

34th European Conference on Object-Oriented Programming

ECOOP 2020, November 15–17, 2020, Berlin, Germany
(Virtual Conference)

Edited by

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■ Preface

ECOOP is a conference about programming. Originally its focus was on object orientation, but now it looks at a much broader range of programming topics. Areas of interest include the design, implementation, optimization, analysis, and theory of programs, programming languages, and programming environments. The conference welcomes innovative and creative solutions to real problems, evaluations that provide new insights into existing solutions, and reproduction studies.

This year ECOOP received 71 submissions categorized by their authors as research papers, tool insight papers, reproduction studies, experience reports, pearls, or brave new ideas. Papers were evaluated based on originality, significance, evidence, and clarity. After careful and thorough review following a light double-blind, identify-the-champion process, 30 of them were accepted by the Program and External Review Committees. Papers written by committee members received extra reviews by the rest of the committee. While some papers received up to six reviews, none had fewer than three.

Due to the COVID-19 pandemic, a physical meeting of the Program Committee was impossible. Despite that, all members of the Program and the External Review Committees did exceptional work, dealt with every obstacle in their way, and stayed positive and constructive, leading to rich and interesting proceedings.

ECOOP 2020 was planned to be held in July in Berlin, Germany, but went virtual and co-located with ACM SIGPLAN's SPLASH conference. Together with OOPSLA, Onward!, GPCE, SLE, DLS, SAS, and several workshops, ECOOP took place in November 2020.

The 2020 AITO Dahl-Nygaard Junior Prize was awarded to Jonathan Bell for his significant contributions to tooling in the Java ecosystem, which has improved our understanding and ability to test and discover bugs in software. The Senior Prize was presented to Jan Vitek, whose work has been to observe how software is being developed and how programming languages are being used; over his career he has studied and improved practical programming languages.

A journal-first arrangement with Elsevier's Science of Computer Programming yielded the first "Special Issue on Selected Papers from the European Conference on Object-Oriented Programming."

It was an honor and a privilege to serve as Program Chair for this edition of ECOOP. I would like to thank the following: all authors who submitted their research; my amazing colleagues of the Program and External Review Committees along with our other external reviewers for their outstanding work and help; the Artifact Evaluation Committee; the Organizing Committee; and my Software Architecture Group here at HPI for their invaluable support.

Robert Hirschfeld
Fall 2020



■ Message from the General Chair

It is my great pleasure to welcome you to ECOOP'20, to be held during 15–17 Nov, the first virtual instance of ECOOP in its 34 years of history. ECOOP is the European forum for bringing together researchers, practitioners, and students to share their ideas and experiences on all topics related to programming languages, software development, object-oriented technologies, systems and applications.

The Corona pandemic quickly raised doubts whether we could have a physical meeting in Berlin during July, as originally planned. Like many other conferences we had to evaluate the situation carefully and eventually came to the conclusion that a physical meeting, while not forbidden by law in the German state of Berlin at the planned timeframe, would not be possible, mostly due to international travel restrictions.

Instead, ECOOP co-located with SPLASH, which gave the organizing team time to plan a virtual meeting and the authors their online presentation. Other conferences and several of ECOOP's satellite events like the Scala Symposium followed, such that SPLASH this year is a true multi-conference on programming and related communities. This year's ECOOP features a doctoral symposium and a poster session, which are jointly organized with SPLASH, as well as tutorials. In the joint SPLASH virtualization team we developed a plan for ECOOP/SPLASH to be experienced world-wide, in particular with closed captioning and a daily 12h program that is repeated in the subsequent half day. Experience was also drawn from other virtually organized conferences like PLDI, ICSE, and ICFP. While nothing can compensate for the networking at a physical meeting, we therefore hope that we can provide you with the best online experience possible.

My congratulations go to the junior and senior AITO Dahl-Nygaard Prize winners, Jonathan Bell and Jan Vitek, who will present keynotes during ECOOP, and the paper “Load-Time Structural Reflection in Java” by Shigeru Chiba, which was selected for the AITO Test of Time Award.

Organizing ECOOP in these challenging times would not have been possible without the support of a great team. I would like to express my gratitude towards all the people involved in organizing this year's ECOOP and the joint virtual event, in particular the members of the ECOOP'20 Organizing Committee, the joint SPLASH Virtualization Committee, especially the intersection of those two consisting of Toni Mattis, Patrick Rein, and Fabio Niephaus, the Program Committee led by Robert Hirschfeld for compiling an excellent program, AITO e.V. and the support from its Executive Board. Many people contributed to various aspects of the program: the Doctoral Symposium was chaired by Philipp Dominik Schubert, Nafise Eskandani Masoule, Chengsong Tan; Julia Belyakova served as Diversity Chair; Annabel Satin served as Finance Chair; Jan Vitek and Gregor Richards co-organized the workshops; Jacob Hughes and Toni Mattis served as Student Volunteer Co-Chairs; Tim Felgentreff and Tobias Pape managed the ECOOP web site; Fabio Niephaus served as Publicity Chair; Eric Bodden served as Sponsorship Chair; Goran Piskachev and Patrik Rein served as Posters Co-Chairs; and last but not least, Lisa Nguyen Quang Do and Manuel Rigger served as Artifact Evaluation Co-Chairs for ECOOP 2020.

I would like to gratefully acknowledge our sponsor AITO and funding by Deutsche Forschungsgemeinschaft (DFG, German Research Foundation) – HA 6869/2-1, our financial supporters Facebook, Google, Connex Communications GmbH, and Huawei Technologies, as well as the cooperation with ACM and SIGPLAN.

