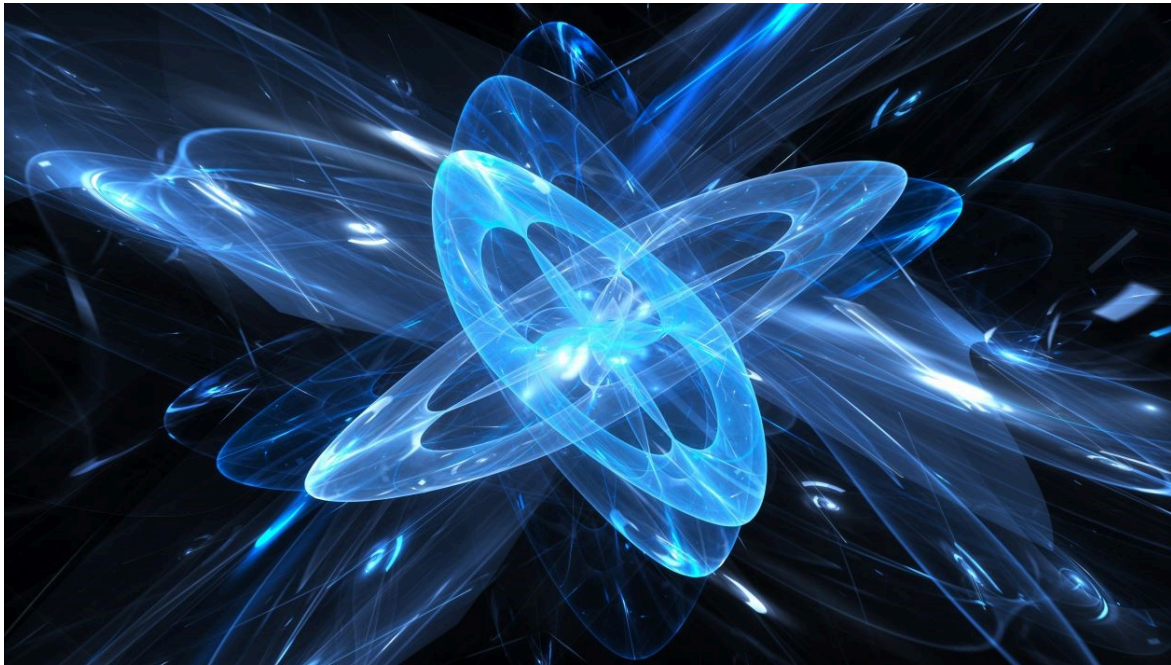


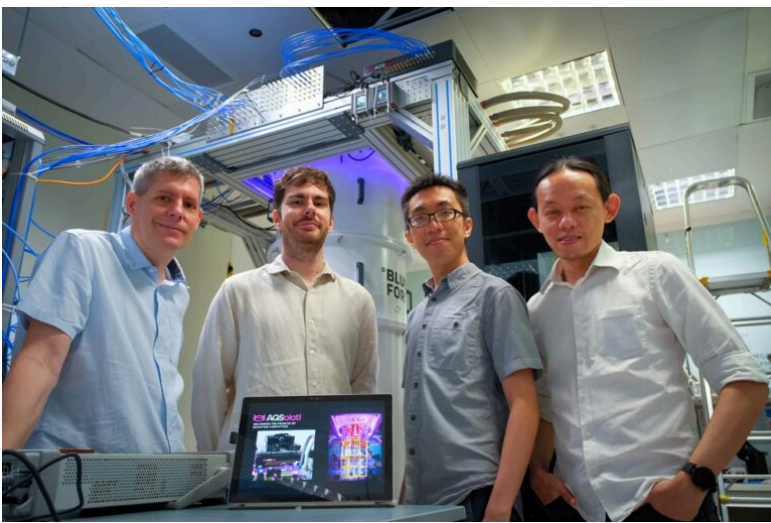
# Singapore: A Breakthrough in Quantum Control with CHRONOS-Q

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In a significant leap for quantum technology (<https://www.ntu.edu.sg/news/detail/cutting-edge-quantum-control-technology-commercialised>), Nanyang Technological University (NTU) and the National University of Singapore (NUS) have launched a deep-tech startup, AQSolotl. The spin-off introduces CHRONOS-Q, a cutting-edge quantum controller designed to bridge conventional computing systems with quantum computers. This breakthrough marks a milestone in Singapore's growing quantum ecosystem and has the potential to reshape industries globally.

Unlike classical computers that rely on binary bits (1s and 0s), quantum computers use qubits, which can exist in multiple states simultaneously. This property allows quantum computers to process problems beyond the reach of even advanced traditional systems. Fields like cryptography, artificial intelligence, climate



*Image credits: Nanyang Technological University*

modelling, and pharmaceutical development stand to benefit significantly.

However, controlling quantum computers has historically been a complex and resource-intensive task. This is where CHRONOS-Q steps in. Acting as a translator between traditional computers and quantum systems, it allows scientists and engineers to control quantum computers efficiently using standard laptops and desktops.

Furthermore, its intuitive user interface reduces the technical expertise required to operate

quantum systems, broadening accessibility for engineers and developers across industries. This opens doors for faster adoption and innovative applications across sectors like logistics, materials science, and sustainable energy solutions.

What sets CHRONOS-Q apart is its exceptional speed and cost efficiency. It determines qubit states in under 14 nanoseconds – a billionth of a second – allowing for real-time feedback and rapid adjustments during quantum computations. Moreover, its modular design ensures scalability, accommodating increasingly powerful quantum computers without the need for extensive redesigns.

The firmware of CHRONOS-Q is customisable and upgradable, allowing seamless integration of future advancements. This adaptability makes it a robust choice for both academic research institutions and industries venturing into quantum technologies.

Additionally, the compact design of CHRONOS-Q allows it to be deployed in environments with limited physical space, making it ideal for research labs, corporate innovation centres, and even mobile quantum computing setups.

The founding team of AQSolutl includes Professor Rainer Dumke, a Principal Investigator at the Centre for Quantum Technologies (CQT), and Patrick Bore, a former Research Associate at NUS and now CEO of AQSolutl. Both have played instrumental roles in refining the CHRONOS-Q technology over the past three years.

Professor Dumke envisions quantum computing accelerating progress in tackling global challenges – from precision medicine and energy-efficient databases to smarter AI systems and secure financial transactions. He emphasises the importance of making quantum technologies accessible to all, not just wealthy nations, to ensure a widespread positive impact.

The intellectual property (IP) for CHRONOS-Q has been transferred to AQSolutl, with NTU and NUS holding equity stakes while retaining rights for academic and research purposes. Both universities continue to play active roles in supporting AQSolutl's commercial journey.

NTU's Innovation and Entrepreneurship (I&E) initiative has been instrumental in guiding AQSolutl through the early stages of its venture, offering mentorship, business model refinement, and access to collaborative networks.

Professor Louis Phee, Vice President of NTU Innovation & Entrepreneurship, highlighted the critical role of such initiatives in translating deep-tech innovations into market-ready solutions.

Professor Chen Tsuhan, Deputy President of Innovation & Enterprise at NUS, added that the success of AQSolotl exemplifies how collaborative research can drive meaningful technological progress, benefiting both Singapore's economy and the global quantum community.

AQSolotl is raising funds to integrate AI and deliver scalable quantum solutions, aiming to lower barriers to entry for quantum adoption, bringing advanced computing power to businesses of all sizes.

This landmark development not only underscores Singapore's position as a global quantum innovation hub but also demonstrates the transformative power of academic-industry collaboration in tackling the world's most pressing challenges.