**A role for gene editing in breeding chickpea for future protein.**

Bain, M1, Jobling, S1, Sirault, X1

*Mel.Bain@csiro.au*

1 Agriculture and Food, Commonwealth Scientific and Industrial Research Organisation (CSIRO), Canberra, Australia

Chickpea (*Cicer arietinum*) is an important and affordable source of protein as well as starch and dietary fibres globally, with long traditions in food cultures from the Mediterranean, South and Southeast Asia and East Africa. As consumers become more concerned with the nutritional and sustainability credentials of their food there is great potential for expansion in the production of chickpeas in countries such as Australia, both to better meet the needs of established export markets as well as to grow new domestic markets.

One approach to support growth in the Australian chickpea industry is the use of gene editing, a technique for the targeted modification of genomes, for both direct application to precision breeding as well as in support of predictive breeding programs as a tool for validation *in planta*. Progress towards establishing robust techniques for the generation of gene edited chickpea plants will be presented, alongside a discussion of the prospective application pathways into breeding programs. An application for gene editing to support predictive breeding programs will be highlighted within the CSIRO Artificial Intelligence (AI) for Missions program which seeks to utilise AI in the analysis of large genomic data. This project aims to generate data driven predictions about traits of value which can be modified and tested by gene editing, such as the techno-functional properties of chickpea protein, assisting the development of new varieties tailored to individual markets.