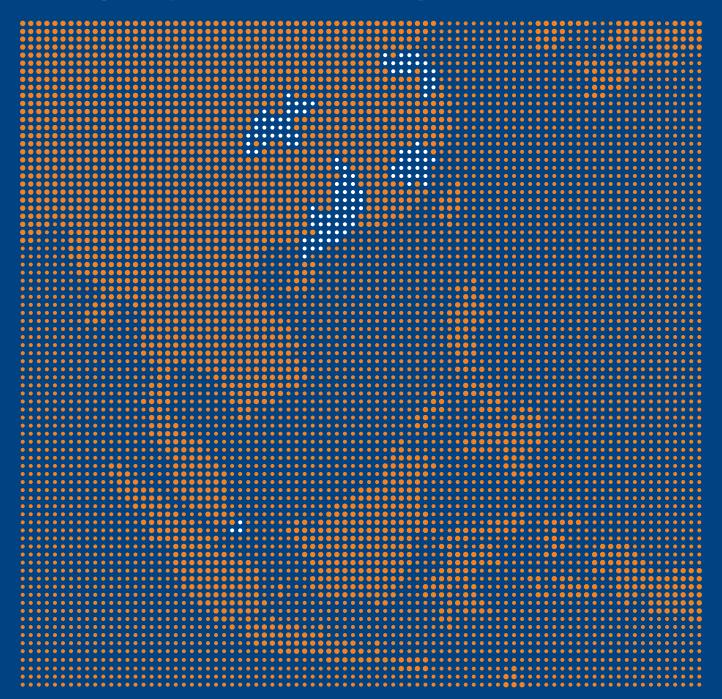
NUSRI CHINA



## 2022 ANNUAL REPORT





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### CHAIRMAN'S MESSAGE

As we expand and deepen our collaborations in China, let us continue pushing boundaries—in research, education, and innovation and enterprise—to bring about a better future for all.



2022 was the year in which academic life in Singapore began to return to normalcy after the Covid-19 pandemic. Flights around the world became commonplace again and global collaborations and research returned to pre-pandemic levels. However, it is worth remembering that even in the darkest days of the pandemic, Singapore and China continued deepening relations with one another, in particular through the Joint Council for Bilateral Cooperation (JCBC), an annual forum to discuss innovations in science and technology, smart cities, finance, and education.

Strong bilateral relations underpin our work at the NUS Research Institutes in China (NUSRI China) and have given rise to many collaborative initiatives and projects to meet the development priorities of both countries. In 2022, we marked a decade of collaborative success at the NUS Research Institute in Suzhou (NUSRI Suzhou). Celebrations were held in January and showcased NUSRI Suzhou's contributions to the Singapore-China partnership in technology and education. In September, we opened the new campus of the Joint Institute in Fuzhou, a physical testament to the continuing strong partnership between NUS and Tianjin University. In 2022 we also broke ground on a new 15,000-squaremetre NUSRI Chongging building in the Liangjiang Collaborative Innovation Zone. NUSRI Chongging is scheduled to move into the new premises by the end of 2024. By expanding the scope of our research and educational programmes, NUSRI China remains committed to nurturing future-ready graduates and the next generation of leaders and entrepreneurs.

In research, we have had another successful year. In the Nature Index 2022 for the Big 5 science nations

(China, Germany, Japan, the United Kingdom, and the United States of America), the collaboration between Tianjin University and NUS achieved the highest collaboration score for partnerships. In addition, our researchers had 343 papers published in top-tier journals, and filed 36 patent applications.

In education, we extended NUS' well-received "3+1+1" joint programme to NUSRI Chongqing. Forty-eight students enrolled in NUSRI Chongqing's inaugural intake for majors in computer engineering, bringing the total number of students that have taken part in the joint programme to more than 500. Meanwhile, 84 students enrolled in our NUSRI-affiliated PhD programmes. We also introduced the Tianjin University-NUS double-master's degree programme, which combines the strengths of both universities in chemistry, physics, and chemical engineering. The programme will welcome its first intake of students in August 2023.

As we look ahead, let us continue to push the boundaries of research, education, and innovation and enterprise, and inspire change to create a better future for all. I would like to thank all the members and partners of the NUS community for their contributions and continuing support as we work hard to meet these goals.

