![NITheCS - National Institute for Theoretical and Computational Sciences]

# NITheCS Mini-school
## Wednesday 6, 13, 20 & 27 July 2022, 14h00 – 15h00
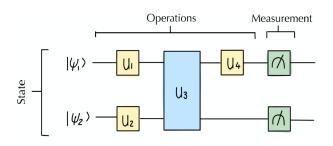### Ian Joel David (UKZN)

## 'A Practical Introduction to Quantum Computing with Qiskit'

### ABSTRACT

Quantum Computing is a growing field that leverages quantum mechanical phenomena to perform computations. A quantum computer, like a classical computer, has a state that can be evolved by applying certain operations to the device. At the end of the computation, a special operation called a measurement is performed to obtain information about the state. The state of the quantum computer can be described using a complex vector while the operations that are applied to the quantum computer can be described using linear operators.

Since its inception, the field has garnered interest due to its promise of efficient computation when applied to specific classes of problems. Quantum hardware is now easily accessible through the cloud and researchers from various fields have begun to use this hardware to solve specific problems in their fields. These fields include chemistry, physics, and computer science. Furthermore, many companies such as Google, IBM, and Microsoft have invested in the development of quantum hardware and quantum software.



This course will introduce participants to the fundamental concepts of quantum computing as well as applications of quantum computing to certain problems. This course will also give participants the opportunity to program quantum hardware using Qiskit.

### BIOGRAPHY

Ian studied Physics and Mathematics at the University of KwaZulu-Natal (UKZN). He is currently completing a Master's degree in Physics at UKZN under the supervision of Prof I. Sinayskiy and Prof F. Petruccione, focusing on the digital simulation of Open Quantum Systems.

He has spent several years as a research assistant in Prof. Petruccione's Quantum Research Group at UKZN. He has given several introductory and advanced quantum computing mini-courses at various institutions and conferences.

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