**CSC528 Assignment 3.**

**Problem 1:** **Expectation Maximization**

This problem comes (approximately) from Chapter 17 of the Forsyth book: create a **Gaussian mixture model** using expectation maximization to segment an image. You are allowed to manually specify how many Gaussians you will have in the final result. (Easiest case to test might be 2: foreground and background; you might want to experiment with larger numbers to reflect more objects in the image.) You need only do this for single parameter images (gray-scale), although you can use color if you wish (harder). Do not use existing packages. Think of this as fitting a Gaussian mixture model to the image histogram: we don’t care about where the pixel is (although we could); we only care about intensities and their probabilities.

You might also look at the Wikipedia article on mixture modeling (<https://en.wikipedia.org/wiki/Mixture_model#Gaussian_mixture_model>). Brilliant.org also had a nice read on Gaussian mixture modelling (<https://brilliant.org/wiki/gaussian-mixture-model/>)

Try your algorithm on an image of your choice. Provide me the original image and an image with pixels labeled by Gaussian model to which they belonged. (You can use color or grayscale to do the labelling.)

Discussion is in video:

https://youtu.be/j\_hV\_LsxLqA

**Put all your work into a single file: all images and program code. Submit using the dropbox in D2L.**