

PROCEEDINGS of EASE 2020- Evaluation and Assessment in Software Engineering



April 15-17, 2020

Norwegian University of Science and Technology, Norway

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Software Security: Challenges, Opportunities and Lessons Learned

Workshop

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MESSAGE FROM THE GENERAL CHAIRS

The EASE conference provides a stimulating environment for the software engineering community to meet to discuss the design, conduct, dissemination, and impact of empirical software engineering research, and to present results from recent high-quality primary and secondary studies. The 24th edition of the conference is planned to take place at the Norwegian University of Science and Technology between April 15 and April 17, 2020 in Trondheim, Norway.

EASE 2020 features high-quality papers in different tracks: Full research papers, Short papers & artefacts, Emerging results & vision, Industry track, Doctoral symposium, Tutorials, and Panels. Three workshops, namely the First Blockchain Software Engineering workshop, DevOps Quality Management Workshop – 2020, and the First International Workshop on Secure Software, Challenges, Opportunities, and Lessons learned, are also part of EASE 2020 program.

We are delighted to have three distinguished keynote speakers to present at EASE 2020: Professor Tracy Hall from Lancaster University (UK), Professor Geraldine Fitzpatrick from TU Wien (Vienna University of Technology) (Austria), and Dr. Oscar Centeno from Volvo Cars (Sweden).

For the main research track, we received 115 full research papers for the review process, of which 27 papers were accepted (about 23% acceptance rate). The 27 accepted full research papers are complemented by 12 short papers, 1 artefact submission, 3 emerging results & vision papers, 2 Doctoral symposium papers, 4 industry papers, 20 workshop papers, 3 tutorials, and 2 panels.

We would like to thank the keynote speakers, the authors of papers (submitted and accepted), the members of the program committees who provided invaluable input and feedback to the track Chairs, the organizing committee, and the range of volunteers who helped with logistics and administration. We also thank the Norwegian University of Science and Technology (NTNU), the International Partnerships for Excellent Education and Research in Information Technology (IPIT) project, the Research Council of Norway for supporting the event, the NTNU Conference Organizer for planning and management of the conference logistics, and the ACM for publishing the proceedings.

General Chairs:

Jingyue Li and Letizia Jaccheri: Norwegian University of Science and Technology

WELCOME MESSAGE: EASE 2020 FULL PAPERS TRACK

EASE 2020 Full Papers track is excited to share this year's program, which covers sessions on a number of empirical software engineering activities:

- **Agile development**, reporting on the complex practices of today's software engineering, such as use of agile practices in conjunction with the waterfall-like islanded [25] processes, and the key practical challenges faced in continuous software engineering [26].
- **Artificial intelligence in software engineering**, exploring both the challenges addressed through use of AI in software engineering (e.g., [1, 2, 3]), the potential biases and problems that careless application of AI could cause [4], as well as the (business) opportunities of AI use [24,27].
- Study of **requirements engineering** concerns affecting the practice [5].
- **Research methods** used in empirical software engineering context in order to address such challenges as bias [6] and uncertainty when reporting empirical results [7], as well as providing guidelines for good practice for qualitative studies in globally distributed projects [8].
- **Software analytics, technical debt and security**, investigating the correlation between performance scores and energy consumption of mobile apps [9], decision making in Open Source Development [10], and practices of technical debt (non-) repayment [11].
- **Software process improvement**, reporting on such issues as the characteristics that define actionable metrics in practical terms, and so how metrics should be constructed to be practically useful [12], how quality requirements are documented in agile development [13], and what are the advantages and disadvantages of using chatbots in collaborative modelling [14].
- **Software quality**, addressing such topics as fault/defect identification/prediction[15,16, 17], what source code lexicon tells about the application's domain [18], and how governance styles of pull request acceptance safeguard the quality of the open source software [19].
- **Software testing** papers question which faults are the tests today less likely to detect [20], and how well exceptional behavior is actually tested when using automated approaches [21]?
- **Studying developers** session considers topics relevant to the programmers' characteristics, such as how programmers with dyslexia structure code [22], as well as use of automation to support work of feature modelling in product line development [23].

The track received 115 submissions, of which 27 have been accepted upon a thorough, double-blind peer review process. The submissions were reviewed for:

- **Relevance:** The extent to which the paper's contributions to the to the knowledge and/or practice of evaluation and assessment in software engineering
- **Soundness:** The extent to which the paper's contributions are supported by rigorous application of appropriate research methods

- **Novelty:** The extent to which the contribution is sufficiently original and is clearly explained with respect to the state-of-the-art
- **Verifiability:** The extent to which the paper includes sufficient information to support independent verification or replication of the paper's claimed contributions, and
- **Presentation:** Pertains to the paper's quality of writing, including clear descriptions and explanations, adequate use of the English language, absence of major ambiguity, clearly readable figures and tables, and adherence to the formatting instructions of the conference.

We would like to express our gratitude and appreciation to the PC members for their help in undertaking a thorough and timely review process to construct this excellent program.

