

## 2. Classification:

- a. Download the data to predict Down syndrome in mice from <https://archive.ics.uci.edu/ml/datasets/Mice+Protein+Expression#>. The prediction problem is to either predict the genotype (binary) using the gene expression variables from DYRK1A\_N to CaNA\_N.
- b. Explore, visualize, and pre-process the data as appropriate, including developing a strategy to deal with missing variables. You can choose to impute the variable. The recommended way is to use multivariate feature imputation (<https://scikit-learn.org/stable/modules/impute.html>) [1]
- c. Train, validate varying at least one hyperparameter, and test at least two types of models: [2]
  - i. Random forest
  - ii. Support vector classification using RBF kernel
  - iii. Neural network with single hidden layer (output layer should be have softmax activation)
- d. See if removing some features systematically will improve your models using recursive feature elimination [https://scikit-learn.org/stable/modules/generated/sklearn.feature\\_selection.RFECV.html](https://scikit-learn.org/stable/modules/generated/sklearn.feature_selection.RFECV.html)). [1]