pursued throughout the lifecycle, and especially from its very beginning. Indeed, if unacceptable qualities are discovered late in the project, it is necessary to either abandon the system entirely or go back through redefinition, redesign and redevelopment phases until the system becomes acceptable. Both options are clearly much more expensive than meeting the quality goals since the initial stages. For these reasons the research has been directed to the (automatic) generation and use of software quality models in a continuous way starting from design time until runtime.

**Scientific contributions** A first research area has been the definition and generation of quality models at design time, with the definition of PRIMA-UML [IC.64], [IC.63], [JR.21] for example, which represents a seminal work in this area widely cited in the reading list of academic courses and in the literature, see for example the citations of Google Scholar for the **WOSP paper** [IC.64], and the **Science of Computer Programming** journal [JR.21]). These methods have been applied to the domain of mobile software architectures and the results presented in [IC.60] and in the **IEEE Transaction on Mobile Computing** [JR.19].

For component-based systems we have been working at a general framework for enabling the early validation of component-based systems on the basis of the architectural specification. We started with a survey on existing methods for the quality analysis of component-based systems presented in [IB.11]. Then, the definition of the Component-Based Software Performance Engineering (CB-SPE) [IC.54], [IC.56], [IC.55], [IC.45] [WS.15], [OJ.4] has been one of the result of this work, which is widely cited in the literature (see for example the citations of Google Scholar for the CBSE [IC.54]). In this context, a common component modeling example has been produced and presented in the widely cited **Springer Book** [BK.1], to provide a common case study to be used as a basis for comparisons of different approaches. Different techniques based on optimization methods have been investigated and presented in [IC.30] and in two journal papers [JR.16], [JR.10] published on **Journal of Systems and Software**.

Another result concerns the definition and analysis of different kind of failures that can affect the overall system behavior [IC.27], [IC.24], [IC.9], and in the **Transactions on Reliability** journal [JR.3]. The paper [IC.27] received the **best paper award** at the CBSE conference.

More recent research contributions have been in the definition of models at runtime (presented at **ICSE Conference** [IC.34]) and their usage in the area of service-oriented application, presented in [IC.42], [IC.33], [IC.32], [IC.36], [IC.12], [IC.11], [IC.1], and in the **IEEE Transactions on Software Engineering** journals [JR.15], [JR.14], [JR.1]. The obtained results are widely cited in the literature, see for example the citations of Google Scholar for the **ICSE paper** [IC.34], the **ESEC/FSE paper** [IC.32], and the **IEEE Transactions on Software Engineering** [JR.15] and [JR.14].

## FORMAL METHODS FOR (SELF-)ADAPTIVE DEPENDABLE IT SYSTEMS

In modern software applications, two requirements are becoming common: software must adapt continuously to respond to changes in application objectives and in the environment in which it is embedded, and it is expected to fulfil its dependability. To this end the seamless use of *formal verification techniques* preventing errors from reaching the final implementation (or at least removing them when a new version of the software is deployed) has been proved to be a feasible way to reach these goals.

**Scientific contributions** In this area, the main contributions concern the definition of an overall framework promoting the use of quantitative formal techniques at runtime presented in [IB.4] and in the **Communication of ACM** [JR.11], as well as a set of specific techniques proposing the use of formal methods to deal with adaptable dependable systems. Specifically, Petri Nets and Queuing Networks have been applied to plan system adaptation while minimizing the energy consumption, in **Journal of Systems and Software** [JR.12], in **Sustainable Computing, Informatics and Systems** [JR.9] and in **International Journal of Performability Engineering** [OJ.1] respectively. Petri Nets have also been applied to devise the most suitable number of resources to be used when the workload of the application presents some burstiness [IC.15]. More recently, Petri nets have also been applied for time-sensitive adaptation in Cyber Physical Systems through run-time configuration generation and verification and the results presented in the conference papers in the conference papers [IC.6] and [IC.4].

Another formalism, called Abstract State Machine (ASM), has been extended to deal with reliability analysis in [IC.13], [IB.1] and in the **Journal of System and Software** paper [JR.4] providing a unique component model, which is both the design oriented model of the component assembly and the formal analysis-oriented model and that leads the reliability analysis. The combined use of optimization techniques and design patterns

and tactics have been exploited to explore the state space adaptation of service oriented applications in [IC.21] and in the **Science of Computer Programming** journal [JR.7]. The research challenges and possible research directions in this field have been explored in [IB.7] and [IB.2]. Some of these topics, concerning the definition of metrics for system adaptability and the definition of different types of uncertainties are presented in the journal paper [JR.8] (**Journal of Systems and Software**) and in the conference papers [IC.8] and [IC.2], respectively.

## MODEL- DRIVEN SOFTWARE ENGINEERING

*Model-driven development* (MDD) is a discipline that tries to systematize model-based software development. The goal of MDD is twofold. On the one side, it aims at deriving (automatically or semi-automatically) a software implementation, starting from high-level models of the system and applying model transformation rules which refine high-level descriptions into more concrete and specific models. On the other, it aims at supporting reasoning activities on the high-level models. Through an early analysis of quality properties, such as performance and reliability, the software engineer can evaluate the impact of the different design choices or candidate system architectures, before they are reified into runnable code.

