



Quantum Science and Technology in SA an NSTF Discussion Forum

20 November 2025

Speakers' biographies:

09:10-09:40

A Quantum Computing Access Strategy – A Growth Pathway Tailored for Africa



Mr Mervyn Christoffels is a well-respected IT executive with over 25 years of international experience. He has effectively led large ICT projects and managed diverse teams across different settings. His qualifications include Electrical Engineering, an MBA, and an MCom in Information Systems. Currently, he is working on a PhD in Business Administration and Management at the University of Cape Town's Graduate School of Business, where he focuses on practice-based leadership approaches during complex digital transformations to inform future infrastructure initiatives in the Global South.

He is the Director of the Centre for High-Performance Computing (CHPC) in South Africa, leading a highly skilled team that provides national research infrastructure combining HPC, AI, Cloud, and Quantum Computing services to foster research and innovation in South Africa and beyond.

Mervyn also oversees major scientific and strategic initiatives, including South Africa's participation in CERN's ALICE Experiment, where the country contributes Tier-2 Grid computing capacity. He is involved in the implementation of quantum computing access services that create frontline opportunities for South African researchers through international partnerships. Additionally, he leads the expansion of a local

cloud platform that supports digital sovereignty and data localisation, serving as South Africa's sovereign government, research, and industry cloud.

His career spans roles in Africa, Europe, and the U. K. He was a Senior Manager at Nokia Siemens Networks in East Africa, delivering ICT solutions and strategic support across West Africa. In the U. K., he was a Senior Network Engineer at AOL, leading telecommunications projects, and at Deutsche Bank in London, managing global networking initiatives. He has also consulted for multinational companies like Coca-Cola in Brussels and BTT Consultancy in the U. S., gaining insight into global ICT deployments.

As part of the CHPC team, Mervyn is dedicated to developing an African-tailored approach to building, managing and scaling digital research infrastructure for South Africa and the wider continent.

09:40-10:10

Quantum Computing, A Journey – Technological Advances and Contributions to Growing the Research Community in South Africa



Dr Sibusisiwe Makhanya is a Senior Research Manager and Leader of the IBM Research Lab in South Africa. She leads teams who are contributing to advances in fundamental and applied artificial intelligence (AI) and in Quantum computing. As a Research Scientist, her core competence and interests are in Spatial Statistics and Data Science.

She holds a Ph.D. in Spatial Statistics from the University of Twente, an MSc. in Mathematical Statistics from Witwatersrand University, and undergraduate Science degrees from the University of KwaZulu-Natal. She is on the advisory board for the National Graduate Academy for Mathematical & Statistical Sciences.

10:30-11:00

Tackling Climate Challenges with Quantum Computing



Ms Shivani Pillay is a PhD candidate in Computer Science at the University of KwaZulu-Natal. Her research lies at the intersection of artificial intelligence and quantum computing, focusing on how quantum technologies can enhance AI methods and how AI can be leveraged to address challenges in quantum

computing. She is also the CEO and Co-Founder of Fraqtal Technologies, a deep-tech company that builds AI- and quantum-powered solutions for businesses.

11:00-11:30

Quantum technologies for solving complex problems to unhackable communications



Dr Isaac Nape is a Senior Lecturer in the School of Physics at the University of the Witwatersrand (Wits). His research activities are conducted at the Structured Light Laboratory, where he focuses on quantum and classical structured light with applications to quantum computing, communication, and imaging.

Dr Nape has pioneered techniques in structured-light quantum information, quantum imaging, and optical communication, with publications in leading journals including Nature Photonics, Nature Communications, Science Advances, Laser & Photonics Reviews, Optica, and Light: Science & Applications, to name a few. He is also advancing research in quantum computing, particularly in programmable photonic processors and quantum-inspired algorithms for solving inverse problems in photonics.

Recognised nationally and internationally for excellence in science and innovation, Dr Nape has received major awards including the Meiring Naudé Medal from the Royal Society of South Africa (2024) and the Jubilee Silver Medal for Physics from the South African Institute of Physics (2023) — prestigious honours awarded for outstanding contributions before the age of 35. His achievements have also led to his selection as one of the Top 200 Young South Africans (2023) in technology and innovation by the Mail & Guardian and as a South African delegate to the Global Young Scientists Summit.

