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Current Trends in Web Engineering

Workshops, Doctoral Symposium, and Tutorials
Held at ICWE 2011
Paphos, Cyprus, June 20-21, 2011
Revised Selected Papers

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Foreword

The series of the International Conference on Web Engineering (ICWE) promotes scientific and practical excellence on Web Engineering, and brings together researchers and practitioners working with technologies, methodologies, tools, and techniques used to develop and maintain Web-based applications.

The 11th edition of ICWE extended its conference program with workshops, a doctoral symposium and tutorials providing a complementary overview on current research issues. The main topics covered all aspects of enabling and improving the dissemination and use of content and services through the Web: Web application engineering, Web service engineering, and Web data engineering. In particular, the workshops offered Web engineering researchers and practitioners highly interactive sessions including in-depth presentations on focused topics and a discussion forum on emerging challenges. Within the scope of the doctoral symposium, PhD students presented their approaches and preliminary results to obtain constructive feedback from experts. Tutorials held by senior Web engineering researchers provided a wide overview on their particular research activities.

The ICWE 2011 conference and its satellite events took place in Paphos (Cyprus) during June 20–24, 2011. It followed editions of the conference in Vienna (Austria), San Sebastián (Spain), Yorktown Heights NY (USA), Como (Italy), Palo Alto CA (USA), Sydney (Australia), Munich (Germany), Oviedo (Spain), Santa Fé (Argentina) and Cáceres (Spain).

This volume contains the papers presented at the workshops and the doctoral symposium, as well as the tutorial summaries. The workshop Program Committee selected seven proposals from ten submissions; due to few submissions one was canceled and the following six workshops were held during June 20–21, 2011.

- Third International Workshop on Lightweight Composition on the Web (ComposableWeb)
- First International Workshop on Search, Exploration and Navigation of Web Data Sources (ExploreWeb)
- Second International Workshop on Enterprise Crowdsourcing (EC)
- 7th Model-Driven Web Engineering Workshop (MDWE)
- Second International Workshop on Quality in Web Engineering (QWE)
- Second Workshop on the Web and Requirements Engineering (WeRE)

The doctoral symposium and four tutorials complemented the conference and workshop program. The doctoral symposium in particular provided helpful feedback to the PhD students and special motivation for their work in the Web engineering field. The tutorials accepted were two full-day presentations: “Multi-Dimensional Context-Aware Adaptation for Web Applications” and “Automating the Use of Web APIs Through Lightweight Semantics,” and two half-day

presentations: “Context-Aware Adaptation for Web Applications” and “Improving Quality in Use of Web Applications in a Systematic Way.”

We thank the ICWE 2011 conference General Chair, George Papadopoulos, and the Program Chairs, Oscar Diaz and Sören Auer, for their constant support in our work. We would like to thank the members of the Program Committee for selecting high-quality workshops, and the organizers of the workshops for providing a world-class program and leading fruitful discussions during the workshop days. Our gratitude goes to the Doctoral Symposium and Tutorial Chairs. Finally, a special thanks to all researchers and students who contributed with their work, presentation and participation to the success of the ICWE 2011 satellite events: workshops, doctoral consortium and tutorials.

September 2011

Andreas Harth
Nora Koch

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Preface

The preface of this volume presents the prefaces of the workshop proceedings of the individual workshops, the PhD symposium and the tutorials. The papers of the workshops and the PhD symposium as well as the summaries on the tutorials are grouped by event and can be found in the body of the volume.

Third International Workshop on Lightweight Composition on the Web (ComposableWeb 2011)

Organizers: Florian Daniel, Sven Casteleyn, and Geert-Jan Houben

The third edition of ComposableWeb was again held in conjunction with the International Conference on Web Engineering (ICWE), which took place this year in Paphos, Cyprus. As such, ComposableWeb has become part of this conference and of its workshop program, a result we are particularly glad of.

The workshop focuses on research, practical experiences, and novel ideas in the context of component-based development of Web applications, lightweight composition on the Web, Web 2.0, and mashups. The goal of the workshop is to provide a discussion forum bringing together researchers and practitioners working in these areas, in order to jointly advance current state-of-the-art solutions. The topics of the workshop typically attract enthusiastic people that like to play with novel technologies and that try to make application development accessible also to less skilled developers or – as envisioned by many – even to end-users. Submissions typically range from mature works to position or vision papers.

