

Foreword to the Sixth International Workshop on Quantum Software Engineering (Q-SE 2025)

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On behalf of the organizing and program committees, we welcome you to the 6th International Workshop on Quantum Software Engineering (Q-SE 2025), co-located with the 47th International Conference on Software Engineering (ICSE 2025).

With the recent advances in the development of powerful new quantum computing hardware, high-level languages to write quantum programs such as Microsoft's Q#, Google's Cirq, and IBM's Qiskit have also started to appear. The Q-SE workshop follows the goal to build a community for quantum software engineering (Q-SE), focusing on devising methods, approaches, and processes to develop correct software for quantum programs efficiently. The workshop is a platform for researchers and practitioners to discuss challenges in developing quantum software in high-level quantum languages, novel solutions to build correct methods for testing quantum programs, executing quantum software, developing best practices, and creating a research roadmap of quantum software engineering.

The Q-SE 2025 workshop received a total of 25 submissions, of which seven were selected for publications. Of these, six were regular papers and one was accepted as a position paper. In total, this yields a competitive acceptance rate of 28 %. All papers were reviewed by at least three members of the program committee.

The papers cover different topics, including quantum software quality and defect prediction, quantum circuit analysis and optimization, quantum software development tools and techniques, and bridging academia and industry, and show the many aspects of the field and the growing interest in the domain.

Next to the presentation of the selected publications, we had the pleasure of welcoming Olivia Di Matteo (University of British Columbia, Canada) for an exciting keynote presentation on the "*The Art of Abstraction in Quantum Software*". The keynote offered insights into the need for more expressive languages and frameworks for developing quantum programs that are fuelled by the advances in quantum hardware. The presentation discussed the importance of abstraction in quantum software development, illustrated by examples such as interactive quantum debuggers and multi-level program optimization.

We extend our heartfelt gratitude to the ICSE Organization Committee for their support in hosting this workshop, dedicated to advancing the field of Quantum Software Engineering. We appreciate the Program Committee members for their efforts in reviewing and selecting submissions that reflect the latest developments and challenges in this emerging area. Our sincere thanks go to the authors for their contributions, the keynote speaker for her inspiring talk, and all participants for their active engagement in fostering discussions on Q-SE. A special acknowledgment goes to Sophie Fortz for her outstanding work as Web & Publicity Chair, ensuring the workshop attracted a broad and enthusiastic audience.

— Stefan Klikovits and Mohammad Reza Mousavi