USC University of Southern California

USC Viterbi School of Engineering
Alfred E. Mann Department of Biomedical Engineering

# USC Viterbi School of Engineering
# BME Department
# BME 527: Integration of Medical Imaging Systems
# Brent J. Liu, Ph.D.

**October 5th, 2023**

## Instructions for all homework

- No more than 2 pages/Question.
- Please write neatly or type (preferred).
- Put your name and date of the assignment on each page.
- State the problem clearly, what are the assumptions, methods, results, and summary.
- ABSOLUTELY NO LATE HW ACCEPTED!

## Homework 4

**Due date:** October 26th @ 5PM

**Prerequisites:**

1. Read Chapter 3; HK Huang: PACS-Based Multimedia Imaging Informatics 3rd Ed., Wiley & Sons, 2019.

**Instructions:**

1. Take a centered 128 x 128 sub-image of Given CT Image Data set (**Pick a section with lots of good features**):
    a. Obtain 180 Projections.
    b. Take 1-D Fourier Transform of all Projections.
    c. Assemble them in the 2-D Frequency Domain.
    d. Compare Result Direct 2-D FT of the 128 x 128 Image.
    e. Perform Inverse 2-D FT & Compare Both Images
2. You should submit one .doc or .pdf format file along with your code and images through DEN.

3. You should make sure that your code could run successfully. (MATLAB is not necessary, if you prefer other programming language, Python is also accepted).
4. If your code couldn't work, please annotate each critical step or describe your understanding of the whole procedure, and you could still get the majority of grades.
5. You should comment on what you have observed of displayed images (characteristics, differences, reasons).
6. The name of your homework should be like:
   - HW4_name_student ID.pdf (.txt)
   - Code_name.m
   - Projection_result.jpg (.bmp .png. tiff)
   - Projection_reconstruction.jpg (.bmp .png .tiff)
7. If you prefer to submit the homework in person, you could write or print out and hand it in before the class.
8. If you are not satisfied with the initial grade, you can still have chance to regrade.