

Sunday, November 2

Room Auditorium

- 09:00 – 10:30 Tutorial I: *Pauli Propagation: A Framework for Simulating Quantum Systems* (Speakers: Manuel Rudolph, Armando Angrisani)
- 11:00 – 12:30 Tutorial II: *Quantum Annealing for Constrained Optimization* (Speaker: Philippe Codognet)
- 14:00 – 15:30 Tutorial III: *Quantum Reinforcement Learning: From Foundations to Emerging Applications – Part I* (Speakers: Samuel Yen-Chi Chen, Joongheon Kim)
- 16:00 – 17:30 Tutorial III: *Quantum Reinforcement Learning: From Foundations to Emerging Applications – Part II* (Speakers: Samuel Yen-Chi Chen, Joongheon Kim)

Room A

- 11:00 – 12:30 Tutorial IV: *Mastering Algorithmic Mechanism Design on Quantum Computing Networks: Resilient Solutions for Cybersecurity* (Speaker: Hubert Kołcz)
- 14:00 – 15:30 Tutorial V: *From Theory to Practice: Applying Quantum Key Distribution and Post-Quantum Cryptography for 6G Network* (Speakers: Engin Zeydan, Abdullah Aydeger)

Monday, November 3

Room Auditorium

Session Name: Quantum Machine Learning – Part I

Chair: Giovanni Acampora

- 9:00 Paper Title: *A generalization of the quantum k-Nearest Neighbours algorithm and its application to solve the problem of the Closest Pair of Points*
Authors name: Manuel P. Cuellar, Amir Pourabdollah
- 9:20 Paper Title: *Quantum-Assisted Correlation Clustering*
Authors name: Antonio Macaluso, Supreeth Mysore Venkatesh, Diego Arenas, Matthias Klusch, Andreas Dengel
- 9:40 Paper Title: *Quantum Long Short-term Memory with Differentiable Architecture Search*
Authors name: Samuel Yen-Chi Chen, Prayag Tiwari
- 10:00 Paper Title: *Adiabatic training of VQAs for entanglement detection*
Authors name: Ernesto Acosta, Carlos Cano, Daniel Manzano, Guillermo Botella
- 10:20 Paper Title: *Compositional Concept Generalization with Variational Quantum Circuits*
Authors name: Hala Hawasheen, Mina Abbaszadeh, Nicholas Joseph, Beth Pearson, Martha Lewis, Mehrnoosh Sadrzadeh

Session Name: Quantum Optimization – Part I

Chair: Autilia Vitiello

- 14:00 Paper Title: *Approximating Ground States of Quantum Hamiltonians with Snapshot-QAOA*
Authors name: Reuben Tate, Quinn Langfitt, Elijah Pelofske, Ammar Kirmani, Andreas Bärtshi, John Golden, Stephan Eidenbenz
- 14:20 Paper Title: *Superpositional Gradient Descent: Harnessing Quantum Principles for Model Training*
Authors name: Ahmet Erdem Pamuk, Emir Kaan Özdemir, Şuayp Talha Kocabay
- 14:40 Paper Title: *Scalable Quantum Approximate Optimisation with Adaptive Bayesian Dimensionality Reduction*
Authors name: Amir Alizadeh, Amir Pourabdollah, Ahmad Lotfi
- 15:00 Paper Title: *A Study of the Effects of Quantum Noise on Hybrid Quantum Genetic Algorithm*
Authors name: Giovanni Acampora, Mario Pignataro, Alessandro Riolo, Autilia Vitiello
- 15:20 Paper Title: *An effective QUBO formulation for knapsack problems*
Authors name: Sutapa Samanta, Dagen Wang, Todd Hodges, Andras Ferenczi
- 15:40 Paper Title: *QUAV: Quantum-Assisted Path Planning and Optimization for UAV Navigation with Obstacle Avoidance*
Authors name: Nouhaila Innan, Muhammad Kashif, Alberto Marchisio, Yung-Sze Gan, Frederic Barbaresco, Muhammad Shafique

