**ECE 8527: Introduction to  
Machine Learning and Pattern Recognition**

# HW No. 12: Confidence and ROC Curves

Using data set no. 8, and your implementations of CD-PCA, SVM and RNF, plot a receiver operating characteristic (ROC) for each classifier and compare performance on a single plot. Show one plot for the training data, one plot for the development data and a third plot for the evaluation data.

For each classifier, consider a four-way choice: class 1, 2, 3, or rejection based on the likelihood for the match (ignore priors). Explore the full range of values for the rejection threshold so that you sweep the entire range of the ROC curve. In a legend for this plot, show the corresponding AUC values also.

Analyze the performance of these classifiers using the results of these plots. Does this change your conclusions about the algorithms in previous homework assignments?

To learn more about ROC curves, read this tutorial ([ROC Curve and AUC](https://developers.google.com/machine-learning/crash-course/classification/roc-and-auc#:~:text=An%20ROC%20curve%20(receiver%20operating,False%20Positive%20Rate)) and these Wiki pages ([Confusion Matrix](https://en.wikipedia.org/wiki/Confusion_matrix), [Sensitivity and Specificity](https://en.wikipedia.org/wiki/Sensitivity_and_specificity), [Precision and Recall](https://en.wikipedia.org/wiki/Precision_and_recall)) We will revisit these metrics for the final course project.