January 21, 2025
Denver, CO, USA

Association for Computing Machinery

Advancing Computing as a Science & Profession

PEPM '25

Proceedings of the 2025 ACM SIGPLAN International Workshop on

Partial Evaluation and Program Manipulation

Edited by:

Guillaume Allais and Yanhong Annie Liu

Sponsored by:

ACM SIGPLAN, ACM SIGACT, ACM SIGLOG

Co-located with:

POPL '25

Association for Computing Machinery, Inc.
1601 Broadway, 10th Floor
New York, NY 10019-7434
USA

ACM ISBN: 979-8-4007-1350-7

Cover photo:
Title: " The Rocky Mountains in Feb of 2016"
Photographer: James Heilman, MD
License: Creative Commons Attribution-Share Alike 4.0 International
https://creativecommons.org/licenses/by-sa/4.0/deed.en
Cropped from original:
https://commons.m.wikimedia.org/wiki/File:Backcountry1.JPG

Production: Conference Publishing Consulting
D-94034 Passau, Germany, info@conference-publishing.com

Message from the Chairs

We are pleased to present the proceedings of the *2025 ACM SIGPLAN Workshop on Partial Evaluation and Program Manipulation* (*PEPM 2025*), held in Denver, Colorado, January 21st, 2025, in affiliation with the annual Symposium on Principles of Programming Languages (POPL 2025).

PEPM has a history going back to 1991, and originates in the discoveries of practically useful automated techniques for evaluating programs with only partial input. Over the years, the scope of PEPM has expanded to include a variety of research areas centered around the theme of semantics-based program manipulation — the systematic exploitation of treating programs not only as subject to black-box execution, but also as data structures that can be generated, analyzed, and transformed while establishing or maintaining important semantic properties.

Relevant topics includes program and model manipulation techniques such as partial evaluation, fusion, slicing, symbolic execution, and refactoring; techniques that treat programs/models as data objects such as metaprogramming, generative programming, and program synthesis; program analysis techniques that are used to drive program/model manipulation such as abstract interpretation, constraint solving, type systems, and automated testing; application of these techniques including case studies in real-world (industrial, open-source) projects, and robust tools handling realistic applications.

Examples of application domains include legacy program understanding and transformation, domain-specific language implementation, visual languages and end-user programming, scientific computing, middleware frameworks and infrastructure needed for distributed and web-based applications, embedded and resource-limited computation, and security.

This year we received 15 submissions. Through a single-blind reviewing process, the program committee accepted 4 full-length technical papers and 3 short papers for presentation. Each submission was reviewed by at least three program committee members and went through a discussion among the committee members. The full-length technical papers are included in the proceedings. The short papers are available on the PEPM 2025 website: `https://popl25.sigplan.org/home/pepm-2025#program`.

Additionally, we are delighted to welcome William Bowman (University of British Columbia), Brigitte Pientka (McGill University), and Satnam Singh (Groq) as our invited speakers. The paper of William Bowman's invited talk *The Ethical Compiler: Addressing the Is-Ought Gap in Compilation*, the extended abstract of Brigitte

Pientka's invited talk *Cocon: A Type-Theoretic Framework for Meta-Programming*, and the abstract of Satnam Singh's invited talk *The Missing Diagonal: High Level Languages for Low Level Systems* are included in the proceedings.

PEPM 2025 would not have been possible without the significant contributions of many individuals and organizations. We are grateful to the POPL 2025 organizers for taking care of logistical matters and hosting the conference in Denver. Many thanks go to the program committee members and the additional reviewers for their dedication in reviewing and discussing the submissions. We also thank the PEPM steering committee for providing invaluable assistance and guidance. Our final thanks go to the authors for their efforts in writing and then revising their papers and addressing the recommendations of the referees in a constructive manner, and to our invited speakers.

We hope that you find the workshop intellectually stimulating. We are confident that these proceedings will provide a useful scientific reference for years to come.

Guillaume Allais
University of Strathclyde
PEPM 2025 Program Co-Chair

Yanhong Annie Liu
Stony Brook University
PEPM 2025 Program Co-Chair

PEPM 2025 Organization

Program Chairs:

Guillaume Allais (University of Strathclyde, UK)
Yanhong Annie Liu (Stony Brook University, US)

Steering Committee:

Zena Matilde Ariola (University of Oregon, US)
Youyou Cong (Tokyo Institute of Technology, Japan)
Fritz Henglein (University of Copenhagen, Denmark)
Manuel Hermenegildo (IMDEA Software Institute and T.U. Madrid (UPM)), Spain
Atsushi Igarashi (Kyoto University, Japan)
Sam Lindley (University of Edinburgh, UK)
Casper Bach Poulsen (Delft University of Technology, The Netherlands)

Program Committee:

Nada Amin (Harvard University, US)
Zena Matilde Ariola (University of Oregon, US)
Liang-Tign Chen (Academia Sinica, Taiwan)
Youyou Cong (Institute of Science Tokyo, Japan)
Fritz Henglein (University of Copenhagen, Denmark)
Manuel Hermenegildo (IMDEA Software Institute and T.U. Madrid (UPM), Spain)
Zhenjiang Hu (Peking University, China)
Chantal Keller (Université Paris-Saclay, France)
András Kovács (University of Gothenburg, Sweden)
Sam Lindley (University of Edinburgh, UK)
Torben Mogensen (University of Copenhagen, Denmark)
Jens Palsberg (University of California, Los Angeles, US)
Martin Rinard (MIT, US)
Tiark Rompf (Purdue University, US)
João Saraiva (Universidade do Minho, Portugal)
Mark van den Brand (Eindhoven University of Technology, The Netherlands)
Jeremy Yallop (University of Cambridge, UK)

External Reviewers:

John Clements (California Polytechnic State University, US)
Anthony Dario (University of Oregon, US)
Bart Massey (Portland State University, US)
Cameron Wong (Harvard University, US)

PEPM 2025 Sponsor and Supporters

Sponsor

Supporters

Contents

Frontmatter

Invited Contributions

Papers