**Scientific contributions** A first research contribution in this area is the definition of an UML profile for mobile software architectures and its usage for the analysis of quality requirements: [IC.62], [IC.53] and [IC.52]. Another result concerns the definition of a pivot language called KLAPER facilitating the definition and generation of analysis- oriented models (such as reliability models or performance models) starting from design-oriented models expressed in different formalisms, such as UML or BPMN, [IC.48],[IC.44],[JR.18],[IB.9], together with the possibility to deal with dynamic system environments [IC.43] and [IB.8]. A tool-suite has been built around this language and used in a set of academic and industrial case studies presented at the conferences [IC.23] (**TOOLS2011**, [IC.22] (**ICSE2011**)) and in the **Software and System Modeling** journal [JR.6]. The obtained results are widely cited in the literature, see for example the citations of Google Scholar for the WOSP paper [IC.48] and the **Journal of Systems and Software** paper [JR.18].

A different challenging problem we have considered in the MDE area is called "feedback provisioning": how to propose solutions to non-experienced engineers and guide them in the selection of an appropriate one when issues concerning quality attributes are detected. In this context we have presented a general discussion of challenges and open issues [IC.14] and their application to a specific domain [IC.3], we have proposed a multi-modeling solution that leverages and extends existing model transformation techniques with constructs to elicit the space of the alternative solutions and to bind quality properties to them, presented at **MODELS2011** conference [IC.20] and in the **Computer Science - Research and Development** journal [JR.13]. The model transformations themselves need to be verified and a testing technique has been proposed to this end in the **QUATIC2010** conference paper [IC.29] and in the **Innovations in Systems and Software Engineering** journal paper [JR.5].

## INVITED TALKS

- "Software QoS enhancement through self-adaptation and formal models" invited lectures at GSSI, L' Aquila, Italia, April 2015
- "Software Performance Engineering In and For Dynamic Environments, Keynote at ECSA 2011, Essen Germany, September 2011 (<http://www.ecsa2011.org/>)
- A journey across three decades of software performance engineering approaches Keynote at PalladioDays 2011, Karlsruhe, Germany November 2011 (<http://www.palladio-days.org/2011/programme/>)
- Software Performance Engineering In and For Dynamic Environments Seminar at Milano Bicocca, PhD Course, 2 December 2011

- Tecniche di valutazione di requisiti di performance e reliability per il software, Invited talk, Workshop CDE V&V Intecs, 25 November 2011
- Some issues about modeling of mobile software architecture, Invited presentation at UML 2004 Workshop on Software Architecture Description and UML, 12 October 2004

## TUTORIALS

- "Software QoS enhancement through self-adaptation and formal models" at QoSA'14, the 10th International ACM SIGSOFT Conference on Quality of Software Architectures (part of CompArch 2014), June 30 - July 04, 2014, Lille, France (with Diego Perez-Palacin)
- "Performance Validation of mobile software architecture" at PERFORMANCE 2002 IFIP WG 7.3 International Symposium on Computer Performance Modeling, Measurement and Evaluation, Roma, Italy, September 2002 (with V. Cortellessa and V. Grassi)
- "Performance Validation of mobile software architecture" at the Fourth International Workshop on Software and Performance, WOSP 2004, ACM, January 14-16 2004, Redwood Shores, CA, USA (with V. Cortellessa and V. Grassi)

# Professional Activities

## EUROPEAN RESEARCH PROJECTS

Scientific responsible and local responsible for Politecnico

- FP7 European project Q-ImPrESS: Quality Impact Prediction for Evolving Service-Oriented Software (2008-2011)

I contributed actively in the following research projects:

- FP7 ICT SeaClouds: Seamless adaptive multi-cloud management of service-based applications (30 months)
- FP7 ERC-SMSCom: Self-Managing Situated Computing (60 months)
- FP7 NOE S-Cube: Software Services and Systems Network (48 months)
- FP6 ICT PLASTIC: Providing Lightweight and Adaptable Service Technology for pervasive Information and Communication (36 months)
- FP6-ICT CASCADAS: Component-ware for Autonomic Situation-aware Communications, and Dynamically Adaptable Services (36 months)
- European Project GAAS: Design and development of distributed Client/server Architectures for air traffic control systems
- EUROCONTROL Project PAMPAS: A preliminary approach to performance modelling and analysis of air traffic control systems
- EUROCONTROL Project EVAS: EATMS Validation Strategy

## NATIONAL RESEARCH PROJECTS

I contributed actively in the following Italian research projects:

- PRIN 2008 DASAP: Architetture Software Adattabili e Affidabili per Sistemi Pervasivi, duration: 24 months
- FIRB Programmi Strategici 2005: ART DECO (Adaptive InfraStructures for DECentralized Organizations), duration: 36 months
- FIRB - PERF (2002 - 2006) Performance Evaluation of Complex Systems: Techniques, Methodologies and Tools, duration: 48 months
- PRIN 2001 SAHARA Software Architectures for Heterogeneous Access Infrastructures, duration: 24 months
- PRIN 1999 SALADIN: Software Architectures and Languages to Coordinate Mobile Distributed Components, duration: 24 months
- Certia-CERC Project Software Process Optimization and Collaborative Environments for Software V&V
- CNR Project Performance and Reliability Engineering of Distributed Databases
- ITALIAN MURST Project Performability V&V of Product and Processes in Software Engineering

## EVALUATOR OF RESEARCH PROJECTS

- Reviewer of Research projects for the "Netherlands Organisation for Scientific Research" in 2009 and 2012
- Reviewer of Research projects for the "Fundao para a Cincia e a Tecnologia", Portugal in 2012
- Reviewer of Research projects for the DFG priority program SPP 1593/1, Germany, in 2012
- Reviewer of Research projects for the DFG priority program SPP 1593/1, Germany, in 2015

## EDITORIAL BOARDS

I am a member of the Editorial Board of:

- IEEE Transaction on Software Engineering (2014-present),
- Journal of System and Software, Elsevier (2008-present).

