

**Homework Project # 3 (10 points)**

**Due Date for HW3D: Wed., 02-06-2019, 11:00 AM**  
**Due Date for Report, HW3A, HW3B, HW3C: 02-07-2019**

This project is to help you become familiar with grayscale and color representation in images. The image files, “Data\_File\_3C.tif” and “Data\_File\_3D.tif” are available on Pilot. You are to create and implement your own look-up tables (LUTs) to perform the following tasks:

1. Create a bar with rainbow colors by using your own look-up table. Store this image in .tif format, as “BME7112\_HW3A\_YLN.tif”, where X is your last name. Note: the downloaded image files are not used in this problem.
2. Create 16 pseudocolors that allow you to easily identify each color in an image. Select your colors in a way that will emphasize small gradients in the image. Generate a pseudocolor bar image. Save this image as “BME7112\_HW3B\_YLN.tif”. Then apply that pseudocolor look-up table to the image “Data\_File\_3C.tif”. Save the resultant image as “BME7112\_HW3C\_YLN.tif”. Why is pseudocolor used for image display? What are the advantages and drawbacks to using pseudocolor look-up tables? Include your pseudocolor LUT values in the report.

“Data\_File\_3D.tif” is a hurricane image. Application of your pseudocolor LUT to this image will generally yield interesting results and may help you to answer the questions above. It’s also interesting to see the results of different pseudocolor schemes applied to the same image. Thus, submit the pseudocolored 3D image, saved as “BME7112\_HW3D\_YLN.tif” to Pilot the day before this homework is due, so that they can be compiled into a presentation that will be shared in class on the due date. Students who submit a properly pseudocolored hurricane image on time will receive participation points.

Table 1. Summary of image files to be created in this homework project

| Input Image Filename | Operation                     | Output Image Filename | Note                                |
|----------------------|-------------------------------|-----------------------|-------------------------------------|
| None                 | Rainbow color bar             | ...HW3A_YLN.tif       | Homework assignment, due 02/07      |
| None                 | Pseudocolor color bar         | ...HW3B_YLN.tif       | Homework assignment, due 02/07      |
| Data_File_3C.tif     | Pseudocolored brain image     | ...HW3C_YLN.tif       | Homework assignment, due 02/07      |
| Data_File_3D.tif     | Pseudocolored hurricane image | ...HW3D_YLN.tif       | Participation assignment, due 02/06 |

Submit a copy of your MATLAB code for each task and a short report that describes your approaches and addresses the questions above. Ensure that your look-up table values are documented. Submit the output (image) files, your .m files and an electronic copy of your report to Pilot.