+ Hypothesis: The error is either satellite based, or measurement based (or measurement and Satellite, which is measurement). The former is mostly a static error in measurement, the latter would be somewhat variable relative to factors in measurement (depth of lake, topography of lake bottom)

+ Download Sentinel Data A and B (already available, asking Dr. Li for other lakes)

+ Linear Kalman Filter

(1-6, overview of what a Kalman Filter is, why it exists and why it's good at what it does. Also, a basic introductory)

(7-12, overview of a Kalman Filter with matrices, and an example)

(13 onward; expanding the understanding of Kalman Filter Matrices)

https://#www.youtube.com/watch?v=CaCcOwJPytQ&list=PLX2gX-ftPVXU3oUFNATxGXY90AULiqnWT

+ (Basics of Deep Learning) (A crash Course)
+ Hours 1-5 are absolute beginner friendly, beginning with overview, how to setup a operating system agnostic model, etc.
+ Hours 5+ building a model

https://#www.youtube.com/watch?v=Z_ikDlimN6A

+ (Basics of Deep Learning) (A crash Course)
+ (Tensorflow)
+ Hours 1-4.5 are introductory, for absolute beginners.
+ Hours 4.5+ are model building, evaluation, etc.

+ RNN's
+ https://ai.science/l/25dc3fb7-04a0-4904-812e-3e6a11e3b688@/assets
+
+ GRU's and LSTM's
+ https://ai.science/l/0dddab4a-311c-4c09-bb7b-82985de97483@/assets
+ (Included in the GRU/LSTM recipe are various means of evaluating a model.)

+ Results calculation & Optimization (especially since we can get arbitrarily large networks)

+ Model Comparison, and taking the results of different models to give an static/variable error for use in the Kalman Filter. —> If this can be broadly tested across Canada and beyond (which it can), then Dr. Li would have her paper. —> This could be part of the incentive for prospective students.

Use a RNN to predict the error from time step to time step, measuring the range of errors on a given step. (To pick up patterns in error).
++ All datapoints on a given lake could be used, and the results per lake could be compared to observe how water depth affects error.
+++ Use cartopy to observe differences in error per track (>> stretch goal —> likewise with measurements in a relative location. (Which again, with insitu measurements could be compared to lake depth.)