#### **Professor Ho Teck Hua**

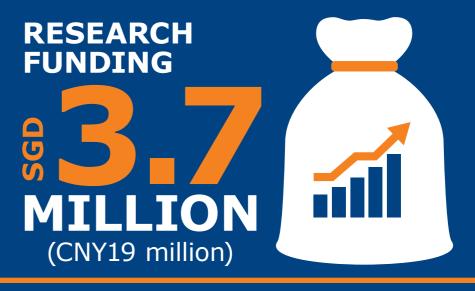
Senior Deputy President and Provost Tan Chin Tuan Centennial Professor, National University of Singapore

## 2022 IN NUMBERS









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## **NUSRI China Management Committee**

NUSRI China is governed by a Management Committee that directs the strategy, policy and governance, as well as oversees the operations and delivery of the desired outcomes in terms of research output and capability development. The Management Committee also reviews the impact of research initiatives and identifies opportunities for synergistic partnerships. The Management Committee's Chair and Members are appointed by the President of NUS.



Professor Ho Teck Hua (Chair) Senior Deputy President and Provost



Professor Chee Yeow Meng Vice Provost (Technology-Enhanced and Experiential Learning)



Professor Hang Chang Chieh
Executive Director,
Institute for Engineering Leadership,
College of Design and Engineering



Professor Liu Bin (Deputy Chair)

Provost's Chair Professor and

Senior Vice Provost

(Faculty & Institutional Development)



Professor Chen Tsuhan
Deputy President
(Research and Technology)



Professor Chong Chi Tat University Professor and Director, Institute for Mathematical Sciences, Faculty of Science



**Professor Xu Guo Qin** Director, NUSRI Suzhou and Director, NUSRI Chongqing



Mr George Loh Senior Director (Strategic Collaboration & Partnership), Office of the Senior Deputy President and Provost



Professor Freddy Boey
Deputy President
(Innovation & Enterprise)



**Professor Shen Zuowei** Vice Provost (Graduate Education & Special Duties)



Professor Susanna Leong Vice Provost (Master's Programmes & Lifelong Education) Dean (School of Continuing & Lifelong Education)



Professor Teo Hock Hai Provost's Chair Professor, Director, Humanities and Social Sciences Research, Office of the Deputy President (Research and Technology)

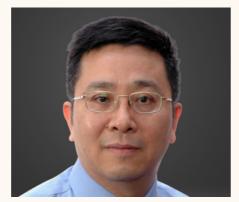
### **NUSRI China Directors**



**Professor Xu Guo Qin** Director, NUSRI Suzhou and Director, NUSRI Chongqing



Professor Chen Wei Executive Dean (NUS), Tianjin University-National University of Singapore Joint Institute in Fuzhou



**Professor Meng Qiang** *Director, NUSRI Guangzhou* 

### **NUSRI China Programme Office**

While strategy is the brain of the organisation, culture and passion is the lifeblood regardless of size—the NUSRI China Programme Office (PO) is the true epitome of that.

Established in August 2020 in the NUS Office of the Senior Deputy President & Provost, the PO serves as the secretariat to the NUSRI China Management Committee. It also oversees the operations of the NUSRI entities and provides support and the resources, including university policies and guidelines to standardise best practices, to all four entities of NUSRI China.

The PO has put in place an effective framework to welcome new hires and set them up for success and build great organisational culture. It also works closely with the NUS Office of Safety, Health and Environment to promote and ensure a safe and conducive environment for all NUSRI staff and students.



Mr George Loh Senior Director



**Ms Vivian Fu** Senior Associate Director



**Ms Wang Lin**Associate Director



Ms Sai Siew Huey Senior Manager



**Mr Vun Bing** Management Assistant Officer

## THE JOURNEY SO FAR: NUSRI CHINA IN NUMBERS\*



166



in international journals

1,827



### **NUMBER OF STUDENTS**

"3+1+1" joint programme & NUSRI-affiliated PhD programme

2,139

\*All figures are cumulative as at December 2022

### THE NUSRI CHINA STORY

### **Making An Impact Beyond Singapore**

Many overseas counterparts often ask: how did NUS, nestled in the relatively young city state of Singapore, develop itself into a globally reputable institution?

