

# Department of Computer Science

## St. Francis Xavier University

### Presents

Towards Designing 3D Generative Models for Medical Image Synthesis and its  
Application

by

Jueqi Wang

St. Francis Xavier University

M.Sc. Thesis Proposal Presentation

Time: Tuesday, Apr 4, 2023 04:30 PM Halifax

Join Zoom Meeting

<https://us02web.zoom.us/j/85726987881>

This study introduces several contributions focused on medical image synthesis, especially medical image-to-image translation. In my undergraduate thesis, a robust and flexible architecture has been proposed to solve various medical image translation problems, which applies multichannel input pixel wise regression 3D U-Net for cross-modality estimation, longitudinal image estimation and diffusion image reconstruction. This thesis extends my undergraduate thesis by comparing whether or not using adversarial loss combined the fixed traditional loss with traditional loss alone on these three applications. A more comprehensive and complete comparison has also been completed with five-fold cross-validation on each application. The results demonstrate that this approach is robust and versatile and can be applied to three different tasks.

Future work will leverage a pre-trained 3D MRI brain generative model to solve the inverse problem with application on MRI super-resolution / in-painting tasks.