

# *Chez Pierre*

Presents ...

**Monday, December 2, 2024**

**12:00 pm - 1:00 pm**

**Duboc Room – 4-331**



## **Chez Pierre Seminar**

**Eddie Farhi, Emeritus (Google/MIT)**

### **"Finding low energy configurations of the Sherrington Kirkpatrick model using a quantum algorithm".**

The Quantum Approximate Optimization Algorithm is a general purpose quantum algorithm for finding good strings (sequences of bits) that minimize a classical cost function. Performance increases with the depth of the quantum circuit. We apply the QAOA to the SK model to look for low energy spin configurations. We work in the infinite size limit and average over realizations of the couplings and prove concentration results which mean that the algorithm works for typical couplings. We see that as the depth increases the spin configurations produced have energy near the Parisi value. We can guarantee performance but you need a quantum computer to get the actual spin configurations.