

## A/Prof Alison McCarthy

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## RESEARCH AREA

**Machine vision system  
development to detect and  
differentiate verticillium and  
fusarium wilts**

### Tell us a bit about yourself?

I am a mechatronic engineer (integrates mechanical, electronics and software engineering) and have been researching in the cotton industry for 15 years, starting with a Cotton Research and Development Corporation (CRDC) funded PhD scholarship and since then, as a researcher leading four CRDC-funded research projects. I am passionate about applying engineering to address challenges in industry that will help growers meet the needs of the world's growing population and limited resources.

### What research have you previously been involved with?

I have led multiple research projects, primarily in the cotton industry, to conceptualise and develop novel technology ideas and turn these into commercial products. This spans new sensing and control technologies for automated agronomic assessments, insect scouting, and irrigation and nutrition management, and includes algorithms used in canopy temperature sensing technology adopted by 60% of the Australian Cotton Industry for irrigation management. I have also led projects on technology research for the Grains Research



and Development Corporation (GRDC),  
Monsanto and John Deere.

### What excites you about working in the Australian cotton industry?

It is exciting to work in an industry which such a broad range of expertise across the supply chain from plant scientists, social scientists, engineers, economists and business disciplines, and to be part of multidisciplinary teams to ensure the industry continues to be world leader in efficiency and innovation.

### What do you like to do when you're not researching?

I am usually knitting or crocheting, reading to learn new things, or exercising to keep myself healthy.

## PROJECT OVERVIEW

### ACDC Project C1.2: Machine vision system development to detect and differentiate verticillium and fusarium wilts

#### Why is it important?

The identification of Verticillium wilt and Fusarium wilt pathogens is of increasing importance as more fields are being confirmed to have both pathogens present. The traditional method of diagnosing wilt pathogens in a field is still manual, which is inefficient, labour-intensive and requires specialist skills to correctly identify pathogen.

#### What does your current project aim to do?

The aim of this study is to develop machine vision sensing to differentiate verticillium and fusarium wilts and predict severity before visual symptoms show.

#### Where is this work being undertaken?

This work is being conducted in glasshouse trials at Queensland Department of Primary Industries (Qld DPI), the University of Southern Queensland (UniSQ) and field trials.

#### What does it involve?

This project will involve technology development, evaluation and refinement in collaboration with pathologists at Qld DPI and with feedback from consultants, technology providers and growers. As this research is aligned with another Australian Cotton Disease Collaboration (ACDC) project that is improving understanding of irrigation and nutrition impacts on disease, the sensing system will also focus on rapid, spatial infield sensing so we can monitor disease progression after different management decisions.

#### How will this work benefit Australian cotton growers and industry?

The expected industry outcomes and impact are that Australian cotton growers will have new technology available to identify Fusarium and Verticillium wilt diseases in-field before symptoms are visible. This will enable mapping of fields to identify predicted high disease areas and implementation of farming practices such as nutrition and irrigation management, to reduce disease development and minimise impact.



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