

# CS 523.V – Spring 2023



## Problem Set 4

**Assigned:** 27 May 2023

**Due:** 9 June 2023

### What to Submit:

Create a folder named `ps<problem set number>_<YourLastName>` (for example, `ps2_Ates`), with the following structure and contents:

`ps<problem set number>_<problem number>.py` → The main script to run.

`/input/` → Directory containing input images, videos or other data used

`/output/` → Directory containing output image, videos or other data generated

`ps<problem set number>_report.pdf` → A PDF report file. (Include figures, discussions, methods, etc., but do not include any code.)

Zip your folder and submit on **LMS**. Submissions that do not obey the guideline above will **NOT** be evaluated.

### Problem:

A folder with a set of images of a checkerboard pattern is provided. The size of a square in the pattern is 30mm. Using the images provided, do the following:

- Estimate the distortion parameters and undistort the images.
- Estimate the intrinsic matrix.
- Estimate the projection matrix for each image.
- Estimate the essential matrix between the first image and each of the remaining images.
- Estimate the rotation and translation between the reference image and each of the remaining images.

You may utilize the tutorial:

[https://docs.opencv.org/4.x/dc/dbb/tutorial\\_py\\_calibration.html](https://docs.opencv.org/4.x/dc/dbb/tutorial_py_calibration.html)