Project 1:

You are given 4 images, color JPEG images of Martian terrain acquired by the Mastcam instrument of the Mars Science Laboratory rover.

Your goal is to separate the rover from the rest of the image using segmentation by clustering and color space transformations (e.g. RGB to HSV or CIELUV), decorrelation stretch and regular linear stretching.

In class we studied clustering by Kmeans and Mean-shift (both available as part of the scikit-learn package in Python).

You should try and evaluate several combinations (color space/ yes-no decorrelation stretch/ kmeans vs mean-shift.

Discuss the limitations and benefit of the different algorithmic pipelines, including the role of algorithm parameters.

For mean-shift discuss the option of including the pixel position information.

Moreover for ECE697IP:

1. grad student will have to segment the rover shadow as well.
2. You should think about and discuss how to use k-means in the 5-dimensional space (color, position) including normalization and proper distance functions.
3. You should also understand try and discuss kmeans with different distance functions (e.g. cosine)
4. Why is the mean-shift iteration repelled by object edges?