**General Abstract**

Manual measurements by snow rod is an inexpensive and popular method for obtaining reliable snow depth data. However, its dependence on human effort makes it highly inefficient and even infeasible at remote locations. The incorporation of time-lapsed cameras with snow rods presents new opportunities for improving efficiency in snow measurements. In this project, we proposed a method for measuring snow depth using machine learning while also reducing human effort in training. Traditional image annotation software rely on human-powered work to generate labels for images, which can be labor-intensive and time-consuming. Thus, we used computer vision tools to expedite this process. Images of snow rods in our work were obtained from the National Ecological Observatory Network (NEON) project database. Each image undergoes a series of image processing operations to isolate the snow rod. Operations vary among images of different weather and lighting. Once found, the snow rod is labeled, and a binary mask is created. The algorithm’s performance was determined through a qualitative assessment of these labels, revealing more precise labeling in images of low noise and high visibility. The labels were then used to train a U-Net convolutional neural network (CNN) for snow rod segmentation. Overall, the model achieved acceptable results. The model attained a mean intersection over union (mIoU) score of 0.565 using algorithm-generated labels as the ground truth. In instances, it can even distinguish snow rods in images of high noise. Future work can be done to incorporate a function for consistent time-lapse snow measurement using segmented images.