Quantum computing working group update

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Research at TRIUMF

Projects include:

- Variational autoencoders for classification and synthetic generation of neutrino detector outputs (update today)
- Efficient qubit encoding for calculating molecular energies with the variational quantum eigensovler
- Co-op student starting in January to work on graph-theoretic methods for problem size reduction of QUBOs for quantum annealing (possible applications to particle tracking – interest from researchers at SFU)

Research at Helmholtz

Projects include:

- Improving the variational quantum eigensolver (Bayesian optimization with Gaussian processes, gradient optimization)
- Applying variational quantum eigensolver to lattice gauge theory simulation
- Solving real-world problems with quantum annealing and QAOA (quantum approximate optimization algorithm)

Other news

TRIUMF:

- Quantum computing retreat on 28 November with faculty from across the country – what should TRIUMF's role be for quantum computing in Canada?
- On-going lecture series about quantum computing hardware and how to build qubits

Helmholtz:

- Constantia Alexandrou named Helmholtz International Fellow and will be visiting DESY; will contribute to development of quantum computing at Helmholtz
- Jülich is creating a platform with different quantum computers (*from Kerstin: more news next time*)

Collaboration opportunities

ODM approaching members of Helmholtz to explore possible collaborations focused on

- Quantum circuit synthesis
- Application/improvement of variational quantum eigensolver

Need greater adoption of Slack to get more conversation going between the two organizations.