



CPS: TTP Option: Medium: Touch Sensitive Technologies for Improved Vineyard Management

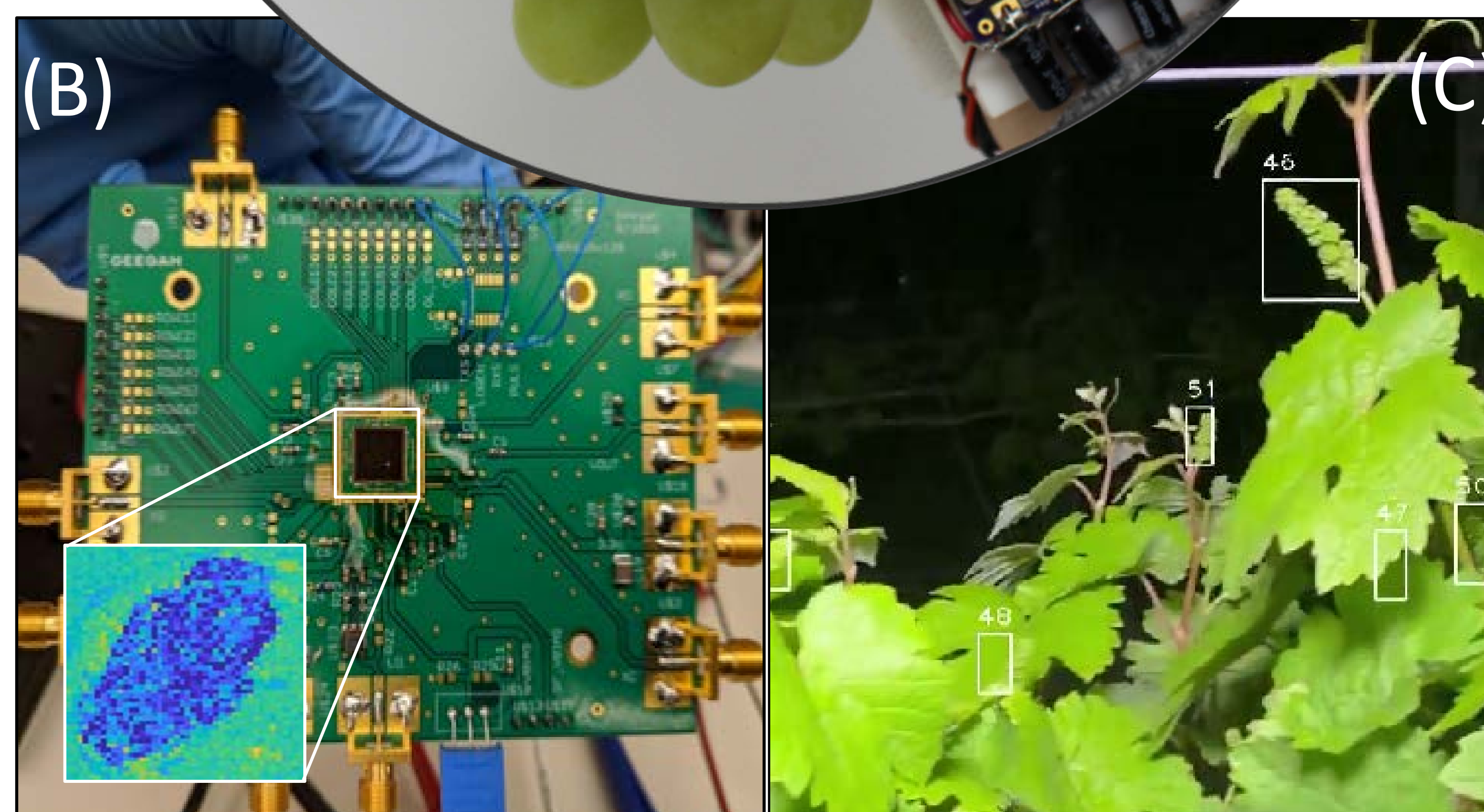
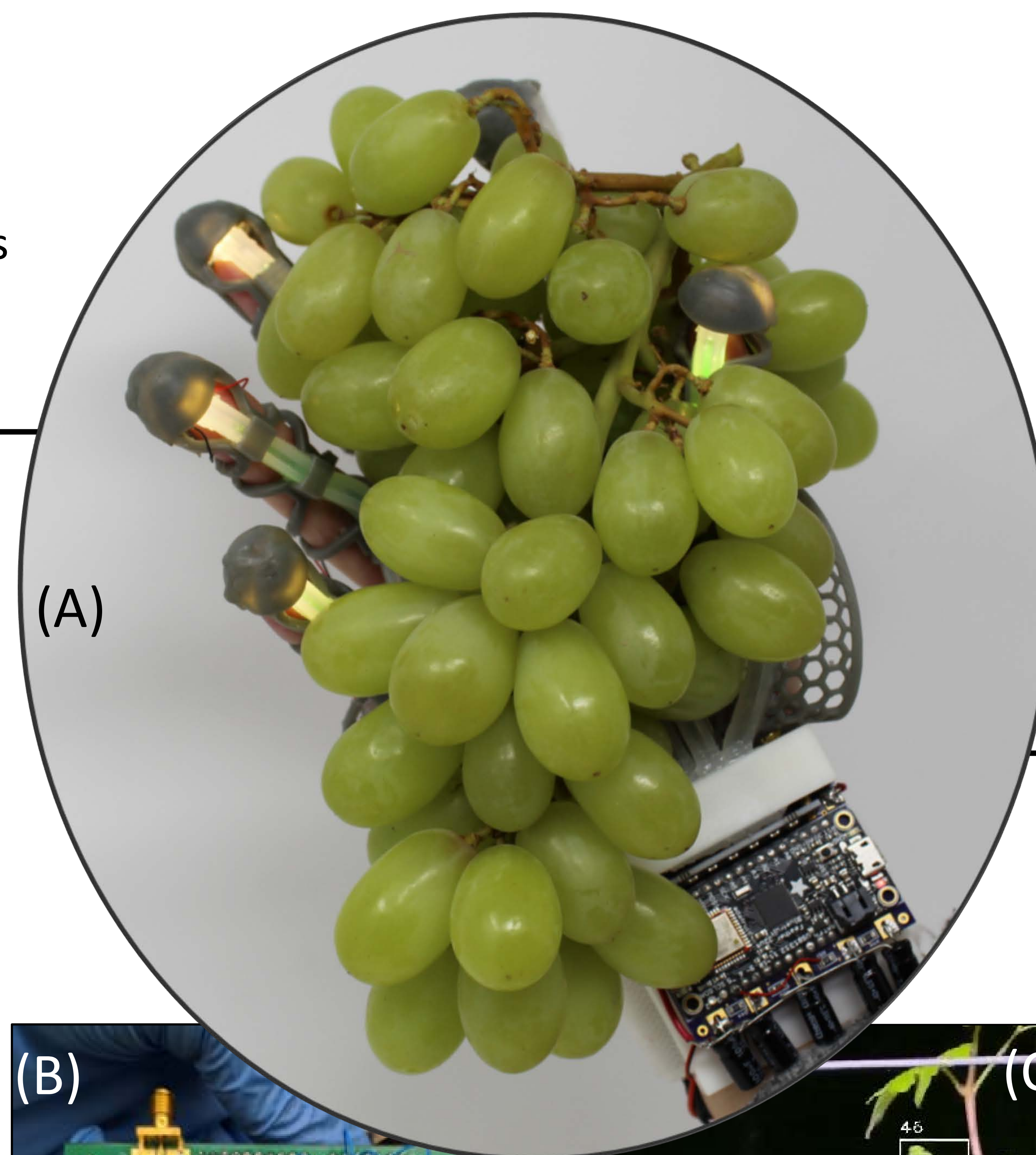
PIs: Kirstin Petersen, Amit Lal, Robert Shepherd, Justine Vanden Heuvel, and Kerik Cox