The scientific program of the 2011 edition of the workshop consisted of nine papers, spanning a variety of topics. All submissions went through a rigorous blind review process by our Program Committee, and only submissions with positive feedback were selected for publication. Among accepted papers, the reader will find a survey on mashup tools, a semantics-based approach to mashup development, a recommendation approach of mashup components, telco mashups, a W3C widget extension for inter-widget communication, cross-domain communications, linking-based protocols for RESTful interactions, transaction support for RESTful services, and security support for mashups.

We intended to re-use last year's successful workshop format, with a whole day of paper presentations and a final demonstration and discussion session, in which also participants without an accepted paper could showcase their ideas and results. For organizational reasons, however, this year we hosted three papers of the Second International Workshop on Enterprise Crowdsourcing in the last session of the day, which focused on crowd-adapted Web applications, human computation, and crowd-assisted IT management (all contributions can be found

in this proceedings volume). This unexpected merge yielded a dense and interesting program with unexpected interaction points among the two workshops and good opportunities for cross-fertilization.

We would like to thank all the authors who contributed to the workshop with their papers and presentations, our Program Committee for the constructive and competent feedback, and the audience for actively participating in the discussions. We thank Maja Vuković and Claudio Bartolini, the organizers of the Enterprise Crowdsourcing Workshop, for contributing to ComposableWeb 2011. Finally, we thank the ICWE Organizers and Workshop Chairs for hosting the workshop and providing a nice, relaxed, and constructive environment.

July 2011

Florian Daniel
Sven Casteleyn
Geert-Jan Houben

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Search, Exploration and Navigation of Web Data Sources (exploreWeb 2011)

Organizers: Marco Brambilla, Piero Fraternali, and Daniel Schwabe

The First International Workshop on Search, Exploration and Navigation of Web Data Sources (exploreWeb 2011) was held on June 20, 2011 in Paphos, Cyprus.

The motivation for this initiative stands in the exponential growth of data sources available on the Web and in the need of devising efficient information exploration options to the users. Web data providers offer a plethora of different ways of accessing their data sources, spanning from APIs (e.g., Google APIs, location-based APIs, and so on) to proprietary query languages (such as Yahoo! Query Language, YQL) to endpoints accessible through standard query languages (e.g., SPARQL). This trend is associated with the increased tendency toward labeling, tagging, and linking data semantically, as pushed also by social networking applications (e.g., social bookmarking, user networks, and so on).

These data sources expose their content as semi-structured information (e.g., JSON, XML, ...) and more and more enrich it in the form of the so-called linked data cloud, with uri-based references between the resources. This is a major change of paradigm with respect to traditional Web publishing. On the one hand, it enormously facilitates access and querying of information with respect to the old-fashioned page-based Web paradigm. On the other hand, however, this challenges the current approaches to Web navigation and information collection by end users. With the growth of the available open and linked data, the need arises for effective mechanisms targeted to human users for searching, exploring, and consuming such data.

Cross-fertilization between different disciplines is mandatory for this purpose: exploratory search approaches should be merged with usability and cognitive science to identify the best interaction paradigms over such new data sources; Web engineering approaches should be extended with data integration and Semantic Web /linked data-based practices (such as knowledge exploration tools) to connect linked and non-linked data, and to provide proper navigational applications to the end users.

The initiative was very successful: the workshop got 12 submissions, of which 7 were accepted for presentation. The program also included an extremely interesting invited talk by Sören Auer on “Exploration and Other Stages of the Linked Data Life Cycle.” Such a life cycle comprises the following phases: extraction, storage and querying, authoring, linking, evolution, exploration, and visualization. The keynote raised a lively discussion that continued throughout the day after each paper had been presented.

The workshop was organized into four sessions: the first one was dedicated to the keynote talk; the second one was on linked data exploration; the third one

was on tag clouds and NLP; and the fourth one dealt with Web data navigation and exploration.

The first paper of the linked data exploration session was written by Alessandro Bozzon, Marco Brambilla, Emanuele Della Valle and Chiara Pasini (from Politecnico di Milano) and presented a “Conceptual Framework for Linked Data Exploration Based on the Search Computing Infrastructure.” Then Marcelo Cohen and Daniel Schwabe (from PUC-Rio) presented their paper dealing with “Support for Reusable Explorations of Linked Data in the Semantic Web.”

In the tag clouds and NLP session the presented paper included: “Generation of Semantic Clouds Based on Linked Data for Efficient Multimedia Semantic Annotations,” by Han-Gyu Ko and In-Young Ko from Korea Advanced Institute of Science and Technology; “Segmentation of Geo-Referenced Queries,” presented by Mamoun Abu Helou, from Politecnico di Milano; and “SimSpectrum: A Similarity-Based Spectral Clustering Approach to Generate a Tag Cloud,” written by Frederico Durao, Peter Dolog, Martin Leginus and Ricardo Lage from Aalborg University.