Part of that answer is clear: appreciating the importance of strategic investment and collaborations in developing areas of research and education excellence. It is through active efforts will new ideas be generated, new knowledge be created, and new approaches be devised to solve important problems.

NUSRI China is one such endeavour, with NUS partnering the local governments in China to establish research institutes focusing on research and innovation, education, and enterprise in the various regions of China.

First laying foundation in 2011 in the Chinese city of Suzhou, home to the Suzhou Industrial Park established in mid-90's between the governments of China and Singapore, NUSRI China has since expanded its footprint to three more cities in the country—Fuzhou, Chongqing and Guangzhou.

Tapping into NUS' strengths and capabilities to address the demands of the different regions in China, NUSRI China's key research areas span across energy, environmental and urban sustainability, advanced materials, financial systems and risk management, and smart nation capabilities such as artificial intelligence and modern logistics.

To date, NUSRI China is by far NUS' most established entity in advancing its research and enterprise outside of Singapore—but it is not just that. NUSRI China is also NUS' largest research and education effort, offering top-class education and training to develop a pipeline of future leaders who will serve in vital roles in an increasingly globalised world.

As it commemorates 10 years of excellence and innovation, NUSRI China is looking ahead to the next decade and beyond. It is determined to not only keep its spirit of adventure burning to stay at the frontiers of knowledge discovery, but also to continue grooming talent for the scientific ecosystem and translating research outcomes into tangible benefits for everyone.



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**Chongqing** *April* 2020

### Fuzhou August 2019

Located in Fuzhou Municipality, the Joint Institute is a strategic partnership between Tianjin University (TJU) and NUS.

### **Guangzhou** December 2021

The newest NUS overseas research institute with a strategic focus on research translation and innovation. NUSRI Guangzhou is hosted by the China-Singapore Guangzhou Knowledge City.

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# Improving Lives One Startup At A Time

NUSRI China has been advancing deep technology in areas such as medicine, food and mobility. While these innovations require heavy investments and may take years to develop, their successful commercialisation will build a better future for all.

Since the establishment of its first research institute in Suzhou, NUSRI China has successfully incubated 104 startups, with 25 in 2022 alone. NUSRI China (BLOCK71) serves as a nexus of global resources and networks providing a full range of services to support tech startups at every stage, helping Singapore's deep tech startups to connect with government agencies, large enterprises, investment and financing institutions and other resources for them to gain access to the China market.

Here, we feature four innovations that can transform our daily lives.

### **Revolutionising The Future Of Retinal Diagnostics**

EyRIS (Chongqing) Al Technology Co. Ltd, a joint venture set up by a Singaporean company EyRIS Pte Ltd and their Chinese partner Aurora International Trading Ltd, aims to raise the standard of healthcare delivery by developing and deploying AI Deep Learning System (DLS) in the healthcare industry. Its core product, Singapore Eye LEsioN Analyzer (SELENA+) is a deep tech product that can automatically detect multiple retinal diseases using a patient's retina image. SELENA+ can simultaneously process large amounts of data and reduce diagnosis time from an hour to three minutes. Indeed, by making the detection of retinal diseases faster, cheaper and more consistent, the future of retinal diagnostics looks set to be revolutionised.



Originally invented by clinicians and technologists from Singapore Eye Research Institute (SERI) and NUS School of Computing, SELENA+'s breakthrough machine learning technology relies on representation-learning methods to convert natural data into its raw form, then analyses the data to sieve out intricate patterns and structure inherent in the data presented.

EyRIS was incubated in NUSRI Chongqing (BLOCK71) on 25 January 2021, made possible by a funding amount of CNY900,000 from the local government. Establishing itself in NUSRI Chongging (BLOCK71) was integral to helping EyRIS take off. The fledgling startup could tap into the resources and government-level networks offered by the incubation programme to improve their business plans, marketing strategies, market research and intellectual property development.

Plans are underway for EyRIS to collaborate with major public hospitals and key medical institutions in Chongqing in areas such as ophthalmology and disease screening.



The award-winning MIMO C1 is a cargo e-scooter that can be transformed into a trolley in three seconds.

