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CALL FOR PAPERS

ACM Transactions on Quantum Computing

*Special Issue on the Techniques of Programming Languages,
Logic, and Formal Methods in Quantum Computing*

Guest Editor

[Xiaodi Wu](#), University of Maryland, USA



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Information

Quantum computing has promised unprecedented improvement in our computational ability to tackle classically intractable problems ranging from crypto-systems, to the simulation of quantum systems, to optimization and machine learning. With the availability of prototypes of quantum computers, especially the recently established quantum supremacy and 53-qubit quantum machines, it becomes possible to investigate the implementation and actual performance of real-world quantum applications. However, many challenges remain in order to unlock the ultimate promises of quantum computing. In particular, the current software tool-chain of quantum computers resembles the one in the early time of classical computers in 1950s. Fortunately, decades of classical computer science research has brought us invaluable experience and techniques that are critical to bring practical quantum computing from the future to the present.

This special issue of *ACM Transactions on Quantum Computing* focuses on the recent developments on the techniques of programming languages, logic, and formal methods to address the unique challenges in quantum computing. Topics of interest to this special issue include, but are not limited to:

- design of quantum programming languages
- verification and debugging techniques for quantum programs
- novel quantum programming abstractions
- semantics of quantum programs
- logics for quantum programs/circuits
- quantum circuit synthesis and optimization
- error-handling, mitigation, and correction as program features
- formal methods in the design and verification of quantum hardware
- intermediate representations and instruction sets for quantum computing
- formally verified software tools for quantum computing
- other techniques from programming languages, logic, and formal methods applied to the domain of quantum computation

Submission Information

For submission information, see the authors guidelines at dl.acm.org/journal/tqc/author-guidelines. Upon submitting your paper, select the paper type "Special Issue on the Techniques of Programming Languages, Logic, and Formal Methods in Quantum Computing".

Important Dates

- Submission Deadline: August 15, 2020
- Reviews Completed: November 1, 2020
- Major Revisions Due: December 1, 2020
- Reviews of Revisions Completed: December 15, 2020
- Notification of Final Acceptance: January 5, 2021

For questions and further information, please write to Xiaodi Wu at xwu@cs.umd.edu.

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