19th Conference on the Theory of Quantum Computation, Communication and Cryptography

TQC 2024, September 9–13, 2024, Okinawa, Japan

Edited by

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Preface

The 19th Conference on The Theory of Quantum Computation, Communication and Cryptography (TQC) was hosted by the Okinawa Institute for Science and Technology in Japan, and held from September 9 to September 13, 2024.

The TQC conference is a leading annual international conference for students and researchers working in the theoretical aspects of quantum information science. The scientific objective of TQC is to bring together the theoretical quantum information science community to present and discuss the latest advances in the field.

Areas of interest for TQC include, but are not restricted to: quantum algorithms, models of quantum computation, quantum complexity theory, simulation of quantum systems, quantum cryptography, quantum communication, quantum information theory, quantum estimation and measurement, quantum error correction and fault-tolerant quantum computing, intersection of quantum information and condensed-matter theory, intersection of quantum information and machine learning.

A list of the previous editions of TQC follows:

- TQC 2023, University of Aveiro, Portugal
- TQC 2022, University of Illinois at Urbana-Champaign, USA
- TQC 2021, University of Latvia, Latvia (virtual conference)
- TQC 2020, University of Latvia, Latvia (virtual conference)
- TQC 2019, University of Maryland, USA
- TQC 2018, University of Technology Sydney, Australia
- TQC 2017, Université Pierre et Marie Curie, France
- TQC 2016, Freie Universität Berlin, Germany
- TQC 2015, Université libre de Bruxelles, Brussels, Belgium
- TQC 2014, National University of Singapore, Singapore
- TQC 2013, University of Guelph, Canada
- TQC 2012, University of Tokyo, Japan
- TQC 2011, Universidad Complutense de Madrid, Spain
- TQC 2010, University of Leeds, UK
- TQC 2009, Institute for Quantum Computing, University of Waterloo, Canada
- TQC 2008, University of Tokyo, Japan
- TQC 2007, Nara Institute of Science and Technology, Nara, Japan
- TQC 2006, NTT R&D Center, Atsugi, Kanagawa, Japan

The conference consisted of invited talks, contributed talks, a poster session, a rump session, and a business meeting. The invited talks were given by Jens Eisert (FU Berlin), Zhengfeng Ji (Tsinghua University), Dakshita Khurana (University of Illinois Urbana-Champaign), and Tomoyuki Morimae (Yukawa Institute for Theoretical Physics, Kyoto University). Submissions were solicited for two tracks: *With Proceedings* (talk and proceedings) and *Without Proceedings* (talk only).

There were 460 submissions for talks, 44 of which were also submitted to the *With Proceedings* track. The program committee selected 92 submissions for talks, including 12 from the *With Proceedings* track. This year, the program committee also selected 19 submissions for outstanding posters.

We wish to thank the members of the Program Committee and all subreviewers for their incredible work towards composing the program of the conference. We would also like to thank the Local Organizing Committee for all their efforts in organizing the conference, as well as the Steering Committee for maintaining the conference's high standards. Last but not least, we thank the authors of all the TQC 2024 submissions.

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Outstanding Paper Award

From the submission of the track *With Proceedings*, the Program Committee selected as the TQC 2024 Outstanding Papers, by order of publication in the proceedings:

- *Multi-qubit Lattice Surgery Scheduling*, by Allyson Silva, Xiangyi Zhang, Zachary Webb, Mia Kramer, Chan Woo Yang, Xiao Liu, Jessica Lemieux, Kawai Chen, Artur Scherer, Pooya Ronagh
- *Stochastic error cancellation in analog quantum simulation*, by Yiyi Cai, Yu Tong, John Preskill

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