Finally, the Web data navigation and exploration session included the presentations of the following works: “Graph Access Pattern Diagrams (GAP-D): Towards a Unified Approach for Modeling Navigation over Hierarchical, Linear and Networked Structures,” written by Matthias Keller and Martin Nussbaumer (from Karlsruhe Institute of Technology, KIT); and “Data-Driven and User-Driven Multidimensional Data Visualization” written by Rober Morales-Chaparro, Juan Carlos Preciado and Fernando Sanchez-Figueroa (from University of Extremadura).

The resources related to the workshop (including the presentation used by the speakers) are available online on the exploreWeb website at: <http://exploreweb.search-computing.org>.

We wish to thank the ICWE 2011 Organizing Committee, the ExploreWeb Program Committee that did a great job in reviewing the submitted papers, and the Search Computing project (<http://www.search-computing.org>) that sponsored the event.

June 2011

Marco Brambilla
Piero Fraternali
Daniel Schwabe

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Second International Workshop on Enterprise Crowdsourcing (EC 2011)

Organizers: Maja Vuković and Claudio Bartolini

Web 2.0 provides the technological foundations upon which the crowdsourcing paradigm evolves and operates, enabling networked experts to work collaboratively or competitively to complete a specific task. Crowdsourcing has the potential to significantly transform Web-enabled business processes by incorporating the knowledge and skills of globally distributed experts to drive business objectives at shorter cycles and lower cost. Many interesting and successful examples exist, such as TopCoder and Amazon Mechanical Turk. Global enterprises are increasingly adopting crowdsourcing given the ease of access to a scalable workforce online. In this context, crowdsourcing takes many different shapes and forms, from mass data collection to enabling end-user driven customer support services. However, to fully adopt this mechanism in enterprises and benefit from appealing value propositions in terms of reducing the time-to-value, a set of challenges remain to be solved.

Based on the increasing number of applications, and platforms that provide crowdsourcing capabilities, this workshop seeks to identify novel enterprise crowdsourcing applications and use them to derive requirements for common protocols and reusable Web service components, leading to a set of standardized interfaces for supporting them.

The first paper written by Nebeling and Norrie highlighted an interesting application of crowdsourcing to enable context-aware and adaptive Web interfaces. With the ever-increasing range and diversity of Web browser properties, crowdsourcing provides a low-cost alternative to enabling a wider range of use contexts to which Web applications can adapt. Nebeling positioned this application of crowdsourcing within the most recent crowdsourcing taxonomy by Quinn and Benderson. The key challenge in this work is how to design a suitable ranking model when crowd workers supply multiple adaptations.

In his presentation Lukas Biewald of CrowdFlower discussed opportunities for new business models on top of existing crowdsourcing marketplaces, providing quality assurance capabilities. For example, quality-controlled human intelligence is being employed to weed through business listings and company information to ensure the correctness of data for CrowdFlower clients. Beyond business-driven tasks, CrowdFlower also enables volunteering-type tasks through their GiveWork iPhone application, developed jointly with Samasource, allowing people in developing countries to complete short tasks that are used for training purposes.

Tata Consultancy Services introduced the use of crowdsourcing internally within the enterprise, with a resulting improvement of the efficiency of their

software engineering processes. Untapped talent, such as new trainees, and experts not practicing fully their technical skills are being exposed to challenging tasks, introducing the disruptive resource allocation model. The proposed system enables a reputation model, as means of motivating the participation of in-house experts. Vuković presented how crowdsourcing mechanisms can be applied within large IT organizations to drive end-to-end on-cloud migration processes. Different crowds of experts, such as application owners, system administrators, business analysts, are harnessed to gather the knowledge that is critical to identifying migration candidates, evaluating the feasibility and impact of this transformation to existing business processes. The key challenge is how to design sustainable incentives, as the crowd may be engaged multiple times during the process.

As crowdsourcing examples abound in enterprise, in scientific and public domains, open questions remain. How can we carry over human relationships arising from the social context to the online work marketplaces? The question of setting effective incentives remains, both for attracting high performers, but also for rewarding and retaining top contributors.

