

# Message from the General Chair

Welcome to ICSME 2015 in Bremen! It is a pleasure and a distinct honour to host the *IEEE International Conference on Software Maintenance and Evolution (ICSME)* for the first time in Germany. Since its start in 1983 – at that time still named ICSM (International Conference on Software Maintenance) – ICSME has grown and developed into the largest international scientific forum for software maintenance researchers and practitioners. Participants from academia, government, and industry share ideas and experiences solving critical software maintenance problems. Today, ICSME is the premier international event in the field of maintenance and evolution.

Our program presents works of international excellence, where reports on the latest advances in the field may be found. It is structured into different tracks. The Technical Research track presents novel scientific contributions on maintaining and evolving software. The Early Research Achievements (ERA) track provides researchers and practitioners with a forum for presenting promising ideas in early stages of research. The Industry track offers state-of-the-art practice and industrial experience reports. The Tool Demo track shows the cutting edge of software maintenance and evolution tool support. In the Doctoral Symposium, pre-doctoral as well as post-doctoral work is presented.

In addition, we will have two exciting invited keynote addresses, one from industry and one from academia. In his industrial keynote titled “Long Term Software Maintenance for the COLUMBUS On-board System of the International Space Station (ISS)”, Uwe Westerholt from Airbus DS will give us insights into the challenges of maintaining complex systems of space flight with regard to technical, economical and socio-political aspects. The academic keynote address by Prof. James Cordy from Queen's University titled “There is no problem in software maintenance that cannot be made worse by another level of indirection (A program understanding theory of software complexity)” will challenge the wide-spread aphorism that all problems in computer science can be solved by another level of indirection. We will also look into the past and celebrate outstanding work with high impact that was published ten years ago at ICSM 2005. The two program co-chairs Tibor Gyimóthy and Václav Rajlich of ICSM 2005 have lead the election of the most influential paper (MIP) award. Following the guidelines set by the steering committee they have asked the current program committee to vote for the MIP based on quantitative indicators (e.g., number of citations) as well as qualitative indicators (e.g., impact and influence). The program committee has selected the paper “The role of refactorings in API evolution” by Danny Dig and Ralph Johnson as the most influential publication of ICSM 2005. The authors will present this work and how it influenced our field at ICSM 2015.

ICSME has also attracted many other related events to co-locate. The week of ICSME offers you the opportunity to participate in the *15th IEEE International Working Conference on Source Code Analysis and Manipulation (SCAM)*, the *Third IEEE Working Conference on Software Visualization (VISSOFT)*, the *Fifth Workshop on Mining Unstructured Data (MUD)*, the *Seventh Workshop on Maintenance and Evolution of Service-Oriented Systems and Cloud-Based Environments (MESOCA)*, and the *Seventh International Workshop on Managing Technical Debt (MTD)*. We are very grateful to the organizers of these meetings for joining ICSME and making the ICSME week the largest annual event on the science of maintaining and evolving existing systems.

Organizing an event on the scale of ICSME with all its co-located events is an immense task. The success is largely due to our fantastic organizing committee. I am extremely grateful for the hard work and dedication of the members of the committee. Jens Krinke and Martin Robillard served not only as

Program Co-Chairs for the Technical Research track but also helped in other matters of the overall organization. I am also very grateful to the chairs of the other tracks: Lin Tan and Serge Demeyer for the ERA track, Jochen Quante and David C. Shepherd for the Industry track, Collin McMillan and Nicholas A. Kraft for the Tool Demo track, and Eleni Stroulia and Massimiliano Di Penta for the Doctoral Symposium. I want to thank David Binkley not only for being the Finance Chair but also for his advice and support in many other organizational issues. He was involved in a lot of important decisions and most instrumental in the successful co-operation with the co-located events. I am very thankful to Tibor Gyimóthy and Václav Rajlich for leading the election of the most influential paper (MIP) award. I want to thank Saman Bazrafshan for the tremendous work on maintaining our web site and Hitesh Sajjani for taking care of publicity and our social media presence. I want to express my gratitude also to several people of IEEE Computer Society, namely, Monique Rice, Silvia Ceballos, Gertrude Adamson, Momoko Vanna, and John Teehan, to name a few. I am also very grateful to the members of my research group for their support in the local organization.

Finally but importantly, I would like to thank the members of the program committees of the various tracks as well as the authors for submitting to ICSME, and you for being here. I hope that you will enjoy a great conference in Bremen and continue to contribute to the success of ICSME in the future.

Rainer Koschke, University of Bremen,  
ICSME 2015 General Chair

# Message from the Program Co-Chairs

Welcome to the 31st edition of the IEEE International Conference on Software Maintenance and Evolution. As this year's strong and diverse program shows, ICSME is a venue of choice for the dissemination of research ideas and results in a wide variety of areas related to software maintenance and evolution.

We invited high-quality submissions describing significant, original, and unpublished results relating to all aspects of software maintenance and evolution. We received 155 submissions by the submission deadline. We rejected five for failing to meet the submission requirements, one paper was withdrawn by its authors, and one paper was rejected for being submitted to multiple venues in parallel. Each of the remaining 148 submissions was reviewed by at least three members of the program committee. Submissions were evaluated primarily on the basis of soundness, importance of contribution, originality, quality of presentation, and appropriate comparison to related work. After an extended on-line discussion spanning multiple weeks, we selected 32 papers for inclusion in the program, yielding an official acceptance rate of  $32/148 = 21.6\%$ .