We also thank to all authors who submitted their work to EASE, and, irrespective of the acceptance of their submissions this year, we hope that the feedback from the conference will help them improve and progress their research.

We are looking forward to welcoming all EASE community members at EASE 2020 as well as the future EASE conferences.

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Ruzanna Chitchyan: University of Bristol, UK

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- [1] Xueying Li, Peng Liang and Zengyang Li, Automatic Identification of Decisions from the Hibernate Developer Mailing List.
- [2] Weichao Liu, Cheng Zhang, Yun Yang and Futian Wang, Combining network analysis with structural matching for design pattern detection.
- [3] Abdulrahman Alatawi, Weifeng Xu and Dianxiang Xu, A Bigram-based Inference Model for Retrieving Abbreviated Phrases in Source Code.
- [4] Bohan Liu, He Zhang, Lanxin Yang, Liming Dong, Haifeng Shen and Kaiwen Song, An experimental evaluation of imbalanced learning and time-series validation in the context of CI/CD prediction.
- [5] Nitish Patkar, Mohammad Ghafari, Oscar Nierstrasz and Sofija Hotomski, How well do practitioners elicit mobile app requirements?

- [6] Rolando Reyes, Oscar Dieste, Efraín R. Fonseca C. and Natalia Juristo, Publication Bias: A Detailed Analysis of Experiments Published in ESEM.
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- [15] Xiao-Yi Zhang and Zheng Zheng, Exploring the Characteristics of Spectra Distribution and Their Impacts on Fault Localization.
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WELCOME MESSAGE FROM THE SHORT PAPERS AND ARTEFACTS TRACK

CHAIR

The EASE 2020 Short Papers and Artefacts track provides an opportunity for researchers and practitioners in the area of software engineering to present and discuss their most recent ideas, tools and challenges based on empirically grounded findings. As a highly-ranked and well-established conference in this area, EASE provides great opportunity for sharing novel ideas, receiving feedback and networking with the evidenced-based software engineering community.

The Short Papers and Artefacts track aims at facilitating the knowledge exchange and foster collaboration within the community. The Short Paper track provides an excellent opportunity to publish the empirical findings that are insightful but might not be mature enough for Full Paper track (e.g., research in early stages). It also encourages research papers that present intuitive empirical findings that serve the community such as reports on theoretical or methodological failures. The Empirical Artefacts track is relatively new addition to EASE, aiming at establishing a bank of empirical artefacts that can be further used by other researchers for different purposes such as experimentation and evaluation. This track encourages publishing different types of empirical artefacts (e.g., data repositories, frameworks, algorithms) accompanied with a paper describing the artifact.

Thanks to our committed programming committee, all the submissions received at least three reviews. We have accepted 12 Short Papers and managed to attract submissions to the Empirical Artifacts track, out of which 1 has been accepted. We think it is a good start and hopefully this track also becomes more established in future.

We very much thank the members of the program committee of Short Papers and Artefacts track for their great effort in reviewing the submissions and providing detailed feedback. Without their support we could not shape such an amazing program with high quality papers.

We look forward to seeing you all in the beautiful Trondheim and we hope you enjoy the conference.

Short Papers and Artefacts Track Chair

Mansooreh Zahedi: The University of Adelaide, Australia

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WELCOME MESSAGE FROM THE VISION PAPERS AND EMERGING RESULTS

TRACK CHAIRS

On behalf of the entire Program Committee, it is our pleasure to welcome you to the Vision Papers and Emerging Results Track of the 24th edition of Evaluation and Assessment in Software Engineering Conference (EASE 2020). The goal of this track is to show two kinds of contributions:

The Emerging Results Papers with the primary purpose to communicate new ideas, to get an early feedback from the empirical software engineering (SE) community, as well as present preliminary and startling emerging results that disregard established results, beliefs or propose new research directions.

The Vision Papers with the aim to present long term challenges and opportunities instead of incremental improvements or evaluations of current solutions or practices.

We received 9 submissions of which three have been desk rejected. Each valid submission was reviewed by four program committee members of the Emerging Results and Vision Papers Track. After online discussion we have accepted three papers and rejected three papers.

Meshed in the final program, we hope that the selected high quality papers will inspire and help the community reflect on, namely, the role of objectivity in judging what is a satisfactory level of security we want and need in modern software, the emerging results on formal- versus case-study-based methods for identifying cultural influences in requirements engineering, and a vision on redefining agility as responsiveness to change and its implications in both research and practice.

We thank the members of the program committee for their thorough reviews, the EASE organizing committee for their help and coordination, and last, but not least, the authors of the papers and the participants that helped establish the track.

Vision Papers and Emerging Results Chairs

Patricia Lago: Vrije Universiteit Amsterdam, the Netherlands

Marco Torchiano: Politecnico di Torino, Italy

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WELCOME MESSAGE FROM THE MESSAGE FROM THE INDUSTRY

EXPERIENCE REPORTS TRACK CHAIRS

EASE aims at understanding the implication of evidence-based software engineering for software practice and relevance for industry is of growing importance for EASE. The industry experience reports track invited two types of submissions. First, experience reports (both positive and negative) on adoption and evaluation of software engineering technologies (such as tools, ideas, processes, practices and methods) in industrial settings. Second, we invited industrial perspectives on empirical software engineering, such as ideas and work in progress, where practitioners are collaborating with academics.