## CONFERENCE AND WORKSHOP ORGANIZATION

### Program Chair and Organization Committees

- *In 2015*
  - Workshop co-chair at the IEEE/ACM International Conference on Software Engineering - ICSE 2015
  - Program co-chair of the 9th European Software Architecture Conference - ECSA 2015
  - TRACK co-chair ACM SAC Software Architecture: Theory, Technology, and Applications (SA-TTA)
  - Editor of the Elsevier Journal of System and Software special issue on New Frontiers in Software Architecture

- *In 2014*
  - TRACK co-chair ACM SAC Software Architecture: Theory, Technology, and Applications (SA-TTA)
- *In 2013:*
  - TRACK co-chair ACM SAC Software Architecture: Theory, Technology, and Applications (SA-TTA)
- *In 2012*
  - General-chair of: Comparch 2012, federated conference including CBSE (International ACM Sigsoft Symposium on Component Based Software Engineering), QoSA (International ACM Sigsoft Conference on the Quality of Software Architectures) and ISARCS (International ACM Sigsoft Symposium on Architecting Critical systems).
  - PC co-chair MOCS Model-based development, Components and Services Track
  - Editor of the Springer Journal Software and Systems Modeling theme issue on Performance Modeling
- *In 2011:*
  - PC co-chair of ACM WOSP/SIPEW ICPE International Conference on Performance Engineering
  - PC co-chair MOCS Model-based development, Components and Services Track Track at EUROMICRO SEAA
- *In 2010:*
  - Organization and PC co- chair of QUOVADIS: First International workshop on Quantitative Stochastic Models in the Verification and Design of Software Systems, Workshop at IEEE International Conference of Software Engineering (ICSE)
  - PC co-chair MOCS Model-based development, Components and Services Track Track at EUROMICRO SEAA
- *In 2009*
  - Program chair of QoSA 2009: Fifth International Conference on the Quality of Software Architectures
  - Co-organizer GI-Dagstuhl-Seminar: " Model-Driven Quality Prediction ", 29.11.09 - 02.12.09
- *In 2008*
  - Program chair of: EUROMICRO Conference on Software Engineering and Advanced Applications (SEAA)
  - Workshop chair of IEEE ASE 2008: International Conference on Automated Software Engineering
  - Panel organizer: SOA and Quality Assurance at SEAA 2008
- *In 2007*
  - Co-organizer of GI-Dagstuhl-Seminar: "Modelling Contest: Common Component Modelling Example", August 2007
- *In 2005* - Workshop organizer: NfC – Models for Non-functional Aspects of Component-Based Software, Models 2005

### **Steering Committees**

I serve on the Steering Committee of the following conferences:

- ACM International Conference on Performance Engineering (ICPE)



- CompArch, federated conference including CBSE (International ACM Sigsoft Symposium on Component Based Software Engineering), QoSA (International ACM Sigsoft Conference on the Quality of Software Architectures) and WCOP (International Doctoral Symposium on Components and Architecture)
- ECSA, The European Conference on Software Architecture
- member of SERENE: Software EngineeRing for rEsilieNt systems, ERCIM Working Group

### **Program Committee Membership**

- *In 2016:*
  - ICPE 2016: ACM International Conference on Performance Engineering
  - WICSA and CompArch 2016: 13th Working IEEE/IFIP Conference on Software Architecture & 10th Federated Conference Series on Component-Based Software Engineering and Software Architecture
  - SEAMS 2016: 11th International Symposium on Software Engineering for Adaptive and Self-Managing Systems
- *In 2015:*
  - ICPE 2015: ACM International Conference on Performance Engineering
  - MODELS 2015, ACM/IEEE 18th International Conference on Model-Driven Engineering Language and Systems
  - ICECCS 2015 International Conference on Engineering of Complex Computer Systems
  - QoSA 2015: International Conference on the Quality of Software Architectures
  - CBSE 2015: International Symposium on Component Based Software Engineering
  - SEAA 2015: 41th Euromicro Conference on Software Engineering and Advanced Applications
  - QEST 2015: 12th International Conference on Quantitative Evaluation of Systems
  - ICGSE 2015: International Conference on Global Software Engineering
  - GPCE 2015: 14th International Conference on Generative Programming: Concepts & Experiences
- *In 2014:*
  - Workshop track at ICSE 2014, the 36th International Conference on Software Engineering
  - ICPE 2014: ACM International Conference on Performance Engineering
  - ECSA 2014: European Conference on Software Architectures
  - MODELS 2014, ACM/IEEE 17th International Conference on Model-Driven Engineering Language and Systems
  - ICECCS 2014 International Conference on Engineering of Complex Computer Systems
  - FESCA 2014 International Workshop on Formal Engineering approaches to Software Components and Architecture
  - QoSA 2014: International Conference on the Quality of Software Architectures
  - CBSE 2014: International Symposium on Component Based Software Engineering
  - ANT 2014: The 5th International Conference on Ambient Systems, Networks and Technologies
  - HotTopiCS-2014: International Workshop on Hot Topics in Cloud services Scalability 2014
  - SAEroCon2014: First Workshop on Software Architecture Erosion and Architectural Consistency

