



COLLEGE of ENGINEERING AND PHYSICAL SCIENCES

SCHOOL OF COMPUTER SCIENCE

PhD Seminar 1

Friday June 2, 2023 at 2pm via Zoom [Remote]

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*Semi-Supervised Neural Network Training:
A Precision Agriculture Perspective*

Advisor: Dr. Neil Bruce

Co-Advisor: Dr. Mary Ruth McDonald [Plant Agriculture]

Advisory: Dr. Stefan Kremer

Advisory: Dr. John Sulik [Plant Agriculture]

Abstract:

Modern agriculture will benefit from extensive use of information-processing technologies applied to operating remotely controlled machinery, analysis of crops and environment, development of strategies for crop preservation, harvest forecasting, and dozens of other applications.

This thesis is aimed at developing a solution for processing large sets of aerial multispectral images collected with the aid of Uninhabited Aerial Vehicles (UAVs) for the purpose of assessment of crops and soil conditions. As a particular focus of this project, a technique for semi-supervised training of neural networks is proposed. Early results indicate that the process of training of neural networks, which is conventionally done with a large set of images labeled by a human, could be changed in such a way that the number of images pre-labeled by humans is significantly reduced. It is expected that such a training approach would be of high interest in multiple application domains, where it is challenging to obtain a large number of accurately labeled training samples in a short time. Among these application domains is the focus domain of agriculture, but also forestry, ecological studies, marine life research and others.