Session Name: Artificial Intelligence for Quantum Computing – Part I

Chair: Angelo Oddi

- 16:30 Paper Title: *CNOT Minimal Circuit Synthesis: A Reinforcement Learning Approach*
Authors name: Riccardo Romanello, Daniele Lizzio Bosco, Jacopo Cossio, Dusan Sutulovic, Giuseppe Serra, Carla Piazza, Paolo Burelli
- 16:50 Paper Title: *Evolutionary-Based Circuit Optimization for Distributed Quantum Computing*
Authors name: Leo Sünkel, Jonas Stein, Gerhard Stenzel, Michael Kölle, Thomas Gabor, Claudia Linnhoff-Popien
- 17:10 Paper Title: *A Game-Theoretic Framework for Adaptive Calibration of Blind Quantum Computing with Metaheuristics and Quantum GAN Feedback*
Authors name: Hubert Kołcz
- 17:30 Paper Title: *Divide-et-impera Heuristic-based Randomized Search for the Qubit Routing Problem*
Authors name: Marco Baiocchi, Fabrizio Fagiolo, Angelo Oddi, Riccardo Rasconi
- 17:50 Paper Title: *Ansatz Optimization using Simulated Annealing in Variational Quantum Algorithms for the TSP*
Authors name: Fabrizio Fagiolo, Nicolò Vescera

Room A

Session Name: Practical Quantum Machine Learning in the NISQ Era – Part I

Chair: Amir Pourabdollah

- 9:00 Paper Title: *Implementing Large Quantum Optimized Quantum Embedding: A Universal Minor-Embedding Framework for Large Complete Bipartite Graph*
Authors name: Salvatore Sinno, Thomas Gross, Nicholas Chancellor, Bhavika Bhargamiya, Arati Sahoo
- 9:20 Paper Title: *Cutting is All You Need: Execution of Large-Scale Quantum Neural Networks on Limited-Qubit Devices*
Authors name: Alberto Marchisio, Emman Sychiuc, Muhammad Kashif, Muhammad Shafique
- 9:40 Paper Title: *Characterizing Scaling Trends of Post-Compilation Circuit Resources for NISQ-era QML Models*
Authors name: Rupayan Bhattacharjee, Pau Escofet, Santiago Rodrigo, Sergi Abadal, Carmen G. Almudever, Eduard Alarcon
- 10:00 Paper Title: *Evaluating Variational Quantum Circuit Architectures for Distributed Quantum Computing*
Authors name: Leo Sünkel, Jonas Stein, Jonas Nüßlein, Tobias Rohe, Claudia Linnhoff-Popien

10:20 Paper Title: *Special-Unitary Parameterization for Trainable Variational Quantum Circuits*
Authors name: Kuan-Cheng Chen, Huan-Hsin Tseng, Samuel Yen-Chi Chen, Chen-Yu Liu, Kin K. Leung

10:40 Paper Title: *Optimization of Approximate Quantum Random Access Memory for NISQ Devices*
Authors name: Sohrab Sajadimanesh, Jean Paul Latyr Faye, Ehsan Atoofian

Session Name: Practical Quantum Machine Learning in the NISQ Era – Part II

Chair: Manuel Cuellar

14:00 Paper Title: *It's-A-Me, Quantum Mario: Scalable Quantum Reinforcement Learning with Multi-Chip Ensembles*
Authors name: Junghoon Justin Park, Huan-Hsin Tseng, Shinjae Yoo, Samuel Yen-Chi Chen, Jiok Cha

14:20 Paper Title: *Medical Imaging Classification with Cold-Atom Reservoir Computing using Auto-Encoders and Surrogate-Driven Training*
Authors name: Nuno Batista, Ana Beatriz Morgado, Oscar Ferraz, Jorge Lobo, Sagar Silva Pratapsi, Gabriel Falcão

14:40 Paper Title: *Quantum Generative Adversarial Networks for Intrusion Detection: An Experimentation on Real Quantum Devices*
Authors name: Franco Cirillo, Christian Esposito

15:00 Paper Title: *HQNET: Harnessing Quantum Noise for Effective Training of Quantum Neural Networks in NISQ Era*
Authors name: Muhammad Kashif, Muhammad Shafique

15:20 Paper Title: *Quantum Fuzzy Edge Detection algorithm: an industrial application*
Authors name: Gennaro Nunziata, Luigi Coraggio, Serena Crisci, Giovanni De Gregorio, Nunzio Itaco, Mattia Neri, Matteo Roffilli, Roberto Schiattarella

15:40 Paper Title: *Quantum Semi-Random Forests for Qubit-Efficient Recommender Systems*
Authors name: Azadeh Alavi, Fatemeh Kouchmeshki, Abdolrahman Alavi, Yongli Ren, Jiayang Niu