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Finally, I wish all attendants of ECOOP'20 and the co-located events a fantastic time, thought-provoking, and inspiring talks, stimulating discussions and that the online conference offers ample opportunities to network with your peers, researchers and practitioners from our vibrant community.

Christian Hammer
Fall 2020

■ Message from the Artifact Evaluation Chairs

The goal of the *Artifact Evaluation* (AE) is to foster the reproducibility of results by providing authors the possibility to submit an artifact for accepted papers. For ECOOP 2020, artifacts include, but are not limited to, software artifacts, data sets, and proofs. An *Artifact Evaluation Committee* (AEC) reviews these artifacts and decides upon their acceptance. The accepted artifacts are archived in the *Dagstuhl Artifacts Series* (DARTS) published on the *Dagstuhl Research Online Publication Server* (DROPS). Each artifact is assigned a *Digital Object Identifier* (DOI) that can be used in future citations.

This year, the committee evaluated 21 artifacts out of 29 papers accepted at the conference's research track. This corresponds to a participation rate of 72%. 20 of those artifacts were accepted, marking a 95% acceptance rate.

In total 70% of the research papers published at ECOOP 2020 have successfully passed the AE process, indicated by an artifact-evaluation badge on the paper. This is an improvement over the previous ECOOP editions: from 2017 to 2019, respectively 59%, 38%, and 50% of the research papers were accompanied by accepted artifacts.

The AE process for 2020 was a continuation of the AE process of previous ECOOP editions. In particular, the process was based on the artifact evaluation guidelines by Shriram Krishnamurthi, Matthias Hauswirth, Steve Blackburn, and Jan Vitek published on the Artifact Evaluation site.¹ In addition, the authors and reviewers were provided with guidelines for creating and reviewing software artifacts, in particular guidelines from the Artifact Evaluation site,² the *HOWTO for AEC Submitters* by Dan Barowy, Charlie Curtsinger, Emma Tosch, and John Vilk,³ Marianna Rapoport's *Proof Artifacts – Guidelines for Submission and Reviewing*,⁴ and Erin Dahlgren's study on the OOPSLA 2019 artifact evaluation process.

Each artifact was evaluated by three AEC members, which corresponded to a reviewer load of two to three artifacts. The reviewing process consisted of three phases:

- In the *kick-the-tires* phase, reviewers briefly verified the basic integrity of the artifacts to discover any issues that could prevent the evaluation of the artifact (e.g., a corrupted virtual machine image) and to assign a grade for the getting-started guide.
- In case of any issues, reviewers could, during the *interactive reviewing period*, indicate issues and ask clarifying questions to the authors. Authors, in turn, could respond to the reviewers' feedback, and update their artifacts to answer questions and address issues that the reviewers could then also respond to. During that phase, reviewers started a more comprehensive evaluation of their assigned artifacts. They were asked to assess the consistency of the artifact with respect to the paper, the artifact's completeness, documentation, and reusability for future research and to decide on an overall grade.
- In the *final reviewing period*, the submission system was closed to the authors. Each reviewer had a week to finish the evaluation of their assigned artifacts.

The review phase was then followed by a discussion phase, in which artifacts were discussed to converge on either the artifacts' acceptance or rejection.

¹ <http://www.artifact-eval.org>

² <https://www.artifact-eval.org/guidelines.html>

³ <http://bit.ly/HOWTO-AEC>

⁴ <https://proofartifacts.github.io/guidelines/>

Authors that received an acceptance notification were given one week of time to incorporate reviewers' feedback and submit the camera-ready version of their artifacts.

We would like to commend the efforts of all 23 members of this year's AEC, who, in spite of the global crisis, donated their valuable time and effort to make the AE process possible. We thank Martin Kavalari, Philipp Markovics, and Jan Vitek for their efforts in enabling Nextjournal as an option for authors to submit and host their artifacts. We would also like to thank Michael Wagner and the DARTS team for their efforts enabling the publication of the artifacts volume, as well as ECOOP 2020's General Chair Christian Hammer, and the Program Chair Robert Hirschfeld for helping us coordinate the AE with the paper review process.

Lisa Nguyen Quang Do and Manuel Rigger
Fall 2020

■ Objects and a Changing World

Foreword by the President of AITO

The world has changed abruptly: The arrival of a new corona virus has seriously impacted society and traditional academic conferences have not been spared, but rather cancelled, or, at best, become virtual as ECOOP 2020. And, already, we have to start seriously considering going virtual in 2021, thus possibly missing out two years in a row, both Berlin 2020 and Aarhus 2021. We may also already now start wondering about the Post-Corona virus time that we hope will follow the likely (we hope) approval and adoption of a corona vaccine: What will that look like? Will we be able to go back to the tradition physical-meeting-for-a-week academic conferences? Will we want to? Or will everyone, including funding agencies, find that, well, virtual is good enough and a lot cheaper? I hope not as the personal interactions at physical conferences is very hard to mimic virtually. What will happen, time will tell.

Another change that has been slowly evolving over the past decades is that the original strong Object Orientation of ECOOP is that OO has become mainstream, and has diversified: thus ECOOP is mellowing into a more general programming language conference.

I would like to thank the ECOOP 2020 Program Chair, his crew and his PC for putting together an excellent program, Christian Hammer and his crew for organizing ECOOP 2020, and Annabel Satin who has been AITO's indispensable behind-the-scene-manager. I hope you-all will enjoy ECOOP 2020.

Sincerely,
Eric Jul



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