REENGINEERING FOR A GREENER WORLD

Trained in basic research, Dr. Zhang Mingzi began applying her skills to solving practical problems after joining Institute of Chemical & Engineering Sciences (ICES). Working here has given her opportunities to network and collaborate with many talented researchers of diverse backgrounds.

Step into the lab of Zhang Mingzi, and you will see a vision of the future – engineered yeast churning out butanediol from glucose.

"Butanediol is just one of the chemicals we are looking at. Many things around us are produced with different chemicals, and butanediol, for instance, can be used to make plastics and fibres. Manufacturing these chemicals usually requires non-renewable petroleum and high temperatures and pressures, which means using a lot of energy," explains Mingzi. "What we are trying to do is to develop greener, more sustainable alternatives."

Unlike petroleum, these materials are readily available and renewable. "I work with budding yeast and you can do a lot of things with it!" enthuses Mingzi. "Of course, there are challenges, such as how to make

it cost-effective and competitive with current processes. But in a way, this will hopefully play a part in alleviating the global environmental issues we face today."

Tenacity's The Word

Cups and cups of long black, no sugar, and animated discussions with fellow researchers are what fuel Mingzi in her work. The night owl had her first taste of research work after an attachment with an A*STAR research institute. The experience convinced her that science was her calling, and she took on an A*STAR scholarship to continue her graduate studies in New York.

"Unlike most jobs where failure is not an option, scientists deal with the unknown and failed experiments are the norm!" grins Mingzi. "To paraphrase a professor, if you are in science, don't do it for the money, and if you want money, don't do science. Scientific research is a choice before it is a career."

Having the opportunity to drive her own projects is highly motivating for Mingzi, who enjoys the intellectual independence and challenge. Designing experiments and being prepared for them to fail, however, can be daunting. "It can be demoralising to run a 300-hour experiment and not have the results I wanted at the end of the day. But counting the things that lead to eventual successes, the adrenaline rush when things work out – that helps in bouncing back." says Mingzi.

It also helps that Mingzi is no stranger to tenacity. The scientist played badminton competitively all the way till she graduated, and was captain of the team in her junior college. She shares, "Badminton shaped me in many ways. It taught me physical and mental tenacity, and the lesson that failures are inevitable but learning from them is key! Today, I still play in small tournaments to relive old times and to have fun. When I'm stuck on a problem at work, I turn to badminton for a break."

A Journey Of Hope

Mingzi is full of hope when it comes to her work at A*STAR.

"Through A*STAR, one gets to see a more complete picture of major societal issues such as the environmental impact of rapidly growing middle classes," Mingzi says. "Here, I realise that I'm only tackling a small part of the problems we are facing. By working together with the researchers here, we hope to provide more feasible solutions to bigger, more global challenges."

Her own journey demonstrates this belief. Trained in basic research, she began applying her skills to solving practical problems after joining ICES. Working here has given her opportunities to network and collaborate with many talented researchers of diverse backgrounds.

Mingzi reflects, "There are now larger initiatives in A*STAR that pull scientists from different fields to solve important problems. This focus on mission-based interdisciplinary research is a good trend as some problems are just too large for a single laboratory to handle. It's like a chemical reaction! Add biologists, chemists and engineers and provide a source of energy such as funding and support, and things will happen. The outcome may not be what we expect but there is a high chance that new things will result! I believe as a collective, we can make a difference!"