- SEAA 2014: 40th Euromicro Conference on Software Engineering and Advanced Applications
- WCOP 2014: International Doctoral Symposium on Components and Architecture
- *In 2013*
  - FASE 2013: Fundamental Fundamental Approaches to Software Engineering, ETAPS 2013
  - New Ideas and Emerging Results (NIER) track at 2013, the 35th International Conference on Software Engineering
  - ICPE 2013: ACM International Conference on Performance Engineering
  - ICECCS 2013 International Conference on Engineering of Complex Computer Systems
  - FESCA 2013 International Workshop on Formal Engineering approaches to Software Components and Architecture
  - MODELS 2013, ACM/IEEE 16th International Conference on Model-Driven Engineering Language and Systems
  - ESEC/FSE 2013 Workshop selection
  - QoSA 2013: International Conference on the Quality of Software Architectures
  - CBSE 2013: International Symposium on Component Based Software Engineering
  - ECSA 2013: European Conference on Software Architectures
  - SERENE: International Workshop on Software Engineering for RESilient SystEms.
- *In 2012:*
  - New Ideas and Emerging Results (NIER) track at ICSE 2012, the 34th International Conference on Software Engineering
  - Workshop track at ICSE 2012, the 34th International Conference on Software Engineering
  - ICPE 2012 ACM International Conference on Performance Engineering
  - ICECCS 2012 International Conference on Engineering of Complex Computer Systems
  - FESCA 2012 International Workshop on Formal Engineering approaches to Software Components and Architecture
  - CLOSER 2012 2nd International Conference on Cloud Computing and Services Science
  - MODELS 2012, ACM/IEEE 15th International Conference on Model-Driven Engineering Language and Systems
  - SC 2012, International Conference on Software Composition 2012, co-located with TOOLS 2012 Federated Conference
  - QoSA 2012: International Conference on the Quality of Software Architectures
  - CBSE 2012: International Symposium on Component Based Software Engineering
  - SERENE: International Workshop on Software Engineering for RESilient SystEms.
- *In 2011:*
  - QoSA 2011: International Conference on the Quality of Software Architectures
  - CBSE 2011: International Symposium on Component Based Software Engineering
  - ECSA 2011: European Conference on Software Architectures
  - ISSRE 2011: International Symposium on Software Reliability Engineering
  - SERENE: International Workshop on Software Engineering for RESilient SystEms

- QUOVADIS 2011 Second International Workshop on Quantitative Models in the Verification/Validation and Design of Software Intensive Systems, ESEC/FSE 2011
- ASAS 2011: Workshop on Assurances for Self-Adaptive Systems, ESEC/FSE 2011
- ICECCS International Conference on Engineering of Complex Computer Systems
- FESCA International Workshop on Formal Engineering approaches to Software Components and Architectures
- *In 2010:*
  - ACM WOSP/SIPEW, ICPE Joint WOSP/SIPEW International Conference on Performance Engineering
  - CBSE: International Symposium on Component Based Software Engineering
  - QOSA: International Conference on the Quality of Software Architectures (QoSA 2010)
  - SC: International Conference on Software Composition
  - ICECCS International Conference on Engineering of Complex Computer Systems,
  - EPEW: 7th European Performance Engineering Workshop
  - SERENE: International Workshop on Software Engineering for RESilient SystEms.
  - FESCA International Workshop on Formal Engineering approaches to Software Components and Architectures
  - ViDAS. International workshop on Validation and Verification of Dynamic Software Systems
  - QUATIC: International Conference on the Quality of Information and Communications Technology
  - QUASOSS: International Workshop on the Quality of Service-oriented Software Systems
- *In 2009:*
  - ESEC/FSE 2009: the joint European Software Engineering Conference and the ACM SIGSOFT Symposium on the Foundations of Software Engineering
  - Workshop at ICSE 2009, IEEE, 31th International Conference on Software Engineering
  - EUROMICRO SEAA 2009: Service and Component-based software engineering track
  - PESOS 2009 Principles of Engineering Service Oriented Systems, in conjunction with the 31st Int. Conf. on Software Engineering (ICSE 2009)
  - QUASOSS: International Workshop on the Quality of Service-oriented Software Systems
  - SERENE: International Workshop on Software Engineering for RESilient SystEms.
- *In 2008:*
  - ACM WOSP 2008: ACM International Workshop on software and performance
  - Fourth International Conference on the Quality of Software Architectures (QoSA 2008)
  - ICISOFT 2008: The 3rd International Conference on Software and Data Technologies
  - ISEC 2008: First India Software Engineering Conference
  - SERA 2008: International Conference on Software Engineering Research, Management and Applications
  - AUTONOMICS 2008: Second International Conference on Autonomic Computing and Communication Systems
  - SERENE 2008: International Workshop on Software Engineering for RESilient SystEms

- *In 2007:*
  - ACM WOSP 2007: ACM International Workshop on software and performance
  - ESEC/FSE 2007: the joint European Software Engineering Conference and the ACM SIGSOFT Symposium on the Foundations of Software Engineering
  - ASE 2007: International Conference on Automated Software Engineering
  - EUROMICRO 2007: Component-based software engineering track
  - Rosatea workshop: The Role of Software Architecture for Testing and Analysis
  - Third International Conference on the Quality of Software Architectures (QoSA 2007)
  - IW-SOWSE07: 2nd International Workshop on Service Oriented Software Engineering
  - ICSOFT 2007: The 2nd International Conference on Software and Data Technologies,
- *In 2006:*
  - EUROMICRO 2006: Component-based software engineering track
  - International Workshop on Web Services - Modeling and Testing (WS-MaTe)
  - ICSE- Workshop on Service Oriented Software Engineering (IW-SOSE'06)
  - EFTS 2006 International Workshop on Engineering of Fault Tolerant Systems
  - ISSA workshop ROSATEA 2006, The Role of Software Architecture for Testing and Analysis
  - Second International Conference on the Quality of Software Architectures (QoSA 2006)
  - 5th International Workshop on Critical Systems Development Using Modeling Languages in conjunction with MoDELS/UML 2006 (CSDUML 2006)
- *In 2005:*
  - ACM WOSP 2005: ACM International Workshop on software and performance
  - IEEE EUROMICRO 2005: Component-based software engineering track
  - First International Conference on the Quality of Software Architectures (QoSA 2005)
- *In 2004*
  - ICSE 2004 Doctoral Symposium
- *In 2002*
  - 3rd ACIS International Conference on Software Engineering, Artificial Intelligence, Networking and Parallel/Distributed Computing, SNPD 2002
  - Second ACIS Annual International Conference on Computer and Information Science (ICIS '02)