July 2011

Maja Vuković
Claudio Bartolini

Organization

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7th Model-Driven Web Engineering Workshop (MDWE 2011)

Organizers: Gustavo Rossi, Geert-Jan Houben, Marco Brambilla, and
Santiago Meliá

The International Workshop on Model-Driven Web Engineering (MDWE 2011) was held in conjunction with the 11th International Conference on Web Engineering (ICWE 2011) in Paphos (Cyprus) on July 21, 2011. MDWE promotes a trend with growing importance in Web application development, which is currently moving from ad-hoc implementations mainly focused on the application of innovative technologies and methods to a more systematic development principally oriented to model-driven, automatic generation, maintenance and modernization of Web systems. In the Web Engineering field, elements such as models, meta-models, model transformations and tools, which are all essential in model-driven approaches, are gaining more and more relevance possibly due to the increasing number of scenarios in which they have successfully proven to be useful.

In this year's edition of the workshop, the five accepted papers addressed a wide set of topics and proposed several approaches for automating the development process of Web applications. The topics covered the whole spectrum of current Web applications from the client or user interface (using traditional Web applications or rich Internet applications) to the server (generating service-oriented architectures, SOAs). Moreover, the proposals introduced the most recent techniques in the field of model-driven engineering (e.g., architecture-centric MDA, aspect-oriented development or modernization) to improve the current Web development processes.

In particular, the first paper, "Aspect-Oriented Modeling of Web Applications with HiLA," by Gefei Zhang and Matthias Hözl, presented an aspect-oriented, model-driven approach aiming to avoid potential interferences between Web engineering concerns and also to specify feature combinations. Regarding the service-oriented architecture topic, Achilleas Achilleos, Georgia Kapitsaki and George Papadopoulos presented their work, "A Model-Driven Framework for Developing Web-Oriented Applications," which specifies multi-platform mobile applications with a client-side DSL model using a PML and an SOA server with WSDL. The third paper titled "Developing Enterprise Web Applications Using the Story-Driven Modeling Approach" (by Christoph Eickhoff, Nina Geiger, Marcel Hahn and Albert Zündorf) introduces an adaptation of the Fujaba Process to support the generation of enterprise Web applications (also called RIAs), implemented using the Google Web Toolkit framework.

Eban Escott, Paul Strooper, Paul King and Ian J. Hayes, in their paper "Model-Driven Web Form Validation with UML and OCL," employed architecture-

centric MDA (AC-MDA) techniques that, starting from an analysis of implementation of a set of target Web forms, derive a collection of models and transformations capable of representing and generating them, respectively. Finally, “Modernization of Legacy Web Applications into Rich Internet Applications” (by Roberto Rodriguez-Echeverria, Jose Maria Conejero, Pedro J. Clemente, Juan Carlos Preciado and Fernando Sanchez-Figueroa) was the last paper of the workshop. In this paper, the authors implemented a process of Web reengineering, based on techniques of architecture-driven modernization, whose final goal was to implement a reengineering process from a traditional Web 1.0 application to a rich Internet application.

The most significant contribution of MDWE is to provide an open discussion forum with renowned experts in this field and to combine works with a solid theoretical basis with experiences in the use of model-driven approaches in real-life scenarios. This year’s discussion was centered on the manner in which the different MDWE approaches respond to the new challenges of Web 2.0. In this regard, the majority of the accepted papers were aligned with relevant Web 2.0 topics, such as service-oriented architectures or rich Internet applications. Another interesting discussion topic was the diffusion of MDWE approaches in real business scenarios: how to improve the adoption of MDWE approaches in the software development market and which would be the optimal mechanisms to maximize the dissemination of the research in different universities and companies.

Last but not least, we would like to express our sincere gratitude to all the authors and workshop attendees for their active participation and contribution to the discussions. We would also like to thank all the members of the Program Committee and the external reviewers for the high quality of their reviews, which provided excellent feedback to the authors. We extend these thanks to the ICWE 2011 Organizing Committee and Workshop Chairs for their support. For more information, please visit the website of MDWE 2011: <http://mdwe2011.pst.ifi.lmu.de/>

July 2011

Gustavo Rossi
Geert-Jan Houben
Marco Brambilla
Santiago Meliá

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Second International Workshop on Quality in Web Engineering (QWE 2011)

Organizers: Cinzia Cappiello, Cristina Cachero, Maristella Matera, and
Silvia Abrahão

The production of Web applications has been among the fastest growing segments of the software industry for several years. In fact, they are an interesting opportunity for companies to deliver services and products at distance. The effectiveness of such applications is dependent on their capability to satisfy the customer needs; thus the quality of Web applications, responsible for the related transactions, has become a crucial factor. However, some recent studies suggest that more than 50% of the delivered Web applications are of poor quality.