### **Leading The Way To A Smarter And Greener Ride**

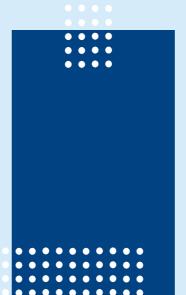
Pandemic restrictions did not prevent MIMO Technology from establishing its presence in China as the startup sought to make inroads to a greener future.

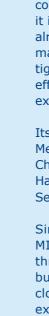
The six-year-old Singapore-based startup aims to design and build smart, eco-friendly personal mobility devices. Its latest award-winning product, the MIMO C1, is a cargo e-scooter smaller than a bicycle. The scooter can turn into a trolley in a mere three seconds. Compared to conventional cargo vehicles and cargo bicycles,

it is less costly and has a lower environmental impact. Riders are already using the MIMO C1 in Singapore's financial district, shopping malls and residential areas, zipping through busy streets and navigating tight corners to deliver parcels, documents and meals with ease and efficiency. Riders do not need a driving licence to operate the device, extending employment opportunities to anyone who is up to the task.

Its founder, Witono Halim, who graduated from NUS with a Bachelor of Mechanical Engineering, believed that expanding MIMO's operations to China would make it more competitive. With the help of NUSRI Suzhou, Halim successfully set up MIMO's operations in the eastern Chinese city in September 2022 remotely from Singapore, despite the travel restrictions.

Since its incubation, NUSRI Suzhou (BLOCK71) has helped to raise MIMO's profile in China. It has introduced MIMO to local companies through its official WeChat account, and channeled high-quality business connections to the startup. MIMO plans to work more closely with local supply chain partners in China and explore market expansion opportunities.







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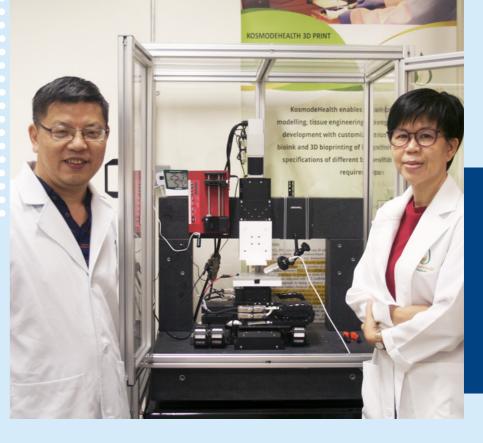
## **W0W® With A Zero! The World's Only Noodles With Zero Glycaemic Response**

Kosmode Biology Technology (Suzhou) Co. Ltd, one of the pioneering incubatees at NUSRI Suzhou (BLOCK71), has plans to revolutionise taste buds by upending an age-old staple at Chinese meal tables: noodles.

It developed a plant extraction technology to create W0W® Noodles in 2021—the world's only starchless protein noodles. They are made with high-quality plant protein and fibre upcycled from spent barley grains, often found as a by-product from producing beer or malt drinks.

The W0W® Noodles developed by Kosmode Biology Technology is the world's only starchless noodles made with high-quality plant protein and fibre upcycled from spent barley grains.





Professor Huang Dejian (left), founder of Kosmode Biology Technology and cofounder of KosmodeHealth, with his mentor,

Ms Florence Leong.

The noodles have been shown to elicit no blood sugar response in consumers. Boasting 4 grams of protein and 6.6 grams of fibre per serving of 100 grams, W0W® Noodles enable good blood sugar control and management, making them an ideal noodle substitute for aging, diabetic or health-conscious consumers who love their noodle dishes.

Kosmode's plant extraction technology is just one of its three major patented technologies. The company has also developed Plant Protein Composite (PPC™) bio-ink formulation technology and high-precision 3D scaffold printing technology. It is planning to deploy the technologies in the food and biomedical industries.

Founded in 2014, Kosmode is the Chinese research and development arm of Singaporean deep tech company KosmodeHealth, and was founded by Professor Huang Dejian from the NUS Department of Food Science and Technology. He also co-founded KosmodeHealth with his mentor, Florence Leong. Prof Huang is a key member of the current research team at the Centre for Peak of Excellence on Biological Science and Food Engineering of NUSRI Suzhou.

KosmodeHealth has secured nearly SGD2 million in financing and is in the midst of constructing a pilot plant in Singapore. The plant is expected to significantly ramp up the production of its WOW® noodles and other functional food products.



