

INCREASING TECHNOLOGY & INNOVATION CAPABILITY IN THE MILLING SECTOR

A CAPABILITY INVESTMENT SCHEME THAT IS A JOINT INVESTMENT BY SUGAR RESEARCH AUSTRALIA (SRA), THE SUGAR RESEARCH INSTITUTE (SRI) AND QUEENSLAND UNIVERSITY OF TECHNOLOGY (QUT) IS PROVIDING THREE RESEARCHERS AN OPPORTUNITY TO BUILD INDUSTRY MILLING RESEARCH CAPACITY BY WORKING WITHIN THE QUT CENTRE FOR TROPICAL CROPS AND BIOCOMMODITIES.



Milling Matters recently met with Dr Changrong Shi and Dr Ehsan Arzaghi who are two of the participants within the milling sector capability building initiative by SRA, SRI and QUT.

Dr Changrong Shi is a postdoctoral research fellow, investigating projects related to sugar manufacturing and she is being mentored by Professor William Doherty.

Dr Shi has a BSc Degree in Applied Chemistry from Huangshan University in Anhui, China. She then went to Guangxi University in Southwest China, which is where most of the country's sugarcane is grown, to do a Masters of Sugar Engineering, with particular interest in the chemistry of sugar manufacture. Her PhD focused on membrane filtration of sugarcane juice with emphasis on the fouling mechanisms of the filtration process. She also examined options to find value for the retentate.

Dr Shi is currently working on two projects with Professor Doherty. The first relates to studying sugar degradation at the milling stage, and the second project is the development of calcium phosphate-based nanoparticles as a clarifying agent to significantly improve juice clarification efficiency.

This will be achieved through the enhanced removal of both soluble and insoluble impurities, as the traditional clarification process is not very effective to remove these impurities.

We also met with Dr Ehsan Arzaghi who is being mentored at the Centre for Tropical Crops and Biocommodities by Dr Geoff Kent.

Dr Arzaghi has a Bachelor's Degree of Mechanical Engineering, Masters in Fluid Mechanics and Maritime Engineering and a Graduate Certificate in Management and Logistics. Dr Arzaghi's PhD research was on asset integrity management of large infrastructures which he completed in 2018. He then spent a year conducting postdoctoral research at Delft University of Technology in the Netherlands where he investigated methods for uncertainty reduction and decision making with regard to the operation and maintenance of offshore wind farms. Dr Arzaghi has a personal research interest in making assets utilised in different industries to operate more efficiently and safely. While he has worked at improving reliability and availability of renewable energy technologies, he is particularly interested in making the exploitation and usage of conventional resources safer, not only for humans but also for the environment.

Dr Arzaghi has spent three weeks running an experiment at the Isis Central Mill which allowed him to learn about sugarcane milling processes. He has also spent time with the mill staff with regard to the problems that relate to his own expertise including deterioration of crystallisation pans. Dr Arzaghi said he looks forward to helping the milling sector become more efficient through reducing mill downtime.

Dr Arzaghi is currently working on three projects at QUT. One of them is related to improving cane feeding at the beginning of the milling process by investigating the application of feeder rolls on shredders. He is planning to conduct some experimentation work with MSF Sugar at their Tableland Mill in 2020.

The second project follows on from SRA-funded research on achieving a better understanding of the millability of various cane varieties. This includes strategies to improve the processing of existing varieties that have posed some challenges for milling.

The third project relates to the economics of mill roll shell maintenance and is part of a larger SRA-funded project to identify ways to reduce the cost of roll shell maintenance and eliminate roll arcing.

Dr Harjeet Khanna, General Manager, Research Funding Unit, SRA, said: "The investment from SRA, SRI and QUT will span across five years. It is recognition of the importance of building and maintaining research capability for the milling sector."

This investment scheme captures mentoring as one of the modes of transfer of discipline knowledge and intellectual capital. It gives new industry entrants the hard skills they need to succeed in their current roles and prepare them to assume more advanced responsibilities over time. It is therefore also a mechanism to ensure good succession planning where senior professional staff pass on the experience-based knowledge they have acquired over the course of their careers to the early and mid-career professionals who ultimately will take over from them. ■

(Far left) Dr Changrong Shi.
(Left) Dr Ehsan Arzaghi.