Experiment 1: Counting Bacteria
Fall 2018

Progress Report and Planned Approach for Experiment 1 - Due on Wednesday, September 12. Submit to Collab.
About a page, typewritten.

Experiment 1 – Due on Wednesday, September 26. Submit via Collab.
Background: The Gahlmann Lab (Chemistry) will give us a brief background on this problem.

These images are of *Shewanella* bacteria, who live in waste water. When they aggregate, they form biofilms, and when one bacterium leaves the biofilm, energy is released that can be harnessed as electricity. *Shewanella* is an electroactive bacteria which can generate macroscopic electrical currents when aggregate on electrode and metabolize chemical compounds contained in domestic and industrial waste water. Understanding the behavior of individual bacteria in crowded environments is a key to controlling biofilm growth and harnessing their output for human benefit.

Load 'confocal.mat' (contains one confocal microscopy image):

1. Demonstrate a method to count bacteria. Estimate the number of cells in the image. Check your result against eyeballing/counting.
2. Demonstrate a method to compute cell length. What can you say about how the length of cells varies across the image?
3. Test your methods on a different type of image: 'latticeLightSheet.jpg.' Do your methods work on both images? What are the limitations of your method for the new data?
4. Extra credit (up to 15 points): The 2D images used above are slices from a 3D stack. Try your methods on the corresponding 3D lattice light sheet dataset ('3D.tif'.) What do you observe about cell length now? Not required.

Best presentation method: One pdf containing one-two page write-up of methodology, followed by results, followed by code. Be sure to attribute any borrowed code after your write-up page.

Images are found on Collab. See Assignments/Experiment1.