We are grateful to the 58 volunteer members of the program committee for their hard work, diligence, and professionalism. Together they authored over 450 detailed reviews in just five weeks.

We hope that you find this year's ICSME program interesting, enriching, and stimulating.

Jens Krinke and Martin Robillard  
ICSME 2015 Program Co-chairs

# **Message from the Early Research Achievements (ERA) Track Co-Chairs**

The goal of the Early Research Achievements track is to provide researchers and practitioners with a forum for presenting great, promising ideas in early stages of research. The 2015 ERA track aims to provide constructive feedback to guide researchers and practitioners from their initial idea and limited evaluation towards a solid ICSME 2016 paper with strong empirical underpinnings.

We are excited to present the program of the ERA track of ICSME 2015! We received 48 submissions, from which 17 submissions have been accepted. All submissions were reviewed by at least three members of the program committee and an online discussion was held for all cases where there is no clear consensus. We thank all committee members and additional reviewers for their valuable reviews and discussions.

We hope that you will enjoy the ERA program of this year as much as we do! We also hope to see the full versions of these papers at next ICSME 2016!

Serge Demeyer and Lin Tan  
ICSME 2015 Early Research Achievements (ERA) Track Co-Chairs

# Message from the Industry Track Co-Chairs

The emphasis for this year's industry track was to more clearly differentiate it from the research track, allowing both tracks to better focus on their strengths. Towards this goal we updated how program committee members were chosen, how papers were solicited, and how reviews were calibrated.

To better focus the industry track on work that is relevant to industry, we intentionally selected a program committee with a much higher percentage of those in industry, raising this percentage from a respectable 46% (11/24) in 2014 to a notable 78% (18/23) in 2015.

To solicit more industry-relevant papers, in addition to our public call for submissions, we strongly encouraged our PC to reach out directly to their industrial contacts. This approach may have been a factor in the record number of submissions, 42 in total, approximately double the amount in the preceding two years.

Of the 42 submissions, two were desk rejected for being out-of-scope. The remaining 40 papers received 120 reviews. In contrast to the research track, the industrial track values impact and real world focus over novelty. Thus, submissions were evaluated on soundness, potential impact, real world focus, presentation, and related work. After an extended online discussion we accepted 15 papers for inclusion, yielding an official acceptance rate of  $15/40 = 37.5\%$

We are grateful to the 23 volunteer members of the program committee. Not only did they author 120 detailed reviews but they were integral in recruiting a record number of strong submissions from their industrial network. This PC was truly a pleasure to work with.

We hope that you enjoy this year's ICSME Industry program!

Jochen Quante and David Shepherd  
ICSME Industry 2015 Program Co-chairs

## **Message from Tool Demonstrations Co-Chairs**

It is our pleasure to introduce the Tool Demonstrations track of ICSME 2015! We invited submissions to discuss the latest tool support for software maintenance and evolution researchers and practitioners. It is our objective to create an intimate environment that maximizes the impact and exposure of these tools.

This year we received 14 submissions. The submissions included a diverse range of tools and led to very intense discussions from the program committee – we thank all committee members who participated in these productive conversations. Emphasis was placed on the usability, novelty, and real-world applicability of the tools. In the end, we accepted seven tool demonstrations.

It is our sincere hope that you will enjoy this year's program!

Collin McMillan and Nicholas A. Kraft  
ICSME 2015 Tool Demonstrations Co-Chairs

# Message from the Doctoral Symposium Co-Chairs

It is our pleasure to welcome you to the Doctoral Symposium of the 31<sup>st</sup> IEEE International Conference on Software Maintenance and Evolution (ICSME). Following a long ICSME tradition, the Doctoral Symposium includes two tracks: the “post-doctoral” track, featuring presentations by recently minted PhDs, i.e., young researchers who have successfully defended their PhD thesis in the last two years; and, the “pre-doctoral” track, reserved for PhD candidates investigating problems in the area of software maintenance and evolution. This year we received three post-doctoral submissions and six pre-doctoral submissions, of which we accepted two and four respectively.

The doctoral symposium will be organized in two sessions. The first session includes the two post-doctoral talks, and a panel in which the post-doctoral presenters and senior members of the research community will report their more salient success/failure stories, will reflect on the lessons they have learned throughout their career, and will answer questions of new students in this area. The second session will include presentations of the ongoing work of the four PhD candidates, and will include both a public and a private feedback session.

We would like to thank the committee members for providing careful, constructive and detailed feedback to the authors. Last, but not least, we would like to thank all the current and past students who submitted their work to this PhD symposium. This conference track offers a great opportunity for young researchers to present their work in its early stage, and to receive meaningful and constructive feedback, directly relevant to their pursuit of a successful career in academia or the software industry.

Massimiliano Di Penta and Eleni Stroulia  
ICSME 2015 Doctoral Symposium Co-Chairs