

33rd European Conference on Object-Oriented Programming

ECOOP 2019, July 15–19, 2019, London, United Kingdom

Edited by

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■ Message from the Chairs

We are delighted to welcome you to London for the 33rd European Conference on Object-Oriented Programming (ECOOP 2019), to be held during July 15–19. 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.

This year, ECOOP is once again co-located with the CurryOn conference, which is focussed on the intersection of emerging languages and industrial challenges associated with programming languages. As well as technical papers and keynotes, ECOOP 2019 features several workshops, a doctoral symposium, a poster session, and a summer school.

Awards and keynotes

ECOOP usually features keynotes from the winners of the Senior and Junior Dahl-Nygaard Prize winners. We are deeply saddened that the AITO Dahl-Nygaard Senior Prize winner, Laurie Hendren (McGill University) died in May 2019. Laurie was a leading light in the Programming Languages field, and her passing is a terrible loss to our community.

Winner of the 2019 AITO Dahl-Nygaard Junior Prize, Ilya Sergey (Yale-NUS College and National University of Singapore) will present a keynote, and we are privileged to have two further keynotes, from Azadeh Farzan (University of Toronto), and Simon Peyton Jones (Microsoft Research). Our congratulations go to Yossi Gil and Ori Roth (Technion), whose paper “Fling—A Fluent API Generator” was selected to receive an AITO Distinguished Paper Award.

Paper selection process

Authors had two main routes open to them when submitting to ECOOP 2019. There was a “Journal First” route, whereby authors could submit their papers to be considered for a special issue of the *Science of Computer Programming* journal, presenting the associated paper at ECOOP if accepted. There was also a standard route, whereby authors could submit their papers directly to the conference to be considered for presentation and inclusion in these Dagstuhl LIPICs conference proceedings. In addition, and new for ECOOP 2019, authors could submit papers to the conference in six distinct categories:

- **Research Papers.** This was the most traditional paper category, for research papers demonstrating advances in the Programming Languages (PL) field.
- **Tool Insights Papers.** This category aimed to solicit articles focussing on the practical details of the design and implementation of PL tools—details that are often omitted from regular papers despite being fascinating and worthy of communication.
- **Reproduction Studies.** Independently reconstructing prior experiments, to validate or refute important results of earlier work, can be extremely valuable; this category welcomed papers reporting on such studies.
- **Experience Reports.** This category was for papers focussing on noteworthy applications of existing PL techniques, tools and ideas in interesting domains, potentially in the context of other communities.
- **Pearls.** Originating in the Journal of Functional Programming, and common to conferences such as ICFP and POPL, ECOOP 2019 welcomed so-called “pearl” articles that explain a known idea in a new and elegant way, to the benefit of the PL community.

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- **Brave New Ideas:** This final new category solicited forward-looking articles on ideas in the PL field that may take some time to fully substantiate, but for which early communication to the community is likely to be of benefit.

In total, ECOOP 2019 received 82 submissions, of which the 28 papers appearing in these proceedings were accepted (34.1% acceptance rate). The 82 total submissions comprised 60 Research Papers (19 accepted), 3 Tool Insights Papers (2 accepted), 5 Experience Reports (1 accepted), 4 Pearls (3 accepted), 5 Brave New Ideas (3 accepted), 5 Journal First Papers (none accepted, so no ECOOP 2019 special issue of *Science of Computer Programming*), and no Reproduction Studies.

The new paper categories and dual submission routes were largely successful in increasing the number of papers submitted to ECOOP compared with the 2018 edition of the conference, and we hope that next year's Program Chair will take them forward.

Each submission was evaluated by at least three members of the Program Committee (PC), External Review Committee (ERC) and selected additional reviewers. Papers for which a PC member was a co-author were reviewed exclusively by non-PC members. Authors were given a chance to respond to all reviews of their paper, except in a few cases where it was deemed necessary to solicit additional reviews for borderline papers after the author response period had closed.