### **Cheers To The World's First Probiotic Beer**

Good gut health and alcoholic drinks do not go hand in hand, but startup Probicient is doing just that with probiotic beer, and is now hoping to tout the drink's benefits to China's millions of consumers.

The ethanol, organic acids and hops in beer are known to impair the growth and survival of probiotics. That is why probiotification of alcoholic beverages has remained elusive for so long.

Probicient

To that end, Probicient has developed a breakthrough approach to ensure the survivability of probiotics at 1 billion colony forming units (CFUs), the minimum amount for a probiotic to be effective.

In early 2022, Probicient partnered Singaporean brewery Brewerkz to launch the world's first probiotic beer that comes in different flavours. The product is a result of an estimated SGD1.5 million investment by Brewerkz to develop specific fermentation methods to introduce probiotics into their beer. Market trends over the past few years have seen an increase in demand for healthier or low-alcoholic beers. With the introduction of Probicient, beer enthusiasts can now enjoy the refreshing taste of beer while protecting their gut health.

The world's first probiotic beer, which comes in different flavours, is jointly created by Probicient and Singaporean brewery Brewerkz.

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The company was spun off from a partnership between the NUS Department of Food Science and Technology and Origgin Ventures. It started in 2017 when one of Probicient's founders, Associate Professor Liu Shaoquan took part in a trade event organised by NUSRI Suzhou, where he noted keen interest in probiotic beers from Chinese investors and entrepreneurs. Together with his colleague at the NUS Department of Food Science and Technology, Dr Alcine Chan Mei Zhi, they founded Probicient in September 2022.

Today, Probicient is a leading beverage technologist specialising in flavour, nutrition, advanced probiotification and fermentation techniques, creating value to global macrobreweries and microbreweries through ease of access to their food tech innovation capabilities.

Having established its presence in NUSRI Suzhou (BLOCK71), Probicient is already in talks with several potential brewing and distribution partners within the region and is looking to expand its footprint in China.



## Relentlessly Expanding Research Frontiers

From public health and food security to energy and climate, solving the most pressing issues of today will no doubt require collaborative efforts. No country can come up with the answers alone; no field can fill the gaps independently; and no scientist can ignite change on their own.

Researchers must join forces to transcend the boundaries across disciplines and even bridging to industrial and public sectors. Such multisectoral partnerships and global networks are exactly what drives NUSRI China forward.

On an everlasting quest to translate new knowledge into social impact, each research institute houses trailblazing researchers from diverse areas of expertise and undertakes major projects with local government and industry partners.

### Serving Up A Fresh Take On Food—And More

It is no secret that the food industry thrives on experimentation and innovation—whether chefs cooking up something new in the kitchen or scientists adding technological flare to the production process. Such creativity and novelty are the foundation of the Centre for Peak of Excellence on Biological Science and Food Engineering (FST-POE) at NUSRI Suzhou.

Professor Zhou Weibiao takes the helm as Director of Centre for Peak of Excellence on Biological Science and Food Engineering at NUSRI Suzhou.



At FST-POE, diverse aspects of food science and technology take the spotlight: developing next-generation functional foods; uncovering bioactive food constituents that may extend the healthy lifespan of humans; developing 3D printing technology based on plant protein composites; and food and beverage fermentation. With a 27-member strong team, it whips up novel recipes that meld health, sustainability and consumer appeal. Beyond merely satiating one's hunger,

Centre Director Professor Zhou Weibiao and his team are spearheading the development of next-generation functional foods—foods that are not only palatable, but also deliver additional health-promoting benefits.

Cereal-based products for example, are a staple around the world, but the prevalence of diabetes in many countries have prompted FST-POE researchers to create more healthful alternatives. They are developing novel cereal-based products using wholegrain flour, while retaining the same taste as white flour products. They are also working on plant extracts containing bioactive compounds that have reported health-promoting benefits.



The new probiotic tea created by Associate Professor Liu Shaoquan and his team. The innovative beverage not only retains the beneficial polyphenol contents of tea, but also contains the antibacterial agent phenyllactate.

For his outstanding contributions to the science of next-generation functional foods and emerging food processing technologies, and for his dedication to education, Prof Zhou has been elected as Fellow of the Singapore National Academy of Science in 2022.