## **REFeree SERVICES**

I regularly serve as a reviewer for the following journals:

- Performance Evaluation, Elsevier
- Journal of System and Software, Elsevier
- IEEE Transaction on Software Engineering,
- Software and System Modeling-Springer,
- ACM transactions on software engineering and methodology,

- IEEE Transactions on Dependable and Secure Systems,
- IEEE Transactions on Service Computing,
- Future Generation of Computer Systems, Elsevier
- Journal of Software: Evolution and Process, Wiley
- Computing Springer,
- Science of Computer Programming, Elsevier
- Information and Software Technology, Elsevier

## Teaching activity

*2015-2016*

Ingegneria del Software II (5 credits) - Master of Science, Computer Engineering, Politecnico di Milano.  
 Distributed Software Development (5 credits) - Master of Science, Computer Engineering, Politecnico di Milano, Course offered in English and together with the University of Zagreb and Malarladen University, Vasteras, Sweden.  
 Computer Infrastructures (5 credits) - - Master of Science, Computer Engineering, Politecnico di Milano.

*2014-2015*

Ingegneria del Software II (5 credits) - Master of Science, Computer Engineering, Politecnico di Milano.  
 Distributed Software Development (5 credits) - Master of Science, Computer Engineering, Politecnico di Milano, Course offered in English and together with the University of Zagreb and Malarladen University, Vasteras, Sweden.  
 Impianti Informatici (5 credits) - Undergraduate Programme, Computer Engineering, Politecnico di Milano, Cremona Campus.

*2013-2014*

Ingegneria del Software II (5 credits) - Master of Science, Computer Engineering, Politecnico di Milano.  
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 Impianti Informatici (5 credits) - Undergraduate Programme, Computer Engineering, Politecnico di Milano, Cremona Campus.

*2012-2013*

Ingegneria del Software II (5 credits) - Master of Science, Computer Engineering, Politecnico di Milano.  
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 Impianti Informatici (5 credits) - Undergraduate Programme, Computer Engineering, Politecnico di Milano, Cremona Campus.

*2011-2012*

Ingegneria del Software II (5 credits) - Master of Science, Computer Engineering, Politecnico di Milano.  
Impianti Informatici (5 credits) - Undergraduate Programme, Computer Engineering, Politecnico di Milano, Cremona Campus.

*2010-2011*

Ingegneria del Software II (5 credits) - Master of Science, Computer Engineering, Politecnico di Milano.  
Impianti Informatici (5 credits) - Undergraduate Programme, Computer Engineering, Politecnico di Milano, Cremona Campus.

*2009-2010*

"Informatica A" (10 credits), Undergraduate Programme, Management and Production Engineering, Politecnico di Milano

Impianti Informatici (5 credits) - Undergraduate Programme, Computer Engineering, Politecnico di Milano, Cremona Campus.

*2008-2009*

"Informatica A" (10 credits), Undergraduate Programme, Management and Production Engineering, Politecnico di Milano

Impianti Informatici (5 credits) - Undergraduate Programme, Computer Engineering, Politecnico di Milano, Cremona Campus.

*2007-2008*

"Informatica A" (10 credits), Undergraduate Programme, Management and Production Engineering, Politecnico di Milano

"Informatica A" (10 credits), Undergraduate Programme, Management and Production Engineering, Politecnico di Milano, Cremona Campus.

*2006-2007*

"Informatica A" (10 credits), Undergraduate Programme, Management and Production Engineering, Politecnico di Milano

"Informatica A" (10 credits), Undergraduate Programme, Management and Production Engineering, Politecnico di Milano, Cremona Campus.

*2005-2006*

"Informatica A" (10 credits), Undergraduate Programme, Management and Production Engineering, Politecnico di Milano

*2004-2005*

Fondamenti di Informatica II, - Undergraduate Programme, Computer Engineering, University of Roma Tor Vergata

Fondamenti di Informatica I, (teaching assistant) - Undergraduate Programme, Computer Engineering, University of Roma Tor Vergata

*2003-2004*

Fondamenti di Informatica II, - Undergraduate Programme, Computer Engineering, University of Roma Tor Vergata

Fondamenti di Informatica I, (teaching assistant) - Undergraduate Programme, Computer Engineering, University of Roma Tor Vergata

Early validation of non-functional requirements in software systems, - PhD Course at University of Roma Tor Vergata

*2002-2003*

Impianti Informatici, - Undergraduate Programme, Computer Engineering, University of Roma Tor Vergata

Fondamenti di Informatica I, (teaching assistant) - Undergraduate Programme, Computer Engineering, University of Roma Tor Vergata

*2001-2002*

Impianti Informatici, - Undergraduate Programme, Computer Engineering, University of Roma Tor Vergata

Fondamenti di Informatica I, (teaching assistant) - Undergraduate Programme, Computer Engineering, University of Roma Tor Vergata

