

Future Food

Creating high quality, safe and sustainable food

Expertise

Our objective is to meet consumer demands for high quality, safe and sustainable food in existing and emerging markets, and thereby support the continued profitability and competitiveness of Australian food and agricultural industries.

We are tackling this challenge from several directions: natural sciences, engineering, health sciences, social sciences, economics and business disciplines, to holistically understand the processes involved in food production and consumption, from the farm-gate to the dinner plate and beyond. We provide a portal for strategic partnerships in multidisciplinary research to address industry priorities and challenges. Our research scope is broad:

- **Quality differentiation and control:** The identification and control of nutritional and sensory traits, the development of analytical techniques and sensor technologies to monitor these through the supply chain
- **Microbial food safety:** assessing risks and developing data-driven tools for risk management, which has been spurred by food-borne disease outbreaks
- **Human health:** the impacts of diet, particularly the effects of food structure on the digestive system, microbiome, immune function and chronic disease
- **Sustainability and industrial ecology of production:** improvements by reducing environmental footprints, increasing process efficiencies and developing co-products from waste streams
- **Perceptions, attitudes and behaviour in the food system:** social, economic and business researchers analyse behaviour, from the determinants of individuals' food preferences and the market impact of regulations and labelling.

Tools and methodologies used

We have excellent facilities that underpin research at different stages of the supply chain, and extend from lab to pilot to field scale, including:

- **Agricultural production facilities:** include a state-of-the-art of greenhouse, glasshouse, field environments and livestock units for farm-scale experiments located at Sydney, Camden and Narrabri campuses.
- **Food science laboratory:** includes equipment for bench-scale food preparation and processing, pilot-scale brewing and fermentation, basic food quality analysis, rheological analysis, and sensory evaluation.
- **Pilot processing facilities:** include a variety of spray-driers, fluidised bed dryer, fermenters, membrane technology, advanced extraction facilities, 3D printing, and apparatus for smart packaging and food sensors
- **Chemical analysis:** a wide range of facilities are available for the analysis of food composition, structure, metabolites, and thermo-physical properties including various instrument configurations for liquid chromatography, gas chromatography, mass spectrometry, nuclear magnetic resonance, crystallography, different forms of spectroscopy and calorimetry.
- **Microbiological analysis:** includes facilities for extraction, identification, characterisation, culture and experimenting with microorganisms including food-borne pathogens.



AgTech and Food: Industry Capabilities

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Industry links

ARC Training Centre for Food Safety in the Fresh Produce Industry. Research in the Training Centre directed by Prof. Robyn McConchie encompasses both pre-harvest and postharvest microbial food safety: examining the sources and determinants of microbial contamination in fresh produce, developing improved methods for diagnostics and control, and generating risk assessment and support tools that will assist industry with their management decisions.

Making Food Safer. Dr Floris van Ogtrop and Dr Kim Phan-Thien are leading a project on Fresh Produce Safety in Storage and Transport Facilities to research microbial risks during the distribution phase of the fresh produce supply chain. Working closely with industry partners including Harris Farm Markets, NSW Food Authority, New Zealand Apples and Pears, and New Zealand Institute of Plant and Food Research, the team will compile and analyse data on food safety management in produce distribution centre and transport environments.

ARC Training Centre for Australian Food Processing. Directed by Professor Fariba Dehghani, the overarching goal of the centre is to improve the profitability and sustainability of food industry partners, through strategies of waste stream utilisation, co-product development, and process optimisation.

Optimising Health and Nutritional Quality. Associate Professor Andrew Holmes leads research in the Charles Perkins Centre that examines the interactions between food and health, and how this varies between individuals and across different social demographics.

Our experts

Dr Kim-Yen Phan-Thien (Research Capability Coordinator): Works in food quality, quality differentiation, food safety and food processing.

Associate Professor Teresa Davis: examines the Marketing of food to children and young people, including marketing strategy and its implications for policy decision makers. Also the socio-cultural aspects of families and food consumption.

Professor Fariba Dehghani: Focused on developing technologies for nutritional food products and biodegradable polymers for smart/active packaging.

Associate Professor Paul Henry: Director, Global Executive MBA, with a background in the marketing of packaged foods such as margarine, edible oils, frozen meals, confectionary, wine and soft drinks. Research in understanding everyday consumer behaviour to aid marketing and new product development.

Associate Professor Andrew Holmes: Researchers microbial ecology, specialising in the gut microbiome.

Dr John Kavanagh: Focuses on microbially derived foods and production of fat-soluble vitamins such as A and K. Expertise in two key challenges in the commercialisation of bioprocesses: the design of efficient reactors, and dealing with large volumes of highly concentrated, recalcitrant wastewater.'

Professor Tim Langrish: World leader in drying technology, particularly spray drying. His development of crystallisation in drying has the potential to improve resource use by combining crystallisation and drying into one operation.

Professor David Raubenheimer: Expert in nutritional ecology, examining how nutrition-related aspects of the environment interact with human or animal biology to determine health and fitness outcomes. In food systems, this is understanding consumer choices and the links between diet and health.

Associate Professor Margaret Matanda: Expert in analysing food and agribusiness supply chains, customer preferences and purchasing decisions, food and agribusiness retailing and export marketing strategies. Trainer in capability building programs in food and agribusiness in Africa, USA and Asia.

Professor Robyn McConchie: Research spans the post farm-gate management of food from postharvest, food safety, quality assurance, value-adding, and linking farmers to markets through supply chains.

Dr Floris van Ogtrop: Interested in water quality, aquatic ecology, sustainable agriculture, and data science approaches to risk management in food systems.

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