Session Name: Doctoral Colloquium

Chair: Autilia Vitiello

16:30 Title: *Against Intuition: Designing Quantum Algorithms from Counterintuitive Behavior and Seeking Meaning through Machine Learning*
Speaker: Sara Giordano

16:45 Title: *Tensor Networks for Machine Learning*
Speaker: Guillermo Valverde

17:00 Title: *Hybrid Quantum Algorithms for Industrial Optimisation: Drone Routing with QAOA*
Speaker: Julen Ercibengoa

17:15 Title: *Reinforcement Learning for Quantum Circuit Optimization*
Speaker: Allegra Cuzzocrea

17:30 Title: *Optimization in Quantum Computing Models Using Hybrid Machine Learning, Representation Theory, and Optical Technologies*
Speaker: Hubert Kołcz

Tuesday, November 4

Room Auditorium

Session Name: Quantum Optimization – Part II

Chair: Roberto Schiattarella

- 9:00 Paper Title: *Quadratic Continuous Quantum Optimization*
Authors name: Sascha Mücke, Thore Gerlach, Nico Piatkowski
- 9:20 Paper Title: *On the Effect of Local Readout Error Mitigation on Genetic Algorithm-based QAOA*
Authors name: Giovanni Acampora, Angela Chiatto, Roberto Schiattarella, Autilia Vitiello
- 9:40 Paper Title: *A QUBO formulation for scheduling satellite observations of Mars*
Authors name: Benedetta Ferrari, Giulio Ganzerli, Manuel Iori, Roberto Orosei
- 10:00 Paper Title: *Quantum Markov Chain Monte Carlo for Cosmological Functions*
Authors name: Giuseppe Sarracino, Vincenzo Fabrizio Cardone, Roberto Scaramella, Giuseppe Riccio, Andrea Bulgarelli, Carlo Burigana, Luca Cappelli, Stefano Cavuoti, Farida Farsian, Irene Graziotti, Massimo Meneghetti, Giuseppe Murante, Nicolò Parmiggiani, Alessandro Rizzo, Francesco Schillirò, Vincenzo Testa, Tiziana Trombetti
- 10:20 Paper Title: *Benchmarking of D-Wave's and IBM's Devices on Known Quantum Solutions to NP-Complete Problems*
Authors name: Junjie Zhu, Filippo Orazi, Sara Marzella, Daniele Ottaviani, Stefano Lodi
- 10:40 Paper Title: *From Classical to Quantum Optimization: Enhancing Cultural Heritage Visits through Adaptive Path Planning*
Authors name: Angela Chiatto, Francesco Colace, Alfredo Massa, Giovanni Trezza, Alfredo Troiano, Carmine Valentino, Nadia Caterina Zullo Lasala

Session Name: Industrial Track

Chair: Giovanni Acampora

- 14:00 - *Panelists:* Alessandro Bruno (QuantWare), Enrico Landolfi (NetCom Group), Alfredo
16:00 Massa (QuantumNet), Samuel Yen-Chi Chen (Wells Fargo)

Session Name: Quantum Machine Learning – Part IV

Chair: Daniel Manzano

- 16:30 Paper Title: *FL-QDSNNs: Federated Learning with Quantum Dynamic Spiking Neural Networks*
Authors name: Nouhaila Innan, Alberto Marchisio, Muhammad Shafique
- 16:50 Paper Title: *ResQGRNN: Quantum-Compatible Residual Learning for Graph Recurrent Neural Networks*

Authors name: Jawaher Kaldari, Muhammad Kashif, Saif Al-Kuwari, Muhammad Shafique

17:10 Paper Title: *RobQFL: Robust Quantum Federated Learning in Adversarial Environment*

Authors name: Walid El Maouaki, Nouhaila Innan, Alberto Marchisio, Taoufik Said, Muhammad Shafique, Mohamed Bennai

17:30 Paper Title: *Multimodal Quantum Vision Transformer for Enzyme Commission Classification from Biochemical Representations*

Authors name: Murat Isik, Mandeep Kaur Saggi, Humaira Gowher, Sabre Kais

17:50 Paper Title: *QCA-MolGAN: Quantum Circuit Associative Molecular GAN with Multi-Agent Reinforcement Learning*

Authors name: Aaron Mark Thomas, Yu-Cheng Chen, Hubert Okadome Valencia, Sharu Theresa Jose, Ronin Wu

18:10 Title J2C: Quantum-enhanced Stratification of Breast Cancer: Exploring Quantum Expressivity for Real Omics Data