*2000-2001*

Impianti Informatici, - Undergraduate Programme, Computer Engineering, University of Roma Tor Vergata

Fondamenti di Informatica I, (teaching assistant) - Undergraduate Programme, Computer Engineering, University of Roma Tor Vergata

*1999-2000*

Impianti Informatici, (teaching assistant)- Undergraduate Programme, Computer Engineering, University of Roma Tor Vergata

Fondamenti di Informatica I, (teaching assistant) - Undergraduate Programme, Computer Engineering, University of Roma Tor Vergata

*1998-1999*

Impianti Informatici, (teaching assistant)- Undergraduate Programme, Computer Engineering, University of Roma Tor Vergata

Fondamenti di Informatica I, (teaching assistant) - Undergraduate Programme, Computer Engineering, University of Roma Tor Vergata

*1997-1998*

Impianti Informatici, (teaching assistant)- Undergraduate Programme, Computer Engineering, University of Roma Tor Vergata

Fondamenti di Informatica I, (teaching assistant) - Undergraduate Programme, Computer Engineering, University of Roma Tor Vergata

*1990-1996*

Simulazione, (teaching assistant)- Undergraduate Programme, Computer Engineering, University of Pisa

## RESEARCH ADVISING

### Post-Doc Researchers Supervision

- Diego Perez Palacin (2013-present)
- Pasqualina Potena (2009-2012)

### PhD Students Supervision

- Daniel Dubois (2007-2010), co-advisor, Self-organizing Methods and Models for Software Development
- Mauro Luigi Drago (2008-2011) co-advisor, Quality Driven Model Transformations for Feedback Provisioning

### Graduate and Undergraduate Students Supervision

- Advisor of more than 40 undergraduate and Master students in Computer Engineering at Politecnico di Milano, 2006-Present
- Advisor of several Undergraduate and Master students in Computer Science at University of Roma Tor Vergata, 1997-2005

### PHD EXTERNAL EXAMINER

- PhD Committee member in 2013 at University of Zaragoza, Spain, for the PhD defense of the candidate Diego Perez-Palacin discussing a thesis titled "Extra Functional Properties Evaluation of Self-managed Software Systems with Formal Methods", Advisor Prof. Jose' Merseguer
- PhD Committee member in 2013 at University of Calgary, Canada, for the PhD defense of the candidate Anas Youssef discussing a thesis titled "Burstiness and Uncertainty Aware Service Level Planning for Enterprise Clouds", Advisor Dr Diwakar Krishnamurthy
- External reviewer in 2013 for the habilitation as Associate Professor of Tomas Bures, Charles University, Prague, Czeck Republic
- External reviewer 2012 for the PhD thesis of the candidate Indika Meedeniya titled "Architecture Optimisation of Embedded Systems under Uncertainty in Probabilistic Reliability Evaluation Model Parameters", Advisor Prof. Lars Grunske, Swiburne University, Australia
- PhD Committee member in 2012 at University of Lisbona, Portugal, for the PhD defense of the candidate Liliana Rosa discussing a thesis titled "Self-management of Systems Built from Adaptable Components", Advisor Prof. Luis Rodrigues, co-advisors: Prof. Antonia Lopes
- PhD Committee member in 2012 at Malardalen University, Sweden, for the PhD defense of the candidate Severine Santilles discussing a thesis titled "Managing Extra-Functional Properties in Component-Based Development of Embedded Systems", Advisor Prof. Ivica Crnkovic, co-advisors: Dr. Jan Carlsson, Prof. Hans Hansson
- PhD Committee member in 2010 at Malardalen University, Sweden, for the PhD defense of the candidate Kurt Wallnau discussing a thesis titled "Predictability By Construction: Working the Architecture/Program Seam", Advisor Prof. Ivica Crnkovic, co-advisors: Magnus Larsson, Hans Hansson



# Complete publication list

## PUBLICATION LIST

Refereed international journals	22
Refereed online international journals	4
Refereed international magazines	2
Editorial contributions	6
Refereed chapters in international books	12
Refereed international conferences	64
Refereed international workshops	13
Academic books	2

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[doi: <http://dx.doi.org/10.1109/TSE.2015.2476797>]
- JR.2. V. Cortellessa, R. Mirandola, P. Potena "Managing the evolution of a software architecture at minimal cost under performance and reliability constraints" *Science of Computer Programming, Elsevier* Volume 98, pp 439-463, 2015  
[doi: <http://dx.doi.org/10.1016/j.scico.2014.06.001>]
- JR.3. S. Distefano, C. Ghezzi, S. Guinea, R. Mirandola Dependability Assessment of Web Service Orchestrations *IEEE Transactions on Reliability* Volume 63,n.3, pp 689-705, 2014  
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- JR.4. R. Mirandola, P. Potena, E. Riccobene, P. Scandurra A reliability model for Service Component Architectures *Journal of Systems and Software, Elsevier* Volume 89, 2014, pp. 109-127  
[doi: <http://dx.doi.org/10.1016/j.jss.2013.11.002>]
- JR.5. A. Ciancone, A. Filieri, R. Mirandola Testing operational transformations in model-driven engineering *Innovations in Systems and Software Engineering, Springer* Volume 10, n.1, pp. 19-32, 2014  
[doi: <http://dx.doi.org/10.1007/s11334-013-0208-9>]
- JR.6. A. Ciancone, A. Filieri, M. L. Drago, V. Grassi, H. Koziulek, R. Mirandola The KlaperSuite Framework for Model-Driven Reliability Analysis of Component-Based Systems *Software and System Modeling, Springer* Volume 13, n.4, pp. 1269-1290, 2014  
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- JR.10. A. Koziulek, D. Ardagna, R. Mirandola Hybrid Multi-Attribute QoS Optimization in Component Based Software Systems *Journal of Systems and Software, Elsevier* Volume 86, no. 10 (2013), pp.2542-2558  
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- JR.11. R. Calinescu, C. Ghezzi, M. Kwiatkowska, R. Mirandola Self-adaptive software needs quantitative verification at runtime *Communications of ACM* Volume 55, no. 9 (2012), pp. 69-77  
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- JR.12. Diego Perez Palacin, Raffaella Mirandola, Jose Meseguer QoS and energy management with Petri nets: a self-adaptive framework *Journal of Systems and Software, Elsevier* Volume 85, no. 12 (2012), pp.2796-2811  
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- JR.13. M. L. Drago, C. Ghezzi, R. Mirandola A Quality Driven Extension to the QVT-Relations Transformation Language *Computer Science - Research and Development, Springer* Volume 27, no. 2, (2012)  
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- MAG.2. A. Bertolino, M. Marr, R. Mirandola "The number of tests required for branch coverage" *Cross Talk* Volume 9, no. 9, (1996)

