



Research Collaboration and Technology Licensing Opportunity: Ultra-compact spectral imagers for mapping of weeds in precision agriculture

Background: Weeds are a challenge for farms of all types, and the solution is often to use blanket application of expensive herbicides. More cost-effective weed management strategies depend on good knowledge of weed species present on farmland, and their distribution over time. Such information can be expensive and time-consuming to gather and analyze. The ideal system would require minimal investment of time and money, yet provide the farmer with a complete map of weed species throughout the farm's fields.

Solution: Researchers at Montana State University are developing an ultra-compact and low cost imaging system to detect, identify, and map weeds from the cab of a combine at harvest time, driving lower herbicide usage and costs. The system uses commercial off-the-shelf cameras and sophisticated image analysis to identify unwanted vegetation. The system integrates GPS so post-harvest spraying can be precisely targeted with the optimal type and amount of herbicide. Automated detection algorithms locate weeds within the images and are associated with the GPS location, allowing for the development of field maps.

Benefits:

- Technology has the ability to detect, ID, and map weeds using low cost imaging systems.
- Mapping occurs passively during harvesting, requiring no additional time or effort.
- Farmers can save time and money while minimizing environmental impact in fighting weeds.
- Rapid ROI.
- Farmers can monitor weed species over time to detect new issues and better address chronic problems.
- Weed detection accuracy will improve over time as more data is collected and machine learning algorithm improves.

Supporting publications:

1. MREDI project website: <https://mus.edu/research/Funded/OpticsAndPhotonics.asp>

Researchers:

Joseph Shaw, Ph.D. <http://www.montana.edu/jshaw/>

Paul Nugent, Ph.D.

Seth Laurie

Contact for Inquiries:

Daniel Juliano (daniel.juliano@montana.edu), 406-994-7483

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