**ECE 3522: Stochastic Processes in Signals and Systems**

# Computer Assignment (CA) No. 3: VARIANCE

The goal of this assignment is to demonstrate how you can estimate variance in real-time, which is required for streaming data. Use both data sets (Google stock and speech data) for all tasks.

The tasks to be accomplished are:

1. Estimate the variance (second central moment) from the entire data set. Plot this as a horizontal dotted line.
2. Starting with the first 10 samples, estimate the variance from the first N samples of the signal, letting N vary from 0 to a maximum of the number of samples in the file. Overlay a plot of this on the plot from (1). Describe what you observe.
3. Now estimate the variance using a frame/window approach. For the Google stock price, set the frame to 1 day and the window to 30 days. For the speech signal, set the frame duration to 10 msec and the window duration to 30 msec. Overlay this plot on the above plot and describe what you observe. Which approach makes sense?

We will soon learn that there are many ways to estimate the mean and variance of a time-varying signal.