

Journal One

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- **What specific activities will you be working on this summer?**

In my research project, I am expected to read scientific literature (papers, books, etc.), record all useful information/analysis on a latex documents such as this, and code in python to run experiments on quantum computers on IBM cloud.

- **How do your activities support the larger work of the research project? If you are not sure, what information do you need to answer this question?**

The overarching goal of my research project is to study how quantum computers can help find ground state energies of small molecules within chemical accuracy. My work on error mitigation techniques will help improve the accuracy of those ground state energy computations, especially on noisy quantum computing devices.

- **What will define "progress" for the project you are working on?**

Progress will be defined by the accuracy of ground state energies of H_2 and LiH molecules obtained from running experiments on noisy quantum computers. Specifically, I have to be able to extract results within chemical accuracy given that the quantum computing devices are plagued with noise i.e. imperfections in storing information.

Such progress will require deep understanding of some error mitigation techniques and running experiments utilizing those techniques on simulators (which mimic noisy quantum devices).

- **Where will you primarily do your work (in a lab, the field, an office)?**

I work at my home office customized with "Lord of the Rings" posters and stuffed toys!

- **Who do you work with on a day to day basis?**

I am in constant contact with my faculty mentor to discuss problematic issues through Zoom, Slack and e-mail. Other than these meetings, we also meet Professor Mark Hillery, a friend of my faculty mentor with expertise in this subject, once a week.

- **Who will be your primary resource when you have questions?**

My primary source will be my faculty mentor for questions. If my faculty mentor is unable to help me, I can contact Professor Mark Hillery at City University of New York for queries by e-mail.

- **How often do you meet to discuss your work with your faculty mentor? If you are working primarily with another member of the research team, how often do you discuss the work with that person?**

I meet with my faculty mentor every other day if not every day. These meetings usually last from 30 minutes to 1 hour.