Exploring the use of macromolecules such as plant proteins and polysaccharides as biomaterials with medical applications opens a wide range of possibilities for the biomedical industry. At the centre,

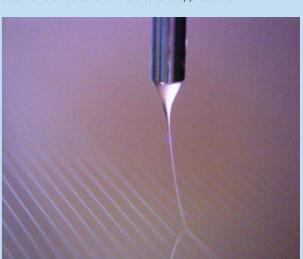


Professor Huang Dejian leads a team to innovate food processing techniques that help foster a zerowaste economy.

Associate Professor
Liu Shaoquan is a trailblazer
in the field of food flavour and
fermentation.



The patented plant protein composites as ink for the printing of scaffolds using an electrohydrodynamic jet printer created by Professor Huang Dejian and his team. The resulting scaffolds are used for biomedical and meat culture applications.



Professor Huang Dejian is leading this effort, with a recent collaboration established with a medical research company in Zhejiang Province.

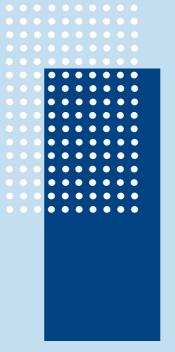
His research team has also collaborated with the Advanced 3D Printing Lab in NUSRI Suzhou and successfully constructed a high precision 3D printer based on electrohydrodynamic jetting (EHDJ) mechanism. In tandem with it, they have developed and patented plant protein composites as ink for the printing of scaffolds using the EHDJ printer. The resulting scaffolds are used for biomedical and meat culture applications.

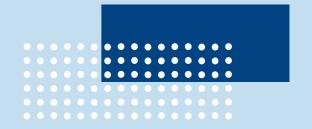
His team's research efforts have become the technological bedrock for Prof Huang to set up Kosmode Biology Technology (Suzhou) Co. Ltd in 2014—a biotech startup innovating food processing techniques while helping to foster a zero waste economy.

Meanwhile, other FST-POE teams are spicing up fermented products through exploring the potential of various probiotic and non-probiotic microorganisms. The driving force behind these research efforts is none other than Associate Professor Liu Shaoquan, who is a renowned scientist in the field of food flavour and fermentation. By brewing new formulas that deliver enhanced flavour and nutritional value, these projects spur opportunities for commercial partnerships and technology transfer.

Several ventures with the industry in food development and processing technologies are also racing along the pipeline from lab to market, including quality control and process optimisation for fish products, as well as automation equipment to empower an intelligent food sector.

By bridging between academia and industry, FST-POE is transforming the future of food in Suzhou and beyond—one bite at a time.





## **Materialising Value To The Community**

From cars to computers, almost everything we use daily is produced by manufacturers. It is no wonder that manufacturing is often described as a key building block of society. Manufacturing has evolved over the centuries, from manual labour to machine-reliant assembly lines to today's highly automated factories. The industry continues to transform itself with further research in advanced manufacturing and materials, giving rise to the Industry 4.0 revolution.

The Advanced Manufacturing and Materials (AMM) Centre at NUSRI Chongqing is playing its part in the industry's continued evolution. It is on a mission to develop an integrated design and manufacturing platform that encompasses innovative manufacturing technologies and novel materials. By understanding the mechanisms and functional properties of advanced materials, AMM researchers can tailor these materials for medical and healthcare, renewable energy, and environmental applications to name a few. To achieve these diverse goals, the centre brings together scientists from varied disciplines, from fluid mechanics to materials science to computer and data science.

**Professor Zhang Yunfeng**, Director of the Advanced Manufacturing and Materials Centre at NUSRI Chongqing.



For Centre Director Professor Zhang Yunfeng, an important pillar of advanced manufacturing lies in producing value-added parts that are technologically complex. The traditional manufacturing method of high value-added parts uses multi-axis milling, which is time-consuming and expensive. Instead, his team is leveraging cost-efficient laser cladding technology and developing intelligent software for hybrid machining of these parts.



Artist's impressions of the Chongqing Elingfeng Project. The green building design and evaluation efforts are led by Dr Li Yongqiang, a Research Fellow at the Advanced Manufacturing and Materials (AMM) Centre at NUSRI Chongqing. The project features solar panels, computational fluid dynamics-powered ventilation optimisation, and rainwater recovery and irrigation systems.

