



## New sensor gives farmers more accurate readings on plant health

Assistant professor Jian Jin, from Purdue University's Department of Agricultural and Biological Engineering, has built an innovative handheld sensor that gives plant scientists and farmers a more precise way of measuring the health of crops while gathering up-to-the-minute data that state and federal officials and others will find valuable.

Jian Jin hopes his hyperspectral-imaging device will be used widely by plant scientists and farmers nationally and internationally. The device scans a plant for physiological features, such as moisture, nutrient and chlorophyll levels, as well as different chemical spraying effects and disease symptoms to determine whether it is healthy or under stress.

"My vision is this sensor will allow household farmers walking through a field to use a handheld device and a smartphone to get the same information available from very expensive phenotyping systems constructed by big companies and big universities in recent years," Jin said.

The sensor, which can scan a plant in less than five seconds, can detect hundreds of bands of colour in each pixel, compared with the three bands of colour detected by traditional cameras. One version also shoots a burst of fluorescent light off the plant. Both are used to measure stress and nutrition levels of the plant.

There has been a rapid development of plant phenotyping in the past decade as technology is increasingly being used to improve efficiency based on current conditions instead of farmers relying on regional conditions and historical data to make decisions.

Jin said his sensor is more precise than current devices used by plant scientists that clamp down on a leaf and measure the health of only a portion of the plant.

"Due to multiple technical reasons, the sensor's prediction quality is much more accurate than any other types of crop imaging sensors that people have in the existing market," Jin said. "It's also constantly getting better because we scan plants every day and are upgrading both hardware and software technologies."

The Purdue Office of Technology Commercialisation has filed three applications for provisional patents for the technology.



This month's issue of *Milling and Grain* magazine is a brilliant World Nutrition Forum special, bringing together the latest innovations and milling technologies discussed at the biannual event. The 2018 World Nutrition Forum was hosted in Cape Town, South Africa, courtesy of Biomin, with the theme of 'S.C.O.P.E.' (Scientific Challenges and Opportunities in the Protein Economy).

The fitting theme encompasses perfectly what the World Nutrition Forum discussed, such as issues of the future of milling, alongside questions of scientific boundaries, as debates concerning genetics and alterations were raised. How to produce and maintain a sustainable protein economy was another key theme discussed at length at the event, and the future of African food was a key topic, the event itself being held in South Africa.

Africa's abundance of natural resources makes it a key area for farming and milling, with so much land dedicated to farming, that it makes other countries seem woefully lacking in comparison. Despite this, however, poverty and malnutrition permeate the continent, which is another issue which speakers at the World Nutrition Forum passionately discussed and were determined to resolve.

In South Africa, agriculture forms approximately 10 percent of employment. Cereals and grains are considered indispensable, being the primary farmed crops, which occupy 60 percent of hectare under cultivation in the 1990s, a number which only continues to expand.

Maize is also a very popular crop grown in South Africa, production of maize generating over 150,000 jobs in years with plentiful rainfall and supplying jobs for over 12,000 small farms and several larger farms.

Wheat production is fairly varied in South Africa, despite production increasing drastically following World War II. In 1991, wheat production exceeded 2.1 million tonnes, yet in 1992 only 1.3 million tonnes were produced, failing to meet local demand.

South Africa also grows a great deal of other crops, such as sorghum, sunflower seeds, beans and soybeans. The annual production of these crops varies slightly each year, and usually is affected more drastically by weather changes and alterations.

This issue of *Milling and Grain* looks into all these issues and more, with close analysis and reports on speeches and essays delivered by Biomin's Austrian research Team Leader, Wulf-Dieter Moll, and De Wet Boshoff, of the Animal Feed Manufacturers Association. We also have an interview by CEO of Biomin Asia, Jan Vanbrabant.