Abstract: Image registration is one of the basic image processing operations in remote sensing. A hyperspectral image has two spatial dimensions and one spectral dimension. There are many hyperspectral sensors used in remote sensing. Traditional intensity-based registration methods may fail for hyperspectral images because of the different spectral sensitivities for different sensors. In addition, not all spectral bands are required to achieve accurate registration. This thesis develops a modification of the large deformation diffeomorphic metric mappings (LDDMM) algorithm in order to deal with the challenges when applied to hyperspectral images. The transformation generated by our method that deforms one image to match the other is differentiable, isomorphic and invertible. We also propose a mutual information based band selection algorithm to reduce the data redundancy of the hyperspectral images. The approach is applied to two hyperspectral images from OMEGA instrument, with a better matching result than original LDDMM method with respect to mutual information.

Date: Monday, April 22, 2019
Time: 3:00 P.M.
Place: Green Hall. Room 0120

Research Advisor:
Dr. Joseph O’Sullivan