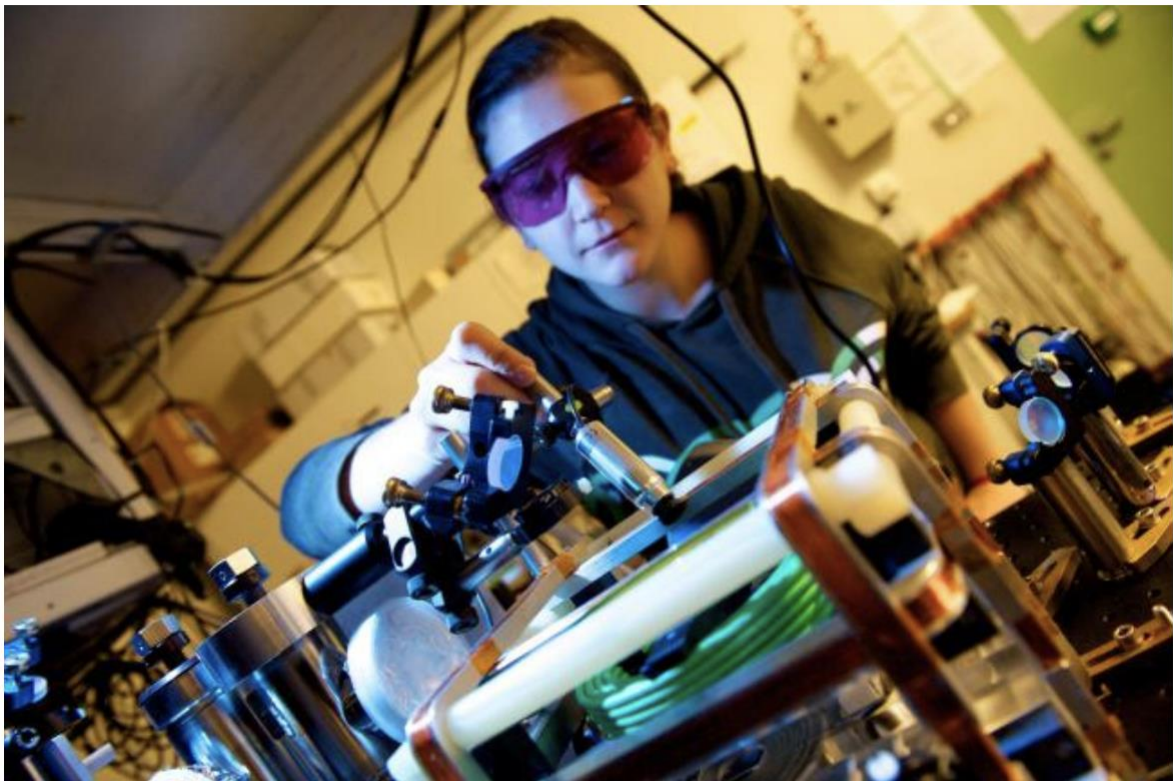


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University collaboration gives Scotland the edge in global quantum computing race

By Victoria Masterson



Quantum technology labs with neutral atoms at the University of Strathclyde. Photo: University of Strathclyde

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SCOTLAND has the expertise to potentially equal tech giants like IBM, Google and Intel in the race to develop next-generation computing technologies, scientists believe.

The universities of Edinburgh, Glasgow and Strathclyde have collaborated to form a new national centre that brings together internationally-recognised experts in hardware, software and

application development for quantum computing – a sector predicted to be worth \$65 billion by 2030.

The new Scottish Centre for Innovation in Quantum Computing and Simulation has received funding from the Scottish Government to explore inward investment opportunities.

Quantum computers process information using the properties of tiny microscopic particles – or nanoelectronic circuits – making them exponentially more powerful than traditional computers. Tech giants including IBM, Google, Microsoft, Intel and Amazon are investing millions of dollars in developing the world's first workable quantum computers.

Last October, Google announced that its quantum computer took three minutes and 20 seconds to solve a problem that would have taken the world's fastest supercomputer around 10,000 years to complete.

“There are problems that even the world's biggest supercomputers are unable to solve,” said Andrew Daley, a professor of quantum computing at the University of Strathclyde. “For example, how to optimise traffic flow by controlling motorways in various places; how to maximise fuel efficiency when big aircraft take off or how to invest in stocks for the maximum reward and minimum risk. Because we can do computing in a very different way on a quantum computer, these are the kinds of things we believe we may be able to do that we can't do on a traditional computer.”

Scottish universities are major beneficiaries of the UK government's £1 billion UK National Quantum Technologies Programme, a 10-year drive to put the UK at the forefront of quantum technology research and commercialisation.

Edinburgh University already hosts the UK's £79m national supercomputer and is one of the partners in a £10m project to develop the UK's first commercial quantum computer.

Strathclyde University's quantum computing research includes a £10m industry-led project addressing technology barriers to scaling quantum hardware. And Glasgow University's projects include being part of a £7m UK consortium aimed at commercialising quantum technologies.

Ivan McKee, Scottish trade, investment and innovation minister, said: "This joint project between the universities of Edinburgh, Glasgow and Strathclyde seeks to position Scotland as the go-to location for quantum computing and has the potential to attract significant international research funding and create jobs.

"It also provides a model of collaboration which could be applied in other sectors to attract inward investment and boost Scotland's economy."

The Scottish Government funding will finance a feasibility study into inward investment opportunities in quantum computing. These might include partnerships with major technology companies, institutions or countries who already have their own quantum computing programmes.

"Microsoft, for example, has quantum computing partnerships with universities and other places in the world," Professor Daley said. "There are large centres of quantum computing in Singapore and in the Netherlands at Delft University. The German and US governments have also created clusters in quantum computing and other quantum technologies."

Professor Elham Kashefi, who leads the quantum team at Edinburgh University's School of Informatics, believes the new centre could help "unlock the potential of quantum tech in an unprecedented way."

She added: "Perhaps such a dream could be only achieved at large corporates like IBM, Microsoft, Amazon or Google. Yet I believe the flexibility that the centre could afford as a research institute, compared to a fully business-driven programme, could be the very fundamental bridge that our field desperately needs."

Martin Weides, professor of quantum technologies at Glasgow

University's James Watt School of Engineering, said: "There's now an international race to realise practical technologies and applications for quantum computing. I believe the Scottish Centre for Innovation in Quantum Computing and Simulation will bring together the strong academic excellence at the three founding universities to give Scotland the edge to develop a vibrant quantum ecosystem."

