SEMINAR

Domain-Driven Applications of Quantum Machine Learning

Dr Nouhaila Innan (New York University, Abu Dhabi)

Friday, 23 May 2025 @ 14h00-15h00 SAST

Venues: Online and Physics Seminar Room, Stellenbosch University

ABSTRACT

Quantum Machine Learning (QML) offers a structured approach to incorporating quantum computational models into learning frameworks, enabling new possibilities for handling complex data and system dynamics. Across domains such as quantum physics, cybersecurity, wireless communication, intelligent transportation, and climate modeling, QML techniques are adapted to match the structure and constraints of the underlying data and systems. Quantum neural networks and variational circuits have been used to reconstruct quantum states, identify structured patterns in cybersecurity vulnerability data, and improve the precision of resource allocation strategies. Other implementations incorporate quantum representations of structured inputs, such as traffic data, or integrate physics-informed models with quantum attention mechanisms to reduce computational overhead while preserving accuracy. These applications reflect the adaptability of QML in supporting domain-specific tasks and offer a view into its evolving role in applied research across science and engineering.

BIOGRAPHY

Dr Nouhaila Innan is a Research Team Lead at eBRAIN Lab, Division and a Postdoctoral Associate at the Center for Quantum and Topological Systems (CQTS) at New York University in Abu Dhabi. She earned her PhD in Quantum Machine Learning from Hassan II University of Casablanca, where she also completed her Bachelor's in Physics and a Master's in Physics and New Technologies, specialising in materials and nanomaterials. Her research focuses on quantum machine learning, quantum algorithms, and their applications in fields like finance and healthcare. Dr Innan is passionate about mentoring and making quantum technologies accessible through global initiatives.

REGISTER: https://bit.ly/3F2UZEw