Authors name: Valeria Repetto

Room A

Session Name: Quantum Machine Learning – Part II

Chair: Alfredo Massa

9:00 Paper Title: *Quantum Principal Component Analysis for Financial Fraud Detection*

Authors name: Giacomo Lancellotti, Alberto Guerrini, Giacomo Ranieri, Valeria Zaffaroni, Paolo Cremonesi

9:20 Paper Title: *Beyond Classical Multi-Krum: Enhancing Byzantine Detection with Quantum Embeddings*

Authors name: Andras Ferenczi, Dagen Wang, Todd Hodges, Sutapa Samanta

9:40 Paper Title: *Hybrid Quantum-Classical Walks for Graph Representation Learning in Community Detection*

Authors name: Adrian Marin, Mauricio Soto-Gomez, Giorgio Valentini, Elena Casiraghi, Carlos Cano, Daniel Manzano

10:00 Paper Title: *Leveraging Quantum Feature Spaces for Industrial Time-Series Anomaly Detection*

Authors name: Takao Tomono, Kazuya Tsujimura

10:20 Paper Title: *A Quantum Machine Learning algorithm for Hazelnut Variety Recognition*

Authors name: Alfredo Massa, Gennaro Nunziata, Fabio Polverino, Lelio Campanile, Mariarosaria Castaldo, Luigi Coraggio, Serena Crisci, Giovanni De Gregorio, Walid Idrissi Ibnsalih, Nunzio Itaco, Enrico Landolfi, Stefano Marrone, Gerardo Toraldo, Alfredo Troiano

10:40 Title J2C: *A quantum leaky integrate-and-fire spiking neuron and network*

Authors name: Dean Brand, Francesco Petruccione

Session Name: Quantum Machine Learning – Part III

Chair: Angela Chiatto

- 14:00 Paper Title: *Quantum Machine Learning for Climate Modelling*
Authors name: Mierk Schwabe, Lorenzo Pastori, Valentina Sarandrea, Veronika Eyring
- 14:20 Paper Title: *Quantum LSTM Guided Sampling for Efficient Configuration Interaction in Solving the Schrödinger Equation*
Authors name: Jorge I. Hernandez-Martinez, Sandra Leticia Juárez-Osorio, Andres Mendez-Vazquez, Gerardo Rodriguez-Hernandez, Eduardo Rodriguez-Tello
- 14:40 Paper Title: *Enhancing Credit Risk Prediction through Co-trained Hybrid Quantum Transfer Learning Model*
Authors name: Parvathy Gopakumar, Rubell Marion Lincy G, Salvatore Sinno, Shruthi Thuravakkath
- 15:00 Paper Title: *Quantum Neuromorphic Classification of EEG Brain Signals*
Authors name: Dean Brand, Ravi Kumar Jha
- 15:20 Paper Title: *MolQAE: Quantum Autoencoder for Molecular Representation Learning*
Authors name: Yi Pan, Hanqi Jiang, Wei Ruan, Dajiang Zhu, Xiang Li, Yohannes Abate, Yingfeng Wang, Tianming Liu
- 15:40 Paper Title: *Sparse Image Classification Using Quantum-Inspired Tensor Networks for Brain MRI*
Authors name: Keshav Balakrishna, Aaryan Chityala, Vivan Kanna, Moemal Al-Wishah, Harshit Ravula, Aaron Lee

Session Name: Artificial Intelligence for Quantum Computing – Part II

Chair: Alberto Marchisio

- 16:30 Paper Title: *Kernel k -Medoids as General Vector Quantization*
Authors name: Thore Gerlach, Sascha Muecke, Christian Bauckhage
- 16:50 Paper Title: *Beyond Classical: The Role of Data Encoding in Quantum Regression on Air Quality Prediction*
Authors name: Mansur Ziatdinov, Salvatore Distefano
- 17:10 Paper Title: *Circuit Partitioning for the Quantum Internet*
Authors name: Leo Sünkel, Thomas Gabor, Claudia Linnhoff-Popien
- 17:30 Paper Title: *Optimising Quantum Calculations Reliability via Machine Learning: The IBM Case Study*
Authors name: Zakaria Abdelmoiz Dahi, Francisco Chicano, Gabriel Luque, Iván Delgado Alba
- 17:50 Paper Title: *QHackBench: Benchmarking Large Language Models for Quantum Code Generation Using PennyLane Hackathon Challenges*

