

## ECE 472/ Robotics and Vision

Prof. K. Dana

### *Project 3*

You will put together many of the concepts used in this class to create a unique reconstruction of images that you acquire. You may use Matlab's Computer Vision Toolbox. All students are expected to use their own images (not downloaded from the internet and not common to other students). **Start Early.**

**The due date for this assignment is Nov 14**

**Submit as a single pdf file to Sakai. IMPORTANT: Points will be taken off for more than one pdf file submitted.**

*Write matlab code to perform the following tasks. Use the command **publish** to create a document to hand in. See (<http://www.mathworks.com/academia/matlab-examples/>).*

1. Camera Calibration (intrinsic parameters) Calibrate your camera and collect images of a scene (remember to lock the focus AE/AF Lock).
2. Image Capture - Collect images of a scene (remember to lock the focus AE/AF Lock).
3. Feature Matching - (Point Matching between image pairs, e.g. using SIFT)
4. Estimation of Camera Matrices (Find the rotation and translation between frames)
5. Triangulation (Reconstruct the 3D Points in the scene using 2 Frame stereo)
6. Bundle Adjustment Refinement (Refine the 3D Points and Camera Pose) - use VLG toolbox
7. 3D Reconstruction (Sparse) (Show the point cloud of 3D reconstructed points)