Outline final report

# Introduction

* Introduce CLEMnet, its features, and what it might be able to do for future EM microscopy,
* Cover a small bit of image segmentation, and a few methods of it. Also highlight the new entry of Machine Learning that is used in processing microscope images.
* Establish the pipeline: From an EM image, to a CLEMnet predicted fluorescence feature, to image segmentation and exportation based on those two things.

# Method

* Introduce U-net, its use in image segmentation, and the training data that would be used.
* Give a small overview of the EM, Hoechst and Insulin data that is used as input.
* Talk about memory issues, and ways of upscaling and downscaling input data to efficiently get high-quality images of cells on a large plane. (65536x65536 max).
* Discuss improvements concerning training data and the data augmentation used.

# Results

* Go over standard metrics to discuss U-net accuracy.
* Discuss types of cells that are in an output.
* Discuss various artifacts within EM data that can throw off a model

# THINGS THAT I WANT TO DO / HAVE DONE

* Use ML to segment nuclei on zoom level 3
* Use Tensorflow U-net to segment images on multiple zoom levels
* Investigate the benefits of data augmentation by using multiple zoom levels to generalize the algorithm.
* Investigate the benefits of using Hoechst and Insulin fluorescence data into both algorithms.
  + For the ML algorithm, adding Hoechst data certainly aided the accuracy.
* Develop some methods to easily upscale and downscale data
* Identify bounding boxes of nuclei, export those bounding boxes as images, trace the nuclear envelope.
* Apply these same segmentation/exporting on Insulin, which is way smaller.
* Develop a GUI to ease user interaction with the code.
* Create more training data which encompasses more ER, EM image artifacts, non-pancreatic cells