The review process was double-blind until the point of review submission. On submitting a review for a paper, the identities of authors of the paper were revealed to the reviewer. The identities of reviewers remained hidden from authors, except that 8 papers were accepted subject to a shepherding process. In these cases, one reviewer served as shepherd for the paper, revealing to the authors that they had reviewed the paper (but not necessarily specifying for which review they were responsible), and acting as an intermediary between the authors and the other reviewers with the aim of helping the authors improve their paper based on key suggestions from the reviewers. We were delighted that all relevant papers ultimately passed the shepherding process and are included in these proceedings.

For environmental reasons, to ease pressure on PC members with family responsibilities, and to make it easier for researchers across the world to commit to serving on the PC, ECOOP 2019 did not feature an in-person PC meeting. Instead, rigorous discussion was conducted online using the HotCRP tool, and a number of conference calls were held for specific papers where it was proving hard to reach a decision asynchronously.

Authors of accepted papers were also invited to submit artifacts, which were evaluated by a separate Artifact Evaluation Committee (AEC). As detailed further in the *Message from the Artifact Evaluation Chairs* below, the committee received 16 artifacts and accepted 14 of them.

Acknowledgements

Putting ECOOP 2019 together has been a big team effort that would not have been possible without help from a lot of people. We offer particular thanks to Annabel Satin, without whose assistance and advice ECOOP could not have happened.

We are very grateful to the authors of *all* submitted papers (whether accepted or not) for taking the time to send their work to ECOOP, and to our keynote speakers and authors of accepted papers who will present at the event. We thank the 25 PC members, 15 ERC members and 15 additional reviewers for their generally very thorough reviewing efforts. We thank our Artifact Evaluation Chairs Maria Christakis and Manuel Rigger for coordinating the evaluation process, and the Artifact Evaluation Committee for their efforts. We are

grateful to many other people for contributing to various aspects of the program: our Workshop Chairs Julian Dolby and Sebastian Erdweg for putting together a comprehensive schedule of workshops; Julia Belyakova and Goran Piskachev for chairing the Doctoral Symposium; Sarah Mount for her work as Diversity Chair; James Noble and Jan Vitek for co-organizing the Summer School; Jacob Hughes and Alisa Maas for their efforts as Student Volunteer Co-Chairs; Stefan Marr for managing the ECOOP web site; Edd Barrett for his tireless efforts as Publicity Chair; Heather Miller for serving as Sponsorship Chair; our poster chair Lisa Nguyen; and our Video chair Benjamin Chung.

Michael Wagner (Dagstuhl) provided excellent support in the preparation of these proceedings, the HotCRP tool was invaluable in facilitating the review process, and the ECOOP 2019 website was powered by the conf.researchr.org service.

We gratefully acknowledge our sponsor AITO as well as our financial supporters—Google, Huawei, Facebook, JetBrains, Oracle, IBM Research, Mozilla and Uber—for their generous contributions.

Finally, we hope that if you are attending ECOOP 2019 that you have a fantastic time, that you find the presentations thought-provoking and inspiring, and that you meet lots of interesting people. Thank you for supporting the event!

Alastair F. Donaldson
ECOOP 2019 Program Chair
Imperial College London

Laurence Tratt
ECOOP 2019 General Chair
King's College London

■ ECOOP: Looking Forward: a Message from the AITO President

A warm welcome to all: I hope that you will enjoy London and the excellent scientific program. Thanks to the organizers, headed up by Laurie Tratt, for working hard on arranging the conference—if just half of their efforts pay off, it will be a great success. ECOOP continues to have great student volunteers that help make things run smoothly—and who get to experience the conference. Thanks to Alastair Donaldson for his dedicated work as PC Chair and to the PC members, who collaborated in assembling a fine scientific program. One of the strong features of ECOOP is the workshops held in connection with the main conference that allows intense interaction between participants. Thanks to all workshop organizers. A final thanks goes to Annabel Satin, the AITO coordinator, without her, things would be a lot more difficult.

This year's Dahl-Nygaard Senior award honours Laurie Hendren, for her continuous and significant contributions for the past 30+ years to the field of object-oriented programming languages and compilation. Sadly, Laurie passed away in May due to illness.

This year's Dahl-Nygaard Junior award goes to Ilya Sergey, who has made a number of significant contributions in the development and application of programming language techniques to various problems across the programming spectrum, covering object-oriented, functional, distributed, and concurrent programming, as well as the blockchain and smart contracts.

