

QCE23 Workshops Papers

WKS06 — Quantum Machine Learning: From Foundations to Applications

Volker Tresp, Siemens AG, Technology / LMU Munich, Germany

Steffen Udluft, Siemens AG, Technology, Germany

Daniel Hein, Siemens AG, Technology, Germany

Martin Leib, IQM, Germany

Christopher Mutschler, Fraunhofer IIS, Germany

Daniel D. Scherer, Fraunhofer IIS, Germany

Wolfgang Mauerer, Technical University of Applied Science Regensburg, Germany

Applying QNLP to sentiment analysis in finance

Jonas Stein, Ivo Christ, Nicolas Kraus, Maximilian Balthasar Mansky, Robert Müller, Claudia Linnhof-Popien

Differentiable Quantum Architecture Search for Quantum Reinforcement Learning

Yize Sun, Yunpu Ma, Volker Tresp

qgym: A Gym for Training and Benchmarking RL-Based Quantum Compilation

Stan van der Linde, Willem de Kok, Tariq Bontekoe, Sebastian Feld

Quantum deep Q learning with distributed prioritized experience replay

Samuel Yen-Chi Chen

Quantum Machine Learning with Quantum Topological Data Analysis

Ankit Khandelwal, M Girish Chandra

A Quantum-annealing-based Transfer Learning Approach for Large-Scale Image Classification Using Quantum Boltzmann Machines

Daniëlle Johanna Schuman, Leo Sünkel, Philipp Altmann, Jonas Stein, Christoph Roch, Thomas Gabor, Claudia Linnhoff-Popien

Quantum Natural Policy Gradients: Towards Sample-Efficient Reinforcement Learning

Nico Meyer, Daniel D. Scherer, Axel Plinge, Christopher Mutschler, Michael J. Hartmann

Towards An End-To-End Approach For Quantum Principal Component Analysis

Emanuele Dri, Antonello Aita, Tommaso Fioravanti, Giulia Franco, Edoardo Giusto, Giacomo Ranieri, Bartolomeo Montrucchio, Davide Corbelleto

QCE23 Workshops Papers

WKS09 — Quantum Algorithms for Differential Equations

David Jennings, PsiQuantum, UK
Matteo Lostaglio, PsiQuantum, The Netherlands
Dong An, University of California Berkeley, USA
Nana Liu, Jiao Tong University, China
Yigit Subasi, Los Alamos National Labs (LANL), USA

Potential quantum advantage for simulation of fluid dynamics

Xiangyu Li, Xiaolong Yin, Nathan Wiebe, Jaehun Chun, Gregory K Schenter, Margaret S Cheung, Johannes Heinrich Georg Muelmenstaedt

Continuous Variables Quantum Algorithm for solving Ordinary Differential Equations

Alice Barthe, Michele Grossi, Jordi Tura, Vedran Dunjko

Efficient Quantum Algorithms for Nonlinear Stochastic Dynamical Systems

Abeynaya Gnanasekaran, Amit Surana, Tuhin Sahai

Quantum algorithm for the linear Vlasov equation with collisions

Abtin Ameri, Erika Ye, Paola Cappellaro, Hari Krovi, Nuno Loureiro

QCE23 Workshops Papers

WKS10 — Chemical Applications of Quantum Computing

Daniel Claudino, Oak Ridge National Laboratory (ORNL), USA

Bo Peng, Pacific Northwest National Laboratory (PNNL), USA

Nicholas Bauman, Pacific Northwest National Laboratory (PNNL), USA

Karol Kowalski, Pacific Northwest National Laboratory (PNNL), USA

Travis Humble, Oak Ridge National Laboratory (ORNL), USA

Quantum Simulations for Carbon Capture on Metal-Organic Frameworks

Gopal Ramesh Dahale

Efficient state preparation on quantum computers using non-unitary CCSD

Alexandre Fleury, James Brown, Erika Lloyd, Valentin Senicourt, Isaac H. Kim

Optimizing Variational Quantum Eigensolver for Simulating Benzene Molecules on Trapped-Ion Quantum Computers

Joshua Goings, Luning Zhao, Jacek Jakowski, Titus Morris, Raphael Pooser

Benchmarking Adaptive Quantum Circuit Optimisation Algorithms for Quantum Chemistry

Waheeda Saib

Symmetry breaking slows convergence of the ADAPT Variational Quantum Eigensolver

Luke Bertels

Logical Error Rates for the Variational Quantum Eigensolver using a $[[4,2,2]]$ Encoded Ansatz

Meenambika Gowrishankar, Daniel Claudino, Jeremiah Wright, Travis Humble

QCE23 Workshops Papers

WKS17 — Third International Workshop on Integrating High-Performance Computing with Quantum Computing (WIHPQC 2023)

Martin Schulz: Technical University of Munich, Germany

Laura Schulz: Leibniz Supercomputing Centre, Germany

Sven Karlsson: Technical University of Denmark

Toward a Unified Hybrid HPCQC Toolchain

Philipp Seitz, Amr Elsharkawy, Xiao-Ting Michelle To, Martin Schulz

Efficient Parameterised Compilation for Hybrid Quantum Programming

Anna M. Krol, Koen Mesman, Aritra Sarkar, Matthias Möller, Zaid Al-Ars

One nine availability of a Photonic Quantum Computer on the Cloud toward HPC integration

Nicolas Maring, Andreas Fyrillas, Mathias Pont, Edouard Ivanov, Eric Bertasi, Mario Valdivia, Jean Senellart