## EDITORIAL CONTRIBUTIONS

- ED.1. Danny Weyns, Raffaella Mirandola, Ivica Crnkovic "Proceedings of 9th European Software Architecture Conference - ECSA 2015" *Lecture Notes on Computer Science, Springer LNCS 9278*, Springer 2015, ISBN 978-3-319-23726-8  
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- ED.2. David J. Lilja, Raffaella Mirandola, "Introduction to the theme issue on performance modeling," *Journal of Software and Systems Modeling, Springer* Volume 12, no. 4, (2013), pp. 679-680  
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- ED.3. Vincenzo Grassi, Raffaella Mirandola, Nenad Medvidovic, Magnus Larsson "Proceedings of the 15th ACM SIGSOFT Symposium on Component Based Software Engineering, CBSE 2012" *Comparch '12 Federated Events on Component-Based Software Engineering and Software Architecture ACM 2012*, ISBN 978-1-4503-1345-2
- ED.4. Vincenzo Grassi, Raffaella Mirandola, Jorge Cullar, Javier Lpez "Proceedings of the 3rd international ACM SIGSOFT symposium on Architecting Critical Systems, ISARCS 2012" *Comparch '12 Federated Events on Component-Based Software Engineering and Software Architecture ACM 2012*, ISBN 978-1-4503-1347-6
- ED.5. Vincenzo Grassi, Raffaella Mirandola, Barbora Buhnova, Antonio Vallecillo "Proceedings of the 8th international ACM SIGSOFT conference on Quality of Software Architectures, QoSA 2012" *Comparch '12 Federated Events on Component-Based Software Engineering and Software Architecture ACM 2012*, ISBN 978-1-4503-1346-9
- ED.6. Samuel Kounev, Vittorio Cortellessa, Raffaella Mirandola, David J. Lilja "ICPE'11 - Second Joint WOSP/SIPEW International Conference on Performance Engineering" ACM 2011, ISBN 978-1-4503-0519-8
- ED.7. Geri Georg, Jan yvind Aagedal, Raffaella Mirandola, Ileana Ober, Dorina C. Petriu, Wolfgang Theilmann, Jon Whittle, Steffen Zschaler "Workshop on Models for Non-functional Properties of Component-Based Software - NfC, MoDELS Satellite Events 2005" LNCS 3844 Springer: 210-216  
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- IB.1. R. Mirandola, P. Potena, E. Riccobene, P. Scandurra "Formal Reliability Models for Web Services" in *Correct Software in Web Applications and Web Services*, pp. 229-256 Springer 2015, ISBN 978-3-319-17111-1  
[doi: [http://dx.doi.org/10.1007/978-3-319-17112-8\\_7](http://dx.doi.org/10.1007/978-3-319-17112-8_7)]
- IB.2. Rogrio De Lemos, Holger Giese, Hausi A Muller, Mary Shaw, Jesper Andersson, Luciano Baresi, Basil Becker, Nelly Bencomo, Yuriy Brun, Bojan Cukic, Ron Desmarais, Schahram Dustdar, Gregor Engels, Kurt Geihs, Karl M Goeschka, Alessandra Gorla, Vincenzo Grassi, Paola Inverardi, Gabor Karsai, Jeff Kramer, Marin Litoiu, Antonia Lopes, Jeff Magee, Sam Malek, Serge Mankovskii, Raffaella Mirandola, John Mylopoulos, Oscar Nierstrasz, Mauro Pezz, Christian Prehofer, Wilhelm SchLfer, Rick Schlichting, Bradley Schmerl, Dennis B Smith, Joo P Sousa, Gabriel Tamura, Ladan Tahvildari, Norha M Villegas, Thomas Vogel, Danny Weyns, Kenny Wong, Jochen Wuttke "Software engineering for self-adaptive systems: A second research roadmap," in *Self-Adaptive Systems, Software Engineering for Self-Adaptive Systems, SefSAS II*, LNCS 7475, Springer 2012 pp. 1-32  
[doi: [http://dx.doi.org/10.1007/978-3-642-35813-5\\_1](http://dx.doi.org/10.1007/978-3-642-35813-5_1)]
- IB.3. D. Weyns, B. Schmerl, V. Grassi, S. Malek, R. Mirandola, C. Prehofer, J. Wuttke, J. Andersson, H. Giese, and K. Goschka "On Patterns for Decentralized Control in Self-Adaptive Systems" in *Self-Adaptive Systems, Software Engineering for Self-Adaptive Systems, SefSAS II*, LNCS 7475, Springer 2012 pp. 76-107  
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- IB.4. Antonio Filieri, Carlo Ghezzi, Raffaella Mirandola, and Giordano Tamburrelli "Conquering Complexity via Seamless Integration of Design-Time and Run-Time Verification" in *Conquering complexity*, Springer 2012 pp. 253-275  
[doi: [http://dx.doi.org/10.1007/978-1-4471-2297-5\\_12](http://dx.doi.org/10.1007/978-1-4471-2297-5_12)]
- IB.5. D. Barbagallo, E. Di Nitto, D. J. Dubois, R. Mirandola "A bio-inspired algorithm for energy optimization in a self-organizing data center" in *Self-Organizing Architectures*, Springer 2010, LNCS 6090, pp. 101-126  
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- IB.6. V. Cardellini, E. Casalicchio, V. Grassi, F. Lo Presti, R. Mirandola "Towards Self-adaptation for Dependable Service-Oriented Systems" in *Architecting Dependable Systems VI*, LNCS 5835, Springer 2009, pp 24-48  
[doi: [http://dx.doi.org/10.1007/978-3-642-10248-6\\_2](http://dx.doi.org/10.1007/978-3-642-10248-6_2)]
- IB.7. Betty H. C. Cheng, Rogrio de Lemos, Holger Giese, Paola Inverardi, Jeff Magee, Jesper Andersson, Basil Becker, Nelly Bencomo, Yuriy Brun, Bojan Cukic, Giovanna Di Marzo Serugendo, Schahram Dustdar, Anthony Finkelstein, Cristina Gacek, Kurt Geihs, Vincenzo Grassi, Gabor Karsai, Holger M. Kienle, Jeff Kramer, Marin Litoiu, Sam Malek, Raffaella Mirandola, Hausi A. Mller, Sooyong Park, Mary Shaw, Matthias Tichy, Massimo Tivoli, Danny Weyns, Jon Whittle "Software Engineering for Self-Adaptive Systems: A Research Roadmap" in *Software Engineering for Self-Adaptive Systems*, LNCS 5525, Springer 2009 pp. 1-26  
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- IB.8. Vincenzo Grassi, Raffaella Mirandola, Enrico Randazzo "Model-Driven Assessment of QoS-Aware Self-Adaptation" in *Software Engineering for Self-Adaptive Systems*, LNCS 5525, Springer 2009 pp. 201-222  
[doi: [http://dx.doi.org/10.1007/978-3-642-02161-9\\_11](http://dx.doi.org/10.1007/978-3-642-02161-9_11)]
- IB.9. Vincenzo Grassi, Raffaella Mirandola, Enrico Randazzo, Antonino Sabetta "KLAPER: an Intermediate Language for Model-Driven Predictive Analysis of Performance and Reliability" in *The Common Component Modeling Example: Comparing Software Component Models*, LNCS 5153, Springer 2008 pp. 327-356  
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- IB.10. Raffaella Mirandola, Frantisek Plasil "CoCoTA: Common Component Task" in *The Common Component Modeling Example: Comparing Software Component Models*, LNCS 5153, Springer 2008 pp. 4-15  
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- IB.12. G. Iazeolla A. D' Ambrogio, R. Mirandola "Software Performance Validation Strategies" in *System Performance Evaluation, Methodologies and Applications*, CRC Press, 2000
- IB.13. M. Conti, Mirandola R. "Hierarchical Performance Modelling of Computer Communication Systems" in *State of the art in Performance modelling and simulation - Modeling and simulation of computer and communication networks: techniques, tools and tutorials*, Gordon and Breach Publisher inc, Amst, New Jersey, USA 1997

