

Anthony Abrantes: Summary of BD2K Summer 2016 traineeship projects

Stem Cell Lineage Project with Dr. Jeremy Purvis

I worked with Dr. Purvis and others on developing a method to track stem cell lineages through time given a 2D “movie” of cell colony images spaced at 5 minute intervals. My main task and contribution was to get the CellProfiler cell image analysis software to run with our data.

<http://cellprofiler.org/>

The reason for using CellProfiler was to get a baseline performance measure with which to compare the ground up methods that other team members were pursuing. Successful use of cell profiler was also intended to inform the other methods with respect to choice of several optimization parameters.

Dream Challenge with Josh Welch

I worked with Josh Welch and other students on the Respiratory Viral Dream Challenge. The goal was to find a classifier that could predict infected and/or symptomatic state based on gene expression data among subjects that were exposed to respiratory viruses.

<https://www.synapse.org/#!Synapse:syn5647810/wiki/399103>

My contribution was to tune parameters and perform cross validation on classifiers in the search for a model with minimal misclassification rate. I tried support vector machines, lasso regression, and nearest shrunken centroids classifiers on gene expression data at individual time points and on the time differentials or changes in gene expressions. None of these methods performed particularly well but, as of the end of the grant, no other group in the challenge had posted results for comparison. If time permits I plan to try a semi-supervised method on the “symptomatic” outcome that has been shown to work well when the outcome data is wrongly labeled.