# October 20 Meeting Agenda

Time: 5:30 PM

Location: Beamish-Munro Hall (ILC) Room 231

Agenda/Meeting Minutes:

* Individually discuss learning progress
  + What have you found interesting/you did not know before?
  + What are you still struggling with?
  + Have you used any other resources that you found useful?
* Discuss as a group the topics people are struggling with/still do not understand
* Outline timeline for the next couple of weeks
  + Meeting times/locations (Saturdays?)
  + Rough timeline: mini project for two weeks. After that begin learning about variational circuits.
* Mini-Project: Research and implement one of the most famous Quantum Computing algorithms. The goal is to fully understand the algorithm of choice and be able to implement it in code (not just copy code from a tutorial, although this can be a good place to start). Potential algorithms:
  + Grover’s Search Algorithm
    - Unstructured search of a list
  + Quantum Fourier Transform (especially if you are familiar with classical Fourier transforms)
    - Used in a lot of Quantum algorithms
  + Simon’s Algorithm
    - Determines whether a function is injective or two-to-one.
  + Bernstein-Vazirani Algorithm
    - Find s in the black-box function f(x) = s \* x (mod 2) using only one function call
  + Quantum Teleportation
    - Transferring qubits using quantum teleportation.
* Mini-Project End Goals:
  + Write code (likely in Qiskit) to implement your algorithm and demonstrate its applications
  + Briefly present to the team (~5 – 10 mins) the purpose of your algorithm and how it works. Give a code walkthrough.
  + Fully understand the mechanics of the algorithm, including (hopefully) the math behind it
  + Time/interest permitting, you could try to run the algorithm on Quantum hardware (through IBM Cloud, etc.)
* Tips:
  + Qiskit textbook has all these algorithms, but often the higher-level tutorials are either too complicated or not thorough enough. Use it as a starting point but you should branch out
  + Learn how the algorithm works before trying to implement it in code
* When is the due date? - November 6th or October 30th? I’d like to give two full weeks to work on this, but we should also move on to other things. If we do November 6th I will likely give you guys some variational materials to start reviewing the week before that meeting.

Immediate Next Steps:

* Decide what algorithm you want to do and send that to the slack chat.
* Research and learn then implement algorithm using code
* For next week:
  + Learned the theory and math of your algorithm.
  + Come prepared with any questions you have about your algorithm.

Mini-Project should be completed in two weeks.