

## Homework #6

Due: Tuesday, Nov 27<sup>th</sup>, 2018  
to be submitted via course webpage

### Introduction

In this MATLAB exercise, we will investigate the concepts of sparse signals, denoising, and undersampling in the context of compressed sensing for 1D data and 2D (medical imaging data). The homework is a modified version of an exercise created by Miki Lustig at UC Berkeley, a pioneer in the use of compressed sensing in MRI and author of the paper in our journal club.

### Matlab Files + Instructions

All necessary Matlab and data files as well as instructions for this work can be found on the course website in a compressed zip file named 'CS Exercise - MP 710.zip'. Download this zip file, unzip it, start Matlab, and change your working directory to the unzipped folder. Files of particular interest are:

1. 'CS\_exercise\_modified\_for\_mp\_710.pdf' – the original exercise instructions from Dr. Lustig with some added annotations from me. Follow these instructions!
2. 'mp710\_cs\_script.m' – Script with the Matlab code for going through the exercise
3. 'Homework\_6 – 2018 – Compressed Sensing.pdf' – this file

The file 'CS\_exercise\_lustig - modified\_for\_mp\_710' is your guide through the homework. Follow these instructions and look for my annotations in this file (highlighted text and comments).

In your report, please include solution images and comments / answers to the questions posted in the file CS\_exercise\_lustig - modified\_for\_mp\_710.pdf. Please label all images properly: provide colorbars and a title. Also provide labels for x and y when you see it necessary. Make sure that the images are properly displayed in terms of their aspect ratio (hint: use *true\_size* with *imshow* or *axis image*)