Preface

This volume contains the papers presented at the AIQxQIA 2023 - International Workshop on AI for Quantum and Quantum for AI (https://aiqxqia2023.cnr.it/) held as a satellite event of the XXII Conference of the Italian Association for Artificial Intelligence (AI*IA 2023), on November 7th, 2023.

In the last years, the convergence of quantum computing and artificial intelligence (AI) has opened up new possibilities for the concrete advancement in both fields. This workshop aims at exploring the intersection of quantum computing and AI, encompassing two perspectives: quantum for artificial intelligence and artificial intelligence for quantum.

"Quantum for Artificial Intelligence" focuses on leveraging quantum computing techniques to enhance AI applications. Quantum machine learning, algorithms, and neural networks utilize the unique properties of quantum systems to tackle complex computational problems. Quantum data analysis, optimization, and pattern recognition offer promising avenues for unlocking the potential of quantum data processing in AI. Additionally, quantum-inspired generative models and natural language processing also open new avenues for quantum-based AI advancements.

On the other hand, "Artificial Intelligence for Quantum" explores the use of AI techniques to advance quantum research. AI-driven algorithms may help in quantum circuit compilation, quantum error correction, state reconstruction, and gate synthesis, thereby improving the reliability and efficiency of quantum computations. AI-based optimization and simulation techniques contribute to quantum algorithm design, resource estimation, and system identification.

The synergy between quantum computing and AI represents a frontier where both fields mutually benefit from each other's advancements, and may open up a vast and promising landscape for research, paving the way for transformative developments in both realms.

As workshop organizers, we would like to thank all the authors and the attendees of the workshop, as well as all the people who contributed to its development and progress, from the Program Committee members to the Roma TRE University staff who helped us set up and run the event.

Marco Baioletti, Miguel Ángel González, Angelo Oddi, Riccardo Rasconi, Ramiro Varela.

Workshops Organizers