MINI-SCHOOL

NITheCS
National Institute for
Theoretical and Computational Sciences

Hands-On Introduction to Quantum Computing with PennyLane

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Attend online: Wed 13, 20 & 27 August 2025 @ 14h00-15h00 SAST

ABSTRACT

As 2025 marks the International Year of Quantum Science and Technology, this NITheCS/QSouthAfrica Mini-school offers a timely and hands-on introduction to quantum computing using PennyLane, an open-source framework for designing and simulating quantum circuits. Designed for students, researchers, and enthusiasts, the Mini-school emphasises practical skills and conceptual understanding.

Participants will learn how to build and run simple quantum circuits, implement both built-in and custom quantum operations, and perform quantum measurements in PennyLane. The sessions will also explore foundational quantum computing protocols such as quantum teleportation, as well as introductory query-based algorithms, including the Deutsch and Deutsch-Jozsa algorithms.

By the end of the Mini-school, attendees will have a solid, practical foundation in quantum computing and the confidence to explore more advanced applications using PennyLane.

BIOGRAPHY

Omid is a PhD student in the Quantum Research Group at Stellenbosch University, under the supervision of Prof Francesco Petruccione and Prof Ilya Sinayskiy. His research is centered on Quantum Biology, an emerging interdisciplinary field that seeks to investigate how non-trivial quantum mechanical effects, such as quantum coherence, entanglement, superposition, and quantum tunneling, may contribute to the function of biological processes in living systems.

He holds a BSc in Physics from the University of Guilan and an MSc in Theoretical Physics from Isfahan University of Technology, Iran.

Omid is actively engaged in promoting quantum science and technology education, as well as community building. He is a founder of QSouthAfrica and a core member of QIran, where he also acts as an organiser and instructor for workshops, training sessions, and outreach initiatives focused on quantum computing. He mentored students in the NITheCS Quantum Computing Internship Program and also took part in a few quantum hackathons, including the NYUAD Quantum Hackathon, where he supported mentees in developing their skills in quantum computing and interdisciplinary innovation to solve real-world problems.

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