

**Title** Quantum algorithms for financial applications

**Workshop organizers**

- **Ruslan Shaydulin** (JPMorganChase, co-chair)
- **Marco Pistoia** (JPMorganChase, co-chair)
- **Mekena Metcalf** (HSBC)
- **Elton Zhu** (Fidelity Center for Applied Technology)

**Workshop objectives** The workshop aims to bring together two groups of people: the people developing quantum algorithms (both in industry and in academia) and the people working out the details of applying these algorithms to practical problems in finance. In the long-term, the goal is to build a community that facilitates the exchanging of ideas between the theoretical algorithms community and industrial research labs, as well as driving the research in academia towards algorithmic directions that best serve industrial needs.

**Workshop format** The workshop will consist of three sections, each with three 20 minute talks and one 30 minute panel. The workshop schedule is as follows:

**10:00 am – 10:05 am:** Welcome

**10:05 am – 10:25 am:** Dylan Herman (JPMorganChase) – Quantum option pricing via the Karhunen-Loève expansion

**10:25 am – 10:45 am:** Guoming Wang (PsiQuantum) - Option Pricing Under Stochastic Volatility on a Quantum Computer

**10:45 am – 11:05 am:** Brandon Augustino (JPMorganChase) – A quantum central path algorithm for linear optimization

**11:05 am – 11:30 am:** Panel discussion with Dylan Herman, Guoming Wang, and Brandon Augustino

**11:30 am – 1:00 pm:** Lunch

**1:00 pm – 1:20 pm:** Elton Zhu (Fidelity Center for Applied Technology) - Solving QUBOs with a quantum-amenable branch and bound method

**1:20 pm – 1:40 pm:** Marco Sciorilli (Technology Innovation Institute) - Towards large-scale quantum optimization solvers with few qubits

**1:40 pm – 2:00 pm:** Nadezhda Voronova (Boston University) - Exponential quantum space advantage for approximating maximum directed cut in the streaming model

**2:00 pm – 2:30 pm:** Panel discussion with Elton Zhu, Marco Sciorilli, and Nadezhda Voronova

**2:30 pm – 3:00 pm:** Coffee Break

**3:00 pm – 3:20 pm:** Ernesto Palidda (Rigetti) - Quantum feature maps and Chebyshev inequality for anomaly detection

**3:20 pm – 3:40 pm:** Pedro Lopes (QuEra) - Large-scale quantum reservoir learning with an analog quantum computer

**3:40 pm – 4:00 pm:** Xun Gao (JILA) - Quantum Neural Sequence Learning

**4:00 pm – 4:30 pm:** Panel discussion with Ernesto Palidda, Pedro Lopes, and Xun Gao