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⟨Programming⟩ '23

Companion Proceedings of the 7th International Conference on

the Art, Science, and Engineering of Programming

Edited by:

Shigeru Chiba, Youyou Cong, and Elisa Gonzalez Boix

Sponsored by:

ACM in-cooperation with SIGPLAN, SIGSOFT, AOSA, University of Tokyo

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Welcome from the Chairs

Welcome to the Companion Proceedings for the 7th International Conference on the Art, Science, and Engineering of Programming, named <Programming> 2023.

The International Conference on the Art, Science, and Engineering of Programming is a conference focused on programming topics including the experience of programming. We have named it <Programming> for short. <Programming> seeks for papers that advance knowledge of programming on any relevant topic, including programming practice and experience.

This seventh edition followed a hybrid format, and was held in Tokyo, Japan during March 13-17, 2023.

To build a community and to foster an environment where participants can exchange ideas and experiences related to practical software development, <Programming> hosts several co-hosted events. In the 2023 edition, there were four workshops and two tutorials. The workshops included the 7th edition of the International Workshop on Modern Language Runtimes, Ecosystems, and VMs (MoreVMs’23), the 9th edition of the Programming Experience Workshop (PX/23), the 1st edition of the International Workshop on the Art, Science, and Engineering of Quantum Programming (QP’23), and the 1st edition of the Value Independence in Modern Programming Languages Workshop. The tutorials were titled “APL ideas without APL syntax: putting the patterns of data flow into words” (ARPL) and “Relational Programming in miniKanren: an Interactive Tutorial” (mkTut). This companion gathers all the papers for the workshop events.

We are grateful to AOSA for sponsoring <Programming> 2023, to ACM SIGPLAN and ACM SIGSOFT for conferring the “in-cooperation-with” status, and to all from the <Programming> 2023 Organizing and Steering Committee members for the preparation of the event.

We would like to express our gratitude to the authors and reviewers of all co-hosted events for their contribution. Last but not least, we thank everyone who physically or virtually participated in the conference.

Youyou Cong and Elisa Gonzalez Boix
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7th International Workshop on Modern Language Runtimes, Ecosystems, and VMs (MoreVMs 2023)

Welcome to the proceedings of the seventh workshop on Modern Language Runtimes, Ecosystems, and VMs (MoreVMs 2023). The workshop is co-located with <Programming>'23 and took place on March 13th, 2023 in Tokyo, Japan. MoreVMs 2023 aims to bring together industrial and academic programmers to discuss the design, implementation, and usage of modern languages and runtimes. This includes aspects such as reuse of language runtimes, modular implementation, language design, compilation strategies, as well as the interaction of modern languages and runtimes with operating systems and modern hardware architectures.

MoreVMs 2023 is the seventh edition of the workshop. This year's workshop continued in the spirit of striving to enable a diverse discussion on how languages and runtimes are currently being utilized, and where they need to improve further. Presentation proposals were in the form of extended abstracts (2 to 4 pages long) and talk proposals (title and 400 words abstract). Proposals discussing experiences, work-in-progress, as well as future visions, from either an academic or industrial perspective were welcomed. Proposals were reviewed by the members of the program and organising committees. The Program Committee was selected with the intention of having equal parts academic and industrial affiliations. We received 6 submissions, which were all accepted for presentation.

In addition to these 6 reviewed contributions, MoreVMs 2023 had two keynote talks. Katsuhiko Ueno presented his work on "SML#: Toward the ideal interoperability between languages and systems", which used a type-directed compilation technique to generate code interoperable with native code. Zoran Sevarac gave a talk titled "Programming for deep learning on top of Virtual Machines", which reported the challenges and research opportunities of implementing deep learning applications using managed programming languages.

We would like to thank the authors and presenters for their submissions, the keynote speakers for sharing their work and insights with us, and of course the

MoreVMs 2023 program committee for its diligent and constructive reviewing.

We hope that you will find this workshop companion thought-provoking, and that you will consider discussing the work with its authors or join us at MoreVMs'24 next year.

May 2023

Stefan Marr, Tomoharu Ugawa, Athanasios Stratikopoulos

MoreVMs 2023 Program Co-Chairs

Keynote Talks

SML#: Toward the ideal interoperability between languages and systems

Katsuhiko Ueno, Niigata University, Japan

Programming for deep learning on top of Virtual Machines

Zoran Sevarac, Deep Netts LLC, Serbia

MoreVMs 2023 Extended Abstracts

A Compact and Extensible Portable Scheme VM

Léonard Oest O'Leary, Marc Feeley

Cross-Language Interoperability of Heterogeneous Code

Athanasios Stratikopoulos, Florin Blanaru, Juan Fumero, Maria Xekalaki, Orion Papadakis, Christos Kotselidis

Implementation and Evaluation of an Interpreter for Functional Reactive Programming on Small Embedded Devices

Go Suzuki, Takuo Watanabe, Sosuke Moriguchi

Threaded Execution as a Dual to Native Code

Dave Mason

MoreVMs 2023 Talk Proposals

Interpreter Taming to Realize Multiple Compilations in a Meta-Tracing JIT Compiler Framework

Yusuke Izawa, Hidehiko Masuhara and Carl Friedrich Bolz-Tereick

Parallel garbage collector and thin monitor locks for SubstrateVM

Dmitry Chuyko

MoreVMs 2023 Workshop Organization

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Foivos Zakkak, Red Hat, United Kingdom

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Tomoharu Ugawa, The University of Tokyo, Japan

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9th International Workshop on Programming Experience (PX/23)

Message from the Chairs

Some programming feels fun, other programming feels annoying. Why?