Challenge

Improving the way we monitor grape vine health and predict crop yield using low-cost, accessible or simple-to-manufacture, cyber physical systems integrating computer vision, soft grippers, and ultrasonic transducers.

Solutions

- **Cluster/Berry assessment (A)**
 - Glove with stretchable light guides for multi-modal sensing (stretch, pressure, bend) spatial resolution down to 10 mm
 - Low-barrier of entry pneumatic gripper with stretchable graphene sensors
 - 40kHz transducer array
- **Cluster counts (B)**
 - Low-cost and accessible CV-based, pre-bloom yield prediction
- **Detection of fungal infections (C)**
 - GHz 128x128 pixel ultrasonic imager in collaboration with Geegah LCC



Intellectual Merit

- Merging soft robots, vision, and ultrasonics for automated non-destructive crop assessment
- Ultrasonic transducers to detect micro-scale fungal infections in the field
- Interpreting multi-modal sensor data to inform crop care
- Supporting rapid technology adoption in small and medium-scale farms through low cost, easily accessible methods

Broader Impacts

- Save farmers money through better resource allocation
- Reduce pesticide use through variable rate application enabled by foliage, crop load, and fungus density mapping
- Ugrad/M.Eng. research opportunities
- K12 outreach events
- Farmer tail gate meetings
- “Robots, Wine, and Food” cross-listed seminar class

Project number:

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Institution: Cornell University

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