

## PUBLIC LECTURE

# A Quantum Future of Computing

Prof Matthias Troyer (Microsoft)

**DATE:** Wednesday, 10 September 2025 | 17h00–18h00 SAST

**VENUES:**

- Stellenbosch University: Neelsie Cinema
- University of the Witwatersrand: Room P215, 2nd Floor, Physics Building
- North-West University: Seminar room K310, Physics building G5, Potchefstroom Campus
- Online

--- A recording of the talk will be published on the NITheCS YouTube channel afterwards ---

### ABSTRACT

For millennia, we've counted with tools like the abacus. Then came classical computers, transforming science and society. Now, for the first time in history, we're changing the very rules of computation. Quantum computing harnesses the laws of quantum mechanics – the same laws that govern atoms and molecules – to solve problems that classical computers may never crack. It's not just faster; it's a new paradigm. Combined with AI, quantum computing offers a powerful engine for accelerating discovery: simulating chemical processes, designing new molecules and materials atom by atom, and addressing global challenges in energy, climate, and health. Breakthroughs in quantum hardware, algorithms, and applications have brought us to the threshold of a new age of discovery. And this transformation is global: it will empower scientists everywhere and thrive on the creativity of a diverse, international talent pool. In this lecture, I will share a roadmap for quantum computing, explore how it converges with AI, and show how we're moving from foundational experiments to scalable systems that can transform science – and society.

### BIOGRAPHY

Matthias Troyer is Technical Fellow and Corporate Vice President at Microsoft, working on the system architecture of quantum computers and their applications. After receiving his PhD in 1994 from ETH Zurich in Switzerland and spending time as postdoc at the University of Tokyo he has been professor of Computational Physics at ETH Zurich until joining Microsoft in 2017. Since August 2025 he is an Honorary Professor in the School of Data Science and Computational Thinking of Stellenbosch University. Matthias is a Fellow of the American Physical Society and President of the Aspen Center for Physics. He is recipient of the Rahman Prize for Computational Physics of the American Physical Society “for pioneering numerical work in many seemingly intractable areas of quantum many body physics and for providing efficient sophisticated computer codes to the community” and of the Hamburg Prize for Theoretical Physics.



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