

AIQxQIA 2025: 3rd International Workshop on AI for Quantum and Quantum for AI

Marco Baioletti, Miguel Ángel González, Corrado Loglisci, Angelo Oddi, Riccardo Rasconi
and Ramiro Varela

Bologna, October 25, 2025.

AIQxQIA 2025: 3rd International Workshop on AI for Quantum and Quantum for AI, Bologna – Italy.



© 2025 Copyright for this paper by its authors. Use permitted under Creative Commons License Attribution 4.0 International (CC BY 4.0).

Copyright for these papers by their authors. Use permitted under Creative Commons License Attribution 4.0 International (CC BY 4.0).

Editors' address:

Marco Baiocchi

University of Perugia,
Perugia, Italy.
marco.baiocchi@unipg.it

Miguel Ángel González

University of Oviedo,
Oviedo, Spain.
mig@uniovi.es

Corrado Loglisci

University of Bari,
Bari, Italy.
corrado.loglisci@uniba.it

Angelo Oddi

Institute for Cognitive Science and Technologies (ISTC),
National Research Council (CNR), Italy.
angelo.odd@istc.cnr.it

Riccardo Rasconi

Institute for Cognitive Science and Technologies (ISTC),
National Research Council (CNR), Italy.
riccardo.rasconi@istc.cnr.it

Ramiro Varela

University of Oviedo,
Oviedo, Spain.
ramiro@uniovi.es

AIQxQIA 2025 Program Chairs

Marco Baioletti	University of Perugia, Italy
Miguel Ángel González	University of Oviedo, Spain
Corrado Loglisci	University of Bari, Italy
Angelo Oddi	National Research Council (CNR), Italy
Riccardo Rasconi	National Research Council (CNR), Italy
Ramiro Varela	University of Oviedo, Spain

AIQxQIA 2025 Program Committee

Michele Amoretti	University of Parma, Italy
Lis Arufe	University of Oviedo, Spain
Kyle E. C. Booth	Amazon Web Services, USA
Simone Bordoni	University of Rome "Sapienza", Italy
Antonio Chella	University of Palermo, Italy
Francisco Chicano	University of Malaga, Spain
Elias F. Combarro	University of Oviedo, Spain
Giuseppe Di Battista	Roma Tre University, Italy
Fabrizio Fagiolo	Institute of Cognitive Sciences and Technologies, Italy
Pier Luigi Gentili	University of Perugia, Italy
Swaroop Ghosh	The Pennsylvania State University, USA
Daniele Lizzio Bosco	University of Udine, Italy
Stefano Lodi	University of Bologna, Italy
Antonio Macaluso	DFKI German Research Center for Artificial Intelligence, Germany
Giuseppe Magnifico	University of Bari, Italy
Stefano Markidis	KTH Royal Institute of Technologies, Sweden
Donato Malerba	University of Bari, Italy
Saverio Pascazio	University of Bari, Italy
Francesco Percassi	University of Huddersfield, UK
Carla Piazza	University of Udine, Italy
Fabrizio Riguzzi	University of Ferrara, Italy
Riccardo Romanello	University of Udine, Italy
Francesco Santini	University of Perugia, Italy
Alexander Stasik	Department of Mathematics and Cybernetics, SINTEF, Norway
Autilia Vitiello	University of Naples Federico II, Italy

Contents

Organizing Committees	i
Preface	iv
Incorporating Content-Based Features into Quantum Knowledge Graph Embeddings <i>Jonas Hendl, Michael Färber</i>	1
Quantum Autoencoder-Based Anomaly Detection for Cyberattacks in Smart Power Systems (Short Paper) <i>Franco Cirillo, Christian Esposito</i>	17
Novel Approach to Multivariate Forecasting with Quantum Reservoirs (Extended Abstract) <i>Diego Alberto Aranda, Jorge Ballesteros, Jesús Bonilla, Elías Fernández-Combarro, Nerea Monrió, Sandra Ranilla-Cortina, Jose Ranilla</i>	26
Quantum Federated Learning for Noisy and Imbalanced State Discrimination <i>Rocco Ballester, Christian Blum, Jesus Cerquides, Luis Artilles</i>	30
QSpark: Towards Reliable Qiskit Code Generation <i>Kiana Kheiri, Aamna Aamir, Andriy Miransky, Chen Ding</i>	34
QAOA for Efficient Urban Logistical Ecosystem <i>Fabio Picariello, Gloria Turati, Riccardo Antonelli, Igor Bailo, Susanna Bonura, Gianmarco Ciarfaglia, Salvatore Cipolla, Paolo Cremonesi, Maurizio Ferrari Dacrema, Michele Gabusi, Ivan Gentile, Vito Morreale, Antonio Noto</i>	46
Scalable Quantum Optimisation using HADOF: Hamiltonian Auto-Decomposition Optimisation Framework <i>Namasi G. Sankar, Georgios Miliotis, Simon Caton</i>	63
Quantum Machine Learning on the Photonic Platform (Extended Abstract) <i>Denis Stanev, Nicolò Spagnolo, Fabio Sciarrino</i>	73
Machine Learning-aided Optimal Control of a Qubit Subjected to External Noise (Extended Abstract) <i>Riccardo Cantone, Shreyasi Mukherjee, Luigi Giannelli, Elisabetta Paladino, Giuseppe A. Falci</i>	77
Testing Noise Correlations by an AI-Assisted Two-Qubit Quantum Sensor (Extended Abstract) <i>Dario Fasone, Shreyasi Mukherjee, Dario Penna, Fabio Cirinnà, Mauro Paternostro, Elisabetta Paladino, Giuseppe Falci, Luigi Giannelli</i>	81
The Effects of Conditional Pooling Techniques in Quantum-Classical Hybrid Neural Networks <i>Robin Faier, Jeanette Miriam Lorenz, Hans Ehm</i>	85

Toward Quantum Social Robotics: A Hybrid Architecture for Emotion and Coping Management (Short Paper) <i>Barbara Castrignano, Berardina Nadja De Carolis, Andrea Fiore, Maria Grazia Miccoli, Marco Romei Longhena, Vito Nicola Losavio, Giuseppe Palestra</i>	106
Triplet Loss Based Quantum Encoding for Class Separability <i>Marco Mordacci, Mahul Pandey, Paolo Santini, Michele Amoretti</i>	115
Leveraging Triplet Autoencoders with Quantum Tensor Networks for Multiclass Image Classification <i>Vito Nicola Losavio, Maria Grazia Miccoli, Donato Malerba</i>	129
Embedding-Aware Quantum-Classical SVMs for Scalable Quantum Machine Learning <i>Sebastián Cajas, Luis Fernando Torres Torres, Mario Bifulco, Carlos Andrés Duran, Cristian Bosch, Ricardo Simón Carbajo</i>	139
Optimization of Beam Systems Using QUBO Models and Annealing Techniques <i>Stefano Speziali, Andrea Marini, Alberto Garinei, Marcello Marconi, Emanuele Piccioni</i>	154
A QUBO Approach to Value-Sensitive Reasoning in Argumentation Frameworks <i>Marco Baiocchi, Francesco Santini, Fabio Rossi</i>	171
Summary of: Solving Industrial Fault Diagnosis Problems with Quantum Computers (Extended Abstract) <i>Alexander Diedrich, Stefan Windmann, Oliver Niggemann</i>	183