Professor William Chen is cooking up a storm in the domain of food innovation, paving the way for greater food security and healthier meals.

Given his expertise in what might be considered food alchemy, Prof Chen was appointed Director of the Fraser & Neave (F&N)-NTU Innovation Lab, which was recently opened by Singapore’s Minister for Education Mr Ong Ye Kung in January 2019. In this interview with NTU Link magazine, Prof Chen shares about the latest developments in food technology and why food innovation and security are essential for Singapore.

**How would you define food innovation and why is food innovation important?**

There are three key areas in food innovation for enhanced food security in Singapore: the first is primary production, like urban farming. Secondly, we have food processing technology, and thirdly, nutrition for Singapore’s ageing population.

Singapore should be more focused on enhancing food processing technology because we import so much food from other countries. That is inevitable since we have less than one percent of land set aside for farming and agricultural activities. We therefore need to maximise the utilisation of imported food and reduce food waste, which ultimately leads to more cost-effective food import.

All the same, we can’t just blindly import food, because it’s equally important to know how much is needed to fulfil the nutrition requirements of local consumers.

**Please explain what you mean by maximising food utilisation.**

When we talk about maximising food utilisation, we’re talking specifically about minimising food waste and how to prolong the shelf life of food. But we can go beyond that—we can recover nutrients from side-streams produced by the food processing industry (soybean residues, spent brewer’s grain, etc) and eventually “give back” to the food chain. We have been adopting this circular economy approach quite successfully, and we hope we can reduce the pressure of importing food in the near future because we’ll know how to use food better.

At present, there is a huge amount of food waste generated in Singapore yearly. For example, we produce more than 80,000 tons of food processing side-streams a year! Since we only have less than one percent of land for agriculture and virtually no animal farming, all this waste is sent to landfills or incinerated instead of being recycled. There are two drawbacks to this: first, there is the issue of landfill capacity. Second, incineration consumes large amounts of energy.

**Could you share a bit more about the F&N-NTU joint lab?**

F&N and NTU have jointly opened an innovation laboratory in Singapore to develop novel products and recipes for F&N’s range of beverage products. This is the first external lab in F&N’s 135 years of history. Over the next four years, our focus is on developing healthier food and drink products, along with greener packaging. We will also find ways to up-cycle side-streams produced from food processing into valuable ingredients or materials.

Everybody knows about fermentation, but no one really thinks about its beneficial effects. When microbes grow on a substrate, they actually produce vitamins, amino acids and antioxidants. Hence, we aim to explore more economic ways of incorporating micronutrients from fermentation into food products to enrich their nutritional value. We are working with a number of other food companies to commercialise our food technology innovations, not limited to fermentation.

**How do you think collaborations between industry and academia are beneficial in pushing forward food innovation?**

I believe it takes two hands to clap. When it comes to industry-academia collaborations, there are two types of industry partners: small- and medium-sized enterprises (SMEs) and multinational companies (MNCs), each with different strategies for tapping on R&D for their product development.

For example, Uni-Tat is a local SME that makes ice products. We’re working with them to make their ice cubes more beneficial for the consumers—by adding probiotics to them. Ice cubes containing probiotics will be more versatile than, say, Yakult, because people can drink it with whiskey, apple juice, or coke. So SMEs may approach us for new ideas, and we work together to formulate the right approach for product development. We can then pitch the new, refined idea for funding, and we start a collaboration.

As for large MNCs, we have been engaged to integrate our innovations into their food production processes. One example is our natural food preservatives, which have attracted strong interest from many food companies, resulting in a number of Research Collaboration Agreements (RCAs) being signed and implemented.

In addition to forging partnerships with the food industry through RCAs, we are also actively working with the NTU Development Office. This approach is very much like fundraising for a purpose, which is to bring in industry funding to support NTU FST beyond research to include bursaries for needy students, scholarships and endowed professorships, among others. This new approach has shown encouraging outcomes so far. Companies would also benefit from this model of partnership as it offers them greater brand awareness and publicity.

**What are your big picture dreams for food innovation at NTU and in Singapore?**

I hope NTU can become a powerhouse of food innovation for the business-to-business (B2B) sector. NTU is not an established food company, neither is it directly involved in the food industry, so we are not well-positioned to develop final food products. That said, food-related innovation and research can develop from NTU or any other institutions of higher learning. The Singapore government has pledged up to S$144 million to write the “Singapore Food Story”. Under this new framework, we are working closely with all relevant stakeholders to drive food technology innovations that further enhance Singapore’s food security.