A Hybrid Classical-Quantum HPC Workload

Aniello Esposito, Jessica Jones, Sebastien Cabaniols, David Brayford

Modeling of Errors in Quantum Computers with Generated Structural Circuits

Jakob Schneider, Mathias Gammelmark, Sven Karlsson

Exploring Hybrid Classical-Quantum Compute Systems through Simulation

Muhammad Nufail Farooqi, Martin Ruefenacht

Experimenting hybrid quantum optimization in HPC software stack for CPU register allocation

Brice Chichereau, Stéphane Vialle, Patrick Carribault

BBQ-mIS: a parallel quantum algorithm for graph coloring problems

Chiara Vercellino, Giacomo Vitali, Paolo Viviani, Edoardo Giusto, Alberto Scionti, Andrea Scarabosio, Olivier Terzo, Bartolomeo Montrucchio

Towards a Dutch hybrid quantum/HPC infrastructure

Olaf Schüsler, Ariana Torres-Knoop, Christiaan Hollemans, Bas van der Vlies, Jaap Dijkshoorn, Richard Versluis

Fidelity Prediction Model Based on Environmental Factors and Metrics of Quantum Computer

Hossam Ahmed, Xiaolong Deng, Helmut Heller, Laura Schulz, Martin Schulz

QCE23 Workshops Papers

WKS21 — 3rd International Workshop on Quantum Software Engineering and Technology

Jose García-Alonso, University of Extremadura, Spain
Majid Haghparast, University of Jyväskylä, Finland
Tommi Mikkonen, University of Jyväskylä, Finland
Ricardo Pérez-Castillo, University of Castilla-La Mancha, Spain
Juan Murillo, Computaex, Spain

Towards Quantum Software Requirements Engineering

Tao Yue, Shaukat Ali, Paolo Arcaini

Generation of Classical-Quantum Code from UML models

Ricardo Pérez-Castillo, Luis Jiménez-Navajas, Iván Cantalejo, Mario Piattini

On Refactoring Quantum Programs

Jianjun Zhao

Quantum Software Engineering Challenges from Developers' Perspective: Mapping Research Challenges to the Proposed Workflow Model

Majid Haghparast, Tommi Mikkonen, Jukka K. Nurminen, Vlad Stirbu

Full-Stack Quantum Software in Practice: Ecosystem, Stakeholders and Challenges

Vlad Stirbu, Majid Haghparast, Muhammad Waseem, Niraj Dayama, Tommi Mikkonen

Comparing Quantum Service Offerings

Julian Obst, Johanna Barzen, Martin Beisel, Frank Leymann, Marie Salm, Felix Truger

Towards efficient automatic oracle synthesis and resource estimation using QDK and QIR

I-Tung Chen, Chaman Gupta

Leveraging API Specifications for Scaffolding Quantum Applications

Javier Romero-Álvarez, Jaime Alvarado-Valiente, Enrique Moguel, Carlos Canal, Jose García-Alonso, Juan M. Murillo

Minimizing Deployment Cost of Hybrid Applications

Álvaro M. Aparicio-Morales, Juan Luis Herrera, Enrique Moguel, Javier Berrocal, Jose Garcia-Alonso, Juan M. Murillo

Dispatching Shots Among Multiple Quantum Computers: an Architectural Proposal

Giuseppe Bisicchia, Jose García-Alonso, Juan M. Murillo, Antonio Brogi

Using interfaces for writing modular quantum software

Michał Stęchły

Resource Estimation of Quantum Multiplication Algorithms

Ethan Hansen, Sanskriti Joshi, Hannah Rarick

QCE23 Workshops Papers

WKS26 — Workshop on Software Architecture Concerns for Quantum (WOSAQ)

Daniel Justice, Software Engineering Institute, Carnegie-Mellon University, USA

Rick Kazman, Software Engineering Institute, Carnegie-Mellon University & University of Hawaii, USA

Jason Larkin, Software Engineering Institute, Carnegie-Mellon University, USA

Andrew Mellinger, Software Engineering Institute, Carnegie-Mellon University, USA

Software Architecture Challenges in Integrating Hybrid Classical-Quantum Computers

Vlad Stirbu, Tommi Mikkonen

A QIR Toolchain with XACC

Elaine Wong, Sharmin Afrose, Meenambika Gowrishankar, Daniel Claudino, Vicente Leyton-Ortega, Seth Johnson, Travis Humble

QCE23 Workshops Papers

WKS30 — Quantum System Stability and Reproducibility Workshop

Weiwen Jiang, George Mason University, USA
Travis Humble, Oak Ridge National Laboratory (ORNL), USA
Qiang Guan, Kent State University, USA

Short-Depth Circuits and Error Mitigation for Large-Scale GHZ-State Preparation, and Benchmarking on IBM's 127-Qubit System

Kuancheng Chen

QVis: A Visual Analytics Tool for Exploring Noise and Errors in Quantum Computing Systems

Chad Steed, Junghoon Chae, Samudra Dasgupta, Travis Humble

Reinforcement Learning for Gate Synthesis in Noisy Quantum Systems

Mekena Metcalf, Amara Katarawa, Collin Farquhar, Yudong Cao, Marc Davis, Hyeonrak Choi, Dirk Englund

Noise Modeling of the IBM Quantum Experience

Yasuo Oda, Omar Shehab, Gregory Quiroz

Reliable Devices Yield Stable Quantum Computations

Samudra Dasgupta, Travis Humble

Extremum seeking control of quantum gates

Erfan Abbasgholinejad, Haoqin Deng, John Gamble, J. Nathan Kutz, Erik Nielsen, Neal Pimenti, Ningzhi Xie

Understanding the Effect of Transpilation in the Reliability of Quantum Circuits

Nicola Dilillo, Edoardo Giusto, Emanuele Dri, Betis Baheri, Qiang Guan, Bartolomeo Montrucchio, Paolo Rech