Authors name: Abdul Basit, Minghao Shao, Muhammad Haider Asif, Nouhaila Innan,
Muhammad Kashif, Alberto Marchisio, Muhammad Shafique

Wednesday, November 5

Room Auditorium

Session Name: Quantum Machine Learning – Part V

Chair: Mierk Schwabe

- 9:00 Paper Title: *Quantum Solution for Nonlinear Differential Equations: Carleman and Liouville Linearization*
Authors name: Alexander Häbel, Nils Klement, Veronika Eyring, Mierk Schwabe
- 9:20 Paper Title: *Advancing the Sustainability of Quantum Computing and Quantum AI: bridging policy gaps with a preliminary framework*
Authors name: Ermanno Petrocchi, Simona Tiribelli, Filippo Caruso
- 9:40 Paper Title: *A Study on Stabilizer Rényi Entropy Estimation using Machine Learning*
Authors name: Vincenzo Lipardi, Domenica Dibenedetto, Georgios Stamoulis, Mark H.M. Winands
- 10:00 Paper Title: *Explaining Anomalies with Tensor Networks*
Authors name: Hans Hohenfeld, Marius Beuerle, Elie Mounzer
- 10:20 Paper Title: *Design of a realistic DI-QKD System*
Authors name: Ugo Chirico, Salvatore Cuomo, Gianluca Vallini, Miriam Del Latte
- 10:40 Title J2C: *Randomized Tensor Network Reservoir Computing: Validity and Learnability Phase Transitions*
Authors name: Chih-Chieh Chen, Shinji Sato, Daiki Sasaki, Kodai Shiba, Tomah Sogabe

Workshop on QAI: Case Studies and Applications in Real World Scenarios – Part I

Chairs: Massimo Esposito, Marco Pota

- 14:00 Paper Title: *Quantum-Efficient Reinforcement Learning Solutions for Last-Mile On-Demand Delivery*
Authors name: Farzan Moosavi, Bilal Farooq
- 14:20 Paper Title: *Portfolio construction using a sampling-based variational quantum scheme*
Authors name: Gabriele Agliardi, Dimitris Alevras, Vaibhaw Kumar, Roberto Lo Nardo, Gabriele Compostella, Sumit Kumar, Manuel Proissl, Bimal Mehta
- 14:40 Paper Title: *A Spiking Neural Network-Quantum Model for Spatiotemporal Data Analysis: An Experimental Framework*
Authors name: Ravi Kumar Jha, Nikola Kasabov, Saugat Bhattacharyya, Damien Coyle, Girijesh Prasad
- 15:00 Paper Title: *QGA Fuzzy C-Means method for Urban Heat Island Detection Using Remote Sensing Data*

Authors name: Rosa Cafaro, Barbara Cardone, Ferdinando Di Martino, Vittorio Miraglia

15:20 Paper Title: *CircuitHunt: Automated Quantum Circuit Screening for Superior Credit-Card Fraud Detection*

Authors name: Nouhaila Innan, Akshat Singh, Muhammad Shafique

15:40 Paper Title: *A Comparative Study of Classical and Quantum Machine Learning Techniques for Industrial Defect Classification*

Authors name: Alfredo Massa, Antimo Angelino, Daniele D'Amato, Gennaro Galante, Enrico Landolfi, Alfredo Troiano

Workshop on QAI: Case Studies and Applications in Real World Scenarios – Part II

Chairs: Francesco Gargiulo, Giuseppe De Pietro

16:30 Paper Title: *Supervised Quantum Machine Learning: A Future Outlook from Qubits to Enterprise Applications*

Authors name: Srikanth Thudumu, Jason Fisher, Hung Du

16:50 Paper Title: *Evaluating Quantum Amplitude Estimation for Pricing Multi-Asset Basket Options*

Authors name: Muhammad Kashif, Shaf Khalid, Nouhaila Innan, Alberto Marchisio, Muhammad Shafique

17:10 Paper Title: *'ClimaShield': Quantum-Enhanced Smart Textiles for Adaptive Thermal Regulation and Biometric Monitoring in Defense Environments*

Authors name: Ahmed Shuhaiber

17:30 Paper Title: *A Novel Dangling Centrality Metric for Real-Life Quantum Graphs with Applications in Control Systems*

Authors name: Ubaida Fatima, Tabish Ahsan

17:50 Paper Title: *Information-Theoretic Limits of Quantum Learning via Data Compression*

Authors name: Armando Angrisani, Brian Coyle, Elham Kashefi