We received 6 submissions. Each submission was peer-reviewed by two to three program committee members of the Industry Experience Reports Track. Reviewing all comments from the program committee, we accepted 4 papers. We also invited an industry keynote speaker, Oscar Centeno, from Volvo Cars.

We think we have put together an interesting industry program for EASE 2020. Topics include a tool-supported approach for automated priority prediction, how to make software measurements standards understandable, characteristic traits of software testers, and experiences from a case study of innovative public procurement of digital systems in the public sector. The industry keynote will share valuable experiences from the work on becoming data-driven at Volvo Cars.

We thank the authors for submitting to the Industry Experience Reports Track, and we are grateful for the thorough reviews from the program committee.

Industry experience track chairs

Lucas Gren: Volvo Cars and Chalmers | University of Gothenburg

Marius Mikalsen: SINTEF Digital and Norwegian University of Science and Technology (NTNU)

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WELCOME MESSAGE FROM THE POSTERS AND DOCTORAL SYMPOSIUM

TRACKS CHAIRS

This year posters track and Doctoral Symposium at EASE were joined, meaning that only from PhD candidates who participated to the Doctoral Symposium presented posters at the conference. This joint track gives PhD students to receive feedback not only on their written PhD plan, submitted to the track chairs for review, but also on their oral presentation of their PhD project during the poster session at the conference.

The PhD plans were submitted to the Doctoral Symposium track and received each 2-3 reviews from track chairs and program committee. We received a total of 4 submissions, two of which were presented at the conference.

All the participating PhD students were given the opportunity to apply for travel grants from the IPIT project (<https://ipit.network/>). We thank IPIT for this support.

Submitted PhD projects covered topics related to agile methods, industry-academia collaboration, teaching of software engineering, software testing and more.

We thank the authors for their submission. We also thank the program committee for their support before and during the review process.

Track Co-Chairs

Babak A. Farshchian, Norwegian University of Science and Technology, Norway

Marouane Kessentini, University of Michigan, Michigan, USA

Program Committee

Maria Teresa Baldassarre, University of Bari, Italy

Davide Taibi, Tampere University of Technology, Finland

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JOINT WELCOME MESSAGE FROM THE EASE 2020 WORKSHOP CHAIRS

Welcome to the workshops of the 24th International Conference on Evaluation and Assessment in Software Engineering (EASE 2020) in Trondheim, Norway. This year the EASE conference hosts workshops to provide a platform for the software engineering (SE) researchers and practitioners, to present their ideas and facilitate a lively discussion on a range of emerging topics relevant to the EASE community. As the EASE 2020 workshops chairs, we evaluated and accepted three submitted workshop proposals related to Blockchain, DevOps Quality Management, and Software Security. The workshops have been evaluated with respect to their originality, the emergence of the proposed theme, and the relevance to empirical software engineering. All workshop submissions, have undergone a rigorous review process by three experts on the corresponding field, aiming to publish top-quality papers that will stimulate interesting discussions during the workshops. The aims of the workshops are presented below.

Blockchain Software Engineering Workshop. In recent years more and more critical software applications apply blockchain technologies or integrate blockchain-based components. To assure (among others) the reliability, security, privacy, and maintainability of blockchain-based applications, existing software engineering theories and approaches need to be evaluated, customized, and improved. The goal of this workshop is to provide a forum for discussing software engineering theories, approaches, and tools methods for effectively developing high-quality blockchain-based applications. As part of this workshop 4 papers have been accepted and presented in the conference.

DevOps Quality Management Workshop. Focusing on various metrics and processes under the DevOps principles could significantly improve the product quality, development and ownership. However, the deployment of DevOps quality assurance techniques and approaches remains largely unknown and the automated steps in DevOps make the quality management a challenging phase which cannot be achieved using the traditional approaches. Therefore, the goal of this workshop is to provide a forum for discussing DevOps-oriented quality management approaches. As part of this workshop 6 papers have been accepted and presented in the conference.

Software Security: Challenges, Opportunities and Lessons Learned. Over the last decade, an increasing number of organizations have started focusing on software security because modern applications typically operate in a hostile network-based environment. The empirical software engineering researchers need new approaches, models, and tools for addressing various

emerging challenges of software security in this modern age. The goal of this workshop is to provide a forum for discussing the need for using empirical evidence to support different new approaches in the software security research and practice which will provide researchers with innovative knowledge on which to develop different software security processes and practices. As part of this workshop 10 papers have been accepted and presented in the conference.

EASE 2020 Workshop Co-Chairs

Apostolos Ampatzoglou: University of Macedonia, Thessaloniki, Greece

Lech Madeyski: Wroclaw University of Science and Technology Poland

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