For a while now the study of programming has forced improvements to be described through the Fordist lens of usability and productivity, where the thing that matters is how much software can get built, how quickly.

But along the way, something has gone missing. What makes programmers feel the way they do when they're programming? It's not usually fun to spend an age doing something that could have been done easily, so efficiency and usability still matter, but they're not the end of the story.

Some environments, activities, contexts, languages, infrastructures make programming feel alive, others feel like working in a bureaucracy. This is not purely technologically determined, writing Lisp to do your taxes probably still isn't fun, but it's also not technologically neutral, writing XML to produce performance art is still likely to be <bureaucratic></bureaucratic>.

Whilst we can probably mostly agree about what isn't fun, what is remains more personal and without a space within the academy to describe it.

PX set its focus on questions like: Do programmers create *text* that is transformed into running behavior (the old way), or do they operate on *behavior* directly ("*liveness*"); are they exploring the *live domain* to understand the true nature of the requirements; are they *like authors creating new worlds*; does *visualization* matter; is the experience *immediate, immersive, vivid and continuous*; do *fluency, literacy, and learning* matter; do they build *tools, meta-tools*; are they creating *languages* to express new concepts quickly and easily; and curiously, is *joy* relevant to the experience?

In PX/23, we expand its focus to also cover the *experience that programmers have*. What makes it and what breaks it? For whom? What can we build to share the joy of programming with others?

PX/23 was the ninth edition of PX. Participants met onsite in Tokyo or joined remotely, authors presented their work in sessions following the Writers' Workshop structure, and everyone engaged in lively discussions.

Our post-workshop proceedings allowed authors to reflect on the feedback they got from both the program committee and the workshop participants and improve their submission.

We would like to thank our program committee, all workshop attendees, and most importantly our authors for their contributions, constructive criticism, hard work, and willingness to share their ideas.

—Luke Church, Richard P. Gabriel, Hidehiko Masuhara, and Robert Hirschfeld

Papers and Presentations

Clerk: Moldable Live Programming for Clojure

by Martin Kavalár, Philippa Markovics, and Jack Rusher

ReactCOP Supporting Layer Parameter Management for Front-end Web Applications

by Hiroki Hashimoto, Ikuta Tanigawa, Nobuhiko Ogura, and Harumi Watanabe

Probe Log: Visualizing the Control Flow of Babylonian Programming

by Eva Krebs, Patrick Rein, Joana Bergsiek, Lina Urban, and Robert Hirschfeld

My Space, Our Space, Their Space: a First Glance at Developers' Experience of Spaces

by Luke Church, Emma Söderberg, and Martin Höst

Object-centric Time-Travel Debugging: Exploring Traces of Objects

by Christoph Thiede, Marcel Taeumel, and Robert Hirschfeld

Programmer Stories, Stories for Programmers: Exploring Storytelling in Software Development

by Paul Wuilmart, Emma Söderberg, and Martin Höst

Five Futures with AI Coding Agents

by Steven Tanimoto

Resurrecting Score11 in Siren: What ever happened to the 1980s score languages?

by Stephen Travis Pope

Multiple-Representation Visual Compositional Dataflow Programming

by Michael Homer

A Caret for Your Thoughts: Adapting Caret (T) Navigation to Visual Editors

by Elliot Evans

Web

<http://programming-experience.org/px23/>

<https://2023.programming-conference.org/home/px-2023/>

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1st International Workshop on the Art, Science, and Engineering of Quantum Programming (QP 2023)

The First International Workshop on the Art, Science, and Engineering of Quantum Programming (QP 2023) was co-located with the Programming 2023 conference, which took place at the University of Tokyo, Japan, from March 13 to March 17, 2023.

Classical computing is reaching its limit. Thus, there is a need to revolutionize the current form of computing. Towards this end, quantum computing is one of the promising computing paradigms. However, programming quantum computers differ significantly from classical computing due to novel features of quantum computing, such as superposition and entanglement. Thus, the art, science, and engineering of quantum programming differ from classical programming. Therefore, there is a need to initiate the discussion towards this direction and clarify and establish relations with classical programming. QP 2023, thus, provided a platform for researchers and practitioners interested in various aspects of quantum programming and its relations with classical programming to brainstorm research challenges, possible solutions, and future research directions.

In total, we received nine submissions, with six in the research papers category and three proposals for lightning talks. All the submissions were reviewed by three program committee members. After the intensive review process, we accepted five research papers and three lightning talks. As a result, the QP 2023 program had eight talks. In addition, we invited one keynote speaker, Prof. Jianjun Zhao from the Kyushu University, Japan, who gave a talk on: Static Analysis for Quantum Software Correctness and Reliability.

We want to thank the following program committee members for their timely reviews and fruitful discussion during the reviewing period.

- Rui Abreu, INESC-ID & U.Porto, Portugal
- Johanna Barzen, IAAS, Universität Stuttgart, Germany
- Carmelo R. Cartiere, NEXTSENSE (SRL)
- Ross Duncan, Quantinuum, UK
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- Yuan Feng, University of Technology, Sydney, Australia
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- Manuel Wimmer, Johannes Kepler University Linz, Austria
- Nengkun Yu, Faculty of Engineering and Information Technology, University of Technology Sydney, Australia
- Lei Zhang, Ryerson University, Canada
- Jianjun Zhao, Kyushu University, Japan

QP 2023 Co-Chairs:

Shaukat Ali, Simula Research Laboratory and Oslo Metropolitan University, Oslo, Norway

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