

Imaging cereals for increased crop yields

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University of Adelaide computer scientists are developing image-based technology which promises a major boost to the breeding of improved cereal varieties for the harsher environmental conditions expected under climate change.

Led by Professor Anton van den Hengel, Director of the Australian Centre for Visual Technologies (ACVT), the [computer scientists](#) are joining with [plant physiologists](#) and an industry partner to develop technology that will be able to accurately estimate plant yield of potential new cereal varieties well before [grain production](#).

They will use multiple images of plants as they grow to construct computerised 3-D models that will match the plants' changing "shape" with its biological properties and, ultimately, predict yield.

"We are using image analysis to understand the shape of plants so that we can automatically and rapidly measure plant structural properties and how they change over time," said Professor van den Hengel.

"We want to be able to predict yield based on a collection of measurable plant attributes early in the plant's lifespan, rather than having to wait for the plant to mature and then measuring the yield."

Professor van den Hengel said this image-based approach would enable detailed, accurate and rapid estimation of large numbers of plants' potential yields under various growing conditions, for example high salinity or drought.

"This novel image analysis technology promises to transform crop breeding and, as a result, the agricultural industry," he said.

"By expediting the development of plant varieties capable of delivering increased yield under harsh environmental conditions this project will help improve Australia's agricultural efficiency and competitiveness. It will help Australian agriculture prepare for the impact of [climate change](#) and the need to produce more food for a growing population."

The image-based analysis will be incorporated into the Plant Accelerator at the University's Waite Campus. Opened last year, the Plant Accelerator houses more than 1km of conveyor systems that deliver [plants](#) automatically to the imaging and other stations.

The project, 'Improving yield through image-based structural analysis of cereals', has been funded under the latest round of Australian Research Council Linkage Projects.

Other chief investigators for the project are Professor Mark Tester, Professor of Plant Physiology in the School of Agriculture, Food and Wine and Director of the Plant Accelerator, and Dr Anthony Dick, Deputy Director of the ACVT. The ACVT is a University of Adelaide research centre housed within the School of Computer Science.

The project involves industry partner LemnaTec, which provided some of the equipment used in the Plant Accelerator. They will help commercialise the technology.

Provided by University of Adelaide

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