The quality of any class of Web products (e.g., a data-intensive application, a Web service, a community portal), should be addressed at different levels: in Web processes, Web artifacts, Web products (applications, services) and in Web content. Also, any quality-oriented approach needs the specification of quality models defining the set of relevant quality attributes to be assessed. Otherwise, quality assessment is left to the intuition or the responsibility of people who are in charge of the process. This need to reflect and advance on methods and techniques that help improve the quality of delivered Web applications led us to organize the second edition of the International Workshop on Quality in Web Engineering (QWE 2011) that was held in conjunction with the 11th International Conference on Web Engineering (ICWE 2011).

The main purpose of the workshop was to discuss and get to know the most innovative and advanced experiences for guaranteeing the quality of Web applications, and the role that Web Engineering methods can play in this respect. In particular this year's edition of the workshop encouraged a discussion on the emergent issues related to the quality of Web 2.0 applications. These applications foster a great user involvement in the production of content, annotations and evaluations, never experienced before in the Web. Traditional quality criteria no longer suffice: a central role is played by the huge amount of user-generated content that is now populating the Web and that is considered as an invaluable source of opinions in several contexts, especially in the enterprise context. The discussions during the workshop thus highlighted the need for new quality models, privileging aspects such as the quality of user-created content (e.g., its trustworthiness and credibility), the user participation in the content creation process and the content authors' reputation.

The discussion of the previous issues was facilitated by the presented papers, which focused on Web 2.0 applications and highlighted the need for new quality models and, in some cases, the inapplicability of traditional dimensions.

We would like to thank the authors for submitting their papers to the workshop and contributing to the interesting discussion during the workshop. We are also grateful to the members of the Program Committee for their efforts in the reviewing process, and to the ICWE organizers for their support and assistance in the production of these proceedings. More details on the workshop are available at <http://gplsi.dlsi.ua.es/congresos/qwe11/>.

July 2011

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Cristina Cachero
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Second Workshop on the Web and Requirements Engineering (WeRE 2011)

Organizers: Irene Garrigós, Jose-Norberto Mazón, Nora Koch, and Maria Jose Escalona

The Second International Workshop on the Web and Requirements Engineering (WeRE) was held in conjunction with the 11th International Conference on Web Engineering (ICWE 2011) in Paphos (Cyprus) on July 21, 2011. WeRE provides an international forum for exchanging ideas on both using Web technologies as a platform in the requirements engineering field, and applying requirements engineering in the development and use of websites. Papers presented at WeRE focused on new domains and new experiences with the connection between requirements engineering and the Web. For more information, please visit the website of WeRE 2011: <http://gplsi.dlsi.ua.es/congresos/were11>.

In the last decade, the number and complexity of Web-based software systems and the amount of information they offer has been continuously growing. In the context of software engineering, design methods and methodologies were introduced to provide mechanisms to develop these complex Web applications and rich Internet applications (RIAs) in a systematic way. Most of these methodologies focus on implementation and neglect other tasks such as requirement analysis and quality management. However, in the development of traditional (non-Web) applications, both practitioners and process experts regard requirements engineering as a phase of crucial relevance in the development process.

It is well-known that the most common and time-consuming errors, as well as the most expensive ones to repair, are those that arise from inadequate engineering of requirements. Therefore, although the relevance of requirements engineering is well known these techniques should be studied more widely in the Web Engineering community due to the complexity of Web Engineering problems. This complexity is caused by the size and changing nature of the community of stakeholders involved, as well as the diversity of requirements, including navigation requirements, self-adaptivity requirements, as well as usability and the user experience.

On the other hand, requirements engineering is a complex activity whose success depends on stakeholder participation. Therefore, the techniques proposed in the requirements engineering field need a more participative environment to support effective collaboration among stakeholders. In this context, the Web (especially Web 2.0 applications) provides a convenient platform that supports active participation by stakeholders in the requirements engineering process.

For this edition two papers were selected for presentation. The first one focuses on “Detecting Conflicts and Inconsistencies in Web Application Requirements.” The second one discusses “Streamlining Complexity: Conceptual Page

Re-modeling for Rich Internet Applications.” The workshop included a discussion slot where participants were very active. The discussion finally focused on the Web 2.0 and requirements engineering that is a hot and challenge topic, which brought some controversy.