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- IC.1. V. Cardellini, M. D'Angelo, V. Grassi, M. Marzolla R. Mirandola A Decentralized Approach to Network-Aware Service Composition *Proceedings of the 4th European Conference on Service Oriented and Cloud Computing(ESOCC 2015)*, pp. 34-48 LNCS 9306, Springer, 2015  
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- IC.2. R. Mirandola, D.Perez-Palacin, P. Scandurra, M. Brignoli, A. Zonca Business Process Adaptability Metrics for QoS-Based Service Compositions *Proceedings of the 4th European Conference on Service Oriented and Cloud Computing(ESOCC 2015)*, pp. 110-124 LNCS 9306, Springer, 2015  
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- IC.3. M. Caporuscio, R. Mirandola, C. Trubiani QoS-based Feedback for Service Compositions *Proceedings of the 11th International ACM SIGSOFT Conference on Quality of Software Architectures(QoSA 2015)*, pp. 37-42  
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- IC.4. M. Garca-Valls, D. Perez-Palacin, R. Mirandola. "Extending the verification capabilities of middleware for reliable distributed self-adaptive systems." *Proceedings of the 12th IEEE International Conference on Industrial Informatics (INDIN 2014)*, pp. 164-169  
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- IC.5. D.Perez-Palacin, R. Mirandola, R. Calinescu Synthesis of Adaptation Plans for Cloud Infrastructure with Hybrid Cost Models *Proceedings of the 40th Euromicro Conference on Software Engineering and Advanced Applications(SEAA 2014)*, pp. 443-450  
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- IC.6. M. Garcia-Valls, D.Perez-Palacin, R. Mirandola "Time-sensitive adaptation in CPS through run-time configuration generation and verification" *Proceedings of the 38th Annual International Computers, Software Applications Conference (COMPSAC)*, 2014, pp. 332-337  
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