



Quantum Enhanced Optimization (Seeking partnering opportunities)

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Group background and expertise

Quantum information work since 2005. Focused on **quantum simulation** applications as well as **quantum optimization** as applied to chemistry problems.

Close connections to experimental groups. Co-authors of 10+ published or in progress experimental quantum information experiments.

Very interested in the entire range of the problem. From the **algorithm** to the **hardware implementation**.

Multidisciplinary approach: chemistry, physics and computer science.

Current research directions and interests that have synergy with QEO

Dimensionality reduction for adiabatic quantum computation. Ways of classically simulating certain problems of interest in 400+ qubits. [[arXiv:1407.8183](#)]

Many-body gadgets for creating higher-order interactions between qubits of use for both optimization and simulation [[Annalen der Physik 525, no. 10-11 \(2013\): 877-888](#); [Scientific Reports 4 \(2014\): 6603](#); [AIP Advances 1, no. 2 \(May 27, 2011\): 022126](#)]

Use of LC oscillators as part of the computational scheme to gain advantage over classical devices. [[New Journal of Physics 14, no. 10 \(2012\): 105013](#); [arXiv:1502.00962](#)]

Faster than classical quantum optimization algorithms. Just discovered one in the *gate model*. Can it be “ported” to the adiabatic model?

Alternative modes of computing using superconducting architectures
[May or may not be able to tell QEO about it yet]

Current research directions and interests that have synergy with QEO

Adiabatic quantum optimization algorithms for several applications but currently focused on biophysical problems. [The European Physical Journal Special Topics 224, no. 1 (2015): 163-188; Scientific Reports 2 (August 2012): 571; Quantum Information Processing 10, no. 1 (2010): 33-52]