Finally, we would like to thank the authors and presenters for their contribution, and the workshop participants for the lively discussion. We also would like to thank the Program Committee for the review of the papers and the ICWE 2011 Organizing Committee for their support. In addition, we would like to gratefully acknowledge the support of our sponsors Sadiel (<http://www.sadiel.es>), Everis (<http://www.everis.com>) and Novasoft (<http://www.novasoft.es>), as well as the financial support of the University Institute for Computing Research (IUII) at the University of Alicante and the MANTRA research project (GRE09-17) from the University of Alicante (Spain) and from the Valencia Government (GV/2011/035).

June 2011

Irene Garrigós
Jose-Norberto Mazón
Nora Koch
María José Escalona

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Doctoral Symposium 2011

Doctoral Symposium Chairs: Peter Dolog, and Bernhard Haslhofer

The ICWE 2011 Doctoral Symposium aimed at providing PhD students with an opportunity to discuss their Web engineering research in an international forum with well-known experts in the field. It helped students to develop and sharpen their research questions, to find methodologies to answer the questions and to exchange ideas with other students and experienced researchers.

Besides the traditional ICWE themes such as *Web Application Development* and *Web Service Engineering*, this year's Doctoral Symposium featured the special theme *Web Data Engineering*. With this theme, the main aim was to address the developments in the Semantic Web and linked data community: creating a Web of data on top of the existing Web architecture. This is interesting for Web Engineering because these developments lift data management to the Web level and pose novel challenges for Web application design and Web service engineering in general. Vice versa, the experiences gained in Web engineering research can be valuable input for the further development of the Web of data. The research ideas presented and further developed in the ICWE 2011 Doctoral Symposium can benefit from these synergies and lead to novel and exciting research directions.

These proceedings collect the papers presented at the ICWE 2011 Doctoral Consortium. All the submissions were peer-reviewed by at least two independent reviewers from the Web Engineering and/or Semantic Web community. In total, we received 17 submissions and selected 10 based on the reviewers' comments. This gives an acceptance rate of 59%. The topics range from a traditional focus on development methods, such as product lines, domain-specific languages, interface specification, application architecture design, end-user programming and Web mashups through information and relation extraction, data modeling, XML document management, and linked data.

We would like to thank the authors for submitting their manuscripts to the Doctoral Symposium and contributing to an interesting program. Also, we would like to thank the members of the Program Committee for reviewing the papers and giving their feedback. Finally, we thank the General Chairs for supporting us in organizing and setting up this Doctoral Symposium.

May 2011

Peter Dolog
Bernhard Haslhofer

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ICWE 2011 Tutorials

Tutorial Chairs: Steffen Lohmann, and Cesare Pautasso

Following its tradition, the 2011 edition of the International Conference on Web Engineering (ICWE 2011) complemented its main program with a rich tutorial program. It took place jointly with the workshops and PhD symposium on the first two days of the conference. The tutorials provided conference attendees with an opportunity to gain new knowledge, insights, skills and abilities on key Web engineering topics, tools and techniques.

We had space for four tutorials this year that were selected from a number of high-quality submissions following an open call. They all covered areas that are of high relevance to the Web Engineering community. On the first day (June 20), Vivian Genaro Motti and Jean Vanderdonckt talked about “Multi-Dimensional Context-Aware Adaptation for Web Applications” and Fabian Abel and Geert-Jan Houben about “Engineering the Personal Social Semantic Web.” The program of the second day (June 21) also consisted of two tutorials: Maria Maleshkova, Dong Liu, and Carlos Pedrinaci lectured on “Automating the Use of Web APIs Through Lightweight Semantics” and Philip Lew and Luis Olsina on “Improving Quality in Use of Web Applications in a Systematic Way.” Summaries of the tutorials are included in this volume—for the first time in the history of the ICWE conference series.

We would like to thank the Conference Chair George Angelos Papadopoulos, the Program Chairs Sören Auer and Oscar Diaz, and the Workshop Chairs and editors of this volume Andreas Harth and Nora Koch for giving us the opportunity to publish the summaries of the tutorials. We believe this is a good way to document, give additional visibility and archive the tutorials. It also offers tutorial attendees and other conference participants as well as the wider public a possibility to look up the tutorial contents and discover interesting aspects and pointers of relevance to their own work. In addition, most summaries include links to Web resources that contain further material.

Last but not least, we would like to thank the tutorial speakers for sharing their knowledge and expertise and the numerous tutorial attendees for their active participation. They helped to make ICWE 2011 a successful event.

July 2011

Steffen Lohmann
Cesare Pautasso

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