# Assignment A12: Range Data Analysis

***CS 6320***
***Spring 2014***

**Assigned:** 31 March 2014

**Due:** 16 April 2014

For this problem, handin the results as a lab report in a pdf (include name, date, assignment and class number in pdf). You should handin the results pdf as well as the Matlab code used in the study. The code should conform to the style requested in the class materials.

In addition, please turn in a hardcopy of the results in class before the start of class on April 16, 2014.

**Range Data Analysis: Comparison of Methods**: The goal of this lab is to compare 3 approaches to range data analysis: (1) simple normal and curvature calculation, (2) differential geometry, and (3) the Hessian. You need to:

1. Develop Matlab functions to generate Monge patches with a variety of surfaces (at least plane, sphere and cylinder).
2. Set up a statistical framework for the comparison.
3. Choose some appropriate measures of the quality of the analysis.
4. Give a good discussion in each section of the lab report comparing the effectiveness of the three methods. This includes providing analytical results for the surfaces studied (i.e., solve the equations analytically to know what the ground truth for the surfaces), and a careful study of the various entities computed (e.g., derivatives, normals, fundamental forms, etc.).