You are encouraged to submit a nomination for either or both awards for next year.

The world is changing and so is ECOOP. ECOOP 1998 had more than 700 attendees, many workshops, a large tutorial program, and many exhibitors. Since then many things have changed starting with the .com bust, which meant a reduction in participation from industry and consequently also a reduction in tutorial attendance and exhibits. The past two decades has also seen a number of more specialised conferences in the OO area focusing on specific topic, e.g., aspects, Java, programming, tools, so it is perhaps natural that some move on from ECOOP to such conferences on subtopics within OO, while ECOOP still covers new, and less established OO ideas of the future.

These trends meant that we have evolved ECOOP and that there is lower attendance, significantly reduced exhibits, and a change in tutorials from fully paid introductory tutorials to an academic program of summer school tutorials. The introduction of Curry On has been successful in maintaining the link between industry and academia.

A good workshop program, besides the strong papers in the main conference, has been one of the hallmarks of ECOOP. A high quality workshop program is important to attract strong academics who are not only trendsetters, but also active participants willing to have lively discussions on their views. And for industry to absorb new trends and, conversely, pass on best practices.

Naturally, AITO continually assess the focus and direction of each ECOOP. The AITO General Assembly meeting, which traditionally is held in connection with the main conference includes a discussion on the upcoming ECOOP conferences. We appreciate all input from ECOOP attendees, so I will conclude by encouraging you to pass on your thoughts to any AITO Member.



We do hope that you will enjoy the conference and its associated events. We do ask that everyone maintains a respectful attitude toward everyone else including avoiding behavior that might be viewed as disrespectful or unwanted. At the previous ECOOP, we did have a report of unwanted behaviour in connection with one of the social events; please be respectful at all times – even if you have enjoyed some of the local pints. If you experience any kind of behaviour that causes you discomfort, please contact one of the organisers, or an AITO Exec Member—even if you want your concerns to be kept confidential.

That said, do not forget to enjoy the conference and have fun.

Looking forward, ECOOP 2020 will be in Berlin, we hope to see you there.

Eric Jul

AITO President

University of Oslo

■ Message from the Artifact Evaluation Chairs

The goals of the *Artifact Evaluation* (AE) are to foster the reproducibility of results by providing authors the possibility to submit an artifact for accepted papers. 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 16 artifacts, which correspond to 57% of all accepted papers. 14 of the artifacts were accepted (a 88% acceptance rate). In total, 50% of the research papers published at ECOOP 2018 have successfully passed the AE process, indicated by an artifact-evaluation badge. This outcome is similar to the outcomes of previous ECOOP editions; in 2018, 38% of the research papers, and in 2017, 59% of the research papers were accompanied by accepted artifacts.

The AE process for 2019 was a continuation of the AE process of previous ECOOP editions. In particular, the process was still based on the artifact evaluation guidelines by Shriram Krishnamurthi, Matthias Hauswirth, Steve Blackburn, and Jan Vitek published on the Artifact Evaluation site.¹ The guidelines for artifacts that contain mechanized proofs developed by the ECOOP 2018 AEC were also reused to help both reviewers and authors in creating and reviewing such artifacts.

Each artifact was evaluated by three AEC members, which corresponded to a reviewer load of two to three artifacts. The reviewing process consisted of two 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, as part of a response phase, indicate issues and ask clarifying questions to the authors. Authors, in turn, could respond to the reviewers’ first feedback, and update their artifacts to address any issues that were raised by the reviewers. In the second phase, each reviewer had three weeks to do a comprehensive evaluation of each artifact. Reviewers 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. The review phase was then followed by a discussion phase, in which artifacts were discussed to converge on either the artifacts’ acceptance or rejection. 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 thank the 19 members of this year’s AEC, who donated their valuable time and effort to make the AE process possible. We would also like to thank Michael Wagner for the publication of the artifacts volume, and the Program Chair Alastair Donaldson for helping us coordinate the artifact evaluation with the paper review process.

Maria Christakis
ECOOP 2019 Artifact Evaluation co-chair
Max Planck Institute for Software Systems

Manuel Rigger
ECOOP 2019 Artifact Evaluation co-chair
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¹ <http://www.artifact-eval.org>



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