Agricultural & Biological
ENGINEERING

Thesis Defense

Aaron Etienne is master's student in agricultural systems management. He is part of the Digitial Agriculture Discovery Group, under the direction of Dr. Saraswat.

Speaker: **Aaron Etienne**

Title: **Automated Weed Detection Using Machine Learning Techniques on UAV-based Imagery**

Major Professor(s): **Dr. Saraswat**

Date: **Tuesday, July 16, 2019**

Time: **11:00 am**

Location: **Lilly Hall, room 3-102**

Abstract:

The current method of herbicide application in row-crop fields is to cover every inch of plantable area whether weeds are present or not therein. This is not only detrimental to farmer's bottom lines, but also negatively impacts the environment. Machine learning and computer vision advances have made it possible to create and train a model capable of detecting specific instances of weed species within a field scene. These approaches create the potential to develop site specific weed management procedures which have the ability to change herbicide application from bulk praying with very little precision, to targeting application on a per-weed basis in-field. The major challenge to creating a weed detection system is acquiring, labelling, and training a set of images with similar characteristics to the weeds one wants to detect within a field. The methods undertaken in this research included 1. Acquiring UAS-based RGB imagery over the 2018 and first month of 2019 growing season in corn and soybean fields, 2. Manually labelling this acquired imagery with dicot and monocot weed classes to create an object detection network training dataset, and 3. Training this dataset on the DetectNet and YOLO open-source object detection models.

Application:

Results of this network training, referred to as final weights, have the potential to be applied to a real-time, UAS-based weed detector or future computer vision system of a self-propelled sprayer.