Dr Nape has secured competitive funding from national and international agencies, including the South African Quantum Technology Initiative (SAQuTI) Emerging Leader Fellowship, the National Research Foundation (Thuthuka and Rental Pool programmes), the Friedel Sellschop Fellowship and holds the Optica Emerging Leader in Optics Chair. In addition to his research leadership, he plays a strategic role in advancing quantum technologies in Africa through postgraduate training, national capacity-building, and international partnerships, and serves as the Wits-IBM Research Liaison helping to accelerate research in quantum computing at Wits.

11:30-12:00

Quantum Teleportation: From qubits to optical images



Prof Thomas Konrad holds a Master of Science from the Eberhard-Karls University in Tübingen (Germany) with a dissertation in celestial mechanics, a Master of Science of the University of London (Imperial College) in quantum field theory and a doctorate in theoretical physics from the University of Konstanz. He joined the University of KwaZulu-Natal in Durban/South Africa in 2006. There he is research professor and director of the Centre for Quantum Computing and Technology. Thomas Konrad pioneers research in quantum information processing and communication. Konrad promotes the interplay between science and arts.

12:00-12:30

Automated Variational Ansatz Design



Prof Francesco Petruccione is the Director of the National Institute for Theoretical and Computational Sciences (NITheCS) and Professor of Quantum Computing and Pro Vice Chancellor: Artificial Intelligence and Quantum Technologies at Stellenbosch University. He holds a PhD and Habilitation in Physics from the University of Freiburg i. Br. and previously served as Pro-Vice Chancellor for Big Data and Informatics at the University of KwaZulu-Natal. He co-leads the Africa-Europe Cluster of Research Excellence in AI and Data Science (CoRE-AI) and held the South African Research Chair in Quantum Information Processing. He is a Fellow of several academies, including the Academy of Sciences South Africa and the African Academy of Sciences. His widely cited work includes the monographs *The Theory of Open Quantum Systems* and *Machine Learning with Quantum Computers*. In 2023, he was awarded the Stella d'Italia by the Italian government. He serves on editorial boards including *Open Systems & Information Dynamics* and *Quantum Machine Intelligence*.

12:45-13:15

The Cryptographic Time Bomb: How Quantum Computing Will Redefine Cybersecurity



Ms Noori Mohammad is a Johannesburg-based cybersecurity expert, entrepreneur, and respected industry thought leader. She is the Founder and CEO of Doyen Cyber, a pioneering cybersecurity firm at the forefront of AI-driven and quantum-resilient security innovation. Holding a Master's in Cybersecurity and globally recognised certifications including CISSP and CEH, Noori brings over two decades of technical and strategic expertise.

She has held senior security leadership roles at Microsoft Africa, IBM, and ABSA, where she led large-scale cybersecurity initiatives across the continent. In her pursuit of advancing quantum readiness, Noori also completed specialized Quantum Science and Quantum Computing courses at MIT, deepening her expertise in quantum physics and its real-world implications for cryptography and national security

At Doyen Cyber, she is the creator and intellectual architect of *Chronos* a proprietary platform she built to enable organizations to discover, analyse, and quantify quantum risk across their cryptographic landscape.

13:15-13:45

Diamond-Based Hybrid Qubit System for Quantum Computation Technology



Prof Somnath Bhattacharyya, a Professor in Physics at Wits University, Johannesburg, since 2012, founded the Nano-Scale Transport Physics Laboratory, which pioneered quantum-nanotechnology in South Africa. His expertise includes superconducting carbon-based quantum technology, qubit-circuit designing & testing, quantum simulations, and theoretical models. He demonstrated diamond-based quantum tunnel devices, spin-triplet superconductivity, diamond qubits, and NV-center-based quantum technology. He published two books ["Evolution: Classical Philosophy meets Quantum Science" and "Carbon Superstructures: From Quantum Transport to Quantum Computation"], five book chapters, and over 100 journal papers. He supervised 8 PhD, 8 MSc students, 8 postdocs, and established many international collaborations. With expertise in:

- Quantum Transport in superconducting carbon-based devices and quantum simulation
- Nano-scale Transport at low temperatures, high magnetic fields, high frequency, and modeling
- Nano-electronics: Device fabrication, characterisation at extreme conditions, and modeling