Meanwhile, another team led by Professor Zhang Huangwei, a key member at AMM Centre, focuses on predicting and analysing the physical and chemical processes involved in advanced manufacturing and materials synthesis. Moreover, using advanced algorithms and simulations powered by supercomputers has further accelerated and improved the accuracy of their analysis.

Professor Zhang Huangwei, a key member at the Advanced Manufacturing and Materials Centre, predicts and analyses the physical and chemical processes in advanced manufacturing and materials synthesis.

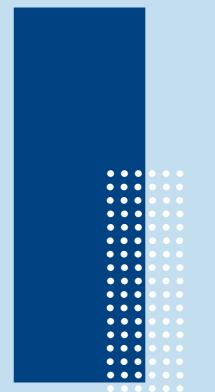


As China's urbanisation rate is expected to reach 80 percent in the next decade, the research team has lent their research expertise in computational fluid dynamics (CFD), multiphase flow and high-performance computing to a research project commissioned by the Chongqing Municipal Bureau of Housing and Urban Rural Development. The project aims to study diffusion patterns of microbial aerosols and the associated disease risk assessment,

providing valuable data to optimise the ventilation of existing buildings and improve the planning and design of new buildings. Findings from the project have the potential to control and prevent an epidemic outbreak in densely populated urban areas.

To further support sustainable urban development, Dr Li Yongqiang, a Research Fellow at the Centre, led the green building design and evaluation of the Chongqing Elingfeng Project of Singapore City Development Limited, incorporating several green building technologies into the landscape. With energy efficiency and resourcefulness as key pillars, the project features solar panels, CFD-powered ventilation optimisation, and rainwater recovery and irrigation systems. Such groundbreaking design has even garnered international recognition, receiving the 3-Star Award for green design in China and the Green-Mark Platinum Award in Singapore.

Alongside collaborators in government and industry, AMM teams are paving the way towards novel material synthesis, innovative manufacturing and sustainable urban masterplans, delivering undeniable value to the community.



### Catalysing A Sustainable Energy Future

As climate change brings growing global challenges, developing sustainable energy solutions for the future has never been more important. The Energy Materials and Catalysis Centre (EMCC) at Tianjin University-National University of Singapore Joint Institute in Fuzhou (Fuzhou RI) aims to do that through research on the understanding and development of novel materials and catalytic technologies for energy applications. The centre is directed jointly by Professor Ma Xinbin, who also serves as the Dean of the School of Chemical Engineering and Technology at Tianjin University, and Associate Professor Yan Ning, who heads the Lab of Green Catalysis at NUS and received the NUS Young Researcher Award in 2019.

Professor Ma Xinbin, Co-Director of the Energy Materials and Catalysis Centre and Dean of School of Chemical Engineering and Technology at Tianjin University.



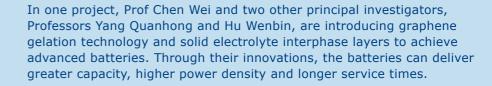


These two Centre Directors, alongside Professor Wang Tuo, are focusing on improving the catalytic conversion of carbon dioxide, which is a primary greenhouse gas. To do that, they study the crystal structures, activity and selectivity of various catalysts. By transforming carbon dioxide into useful chemicals such as methanol for industrial applications, their work can help reduce carbon emissions and promote a greener future.

Meanwhile, another key research area at EMCC involves developing novel 2D materials with exotic physical and chemical properties. Researchers led by Principal Investigator Professor Chen Wei and Associate Professor Huang Yuli have discovered room-temperature 2D magnets for use in future spintronic devices.

They found that monolayers made of ferromagnetic chromium telluride are compatible with silicon oxide semiconductors, even at low substrate temperatures. Such properties may open avenues for large-scale manufacturing of these materials, producing devices with faster data processing speeds and lower power consumption.

Teams at the centre are also advancing research in another important area—advanced ion batteries and other clean energy conversion and storage systems. To improve the design of electrode materials, the researchers first delve into the underlying electrochemical reaction process and catalytic mechanisms. Anchored on such in-depth understanding, their projects seek to improve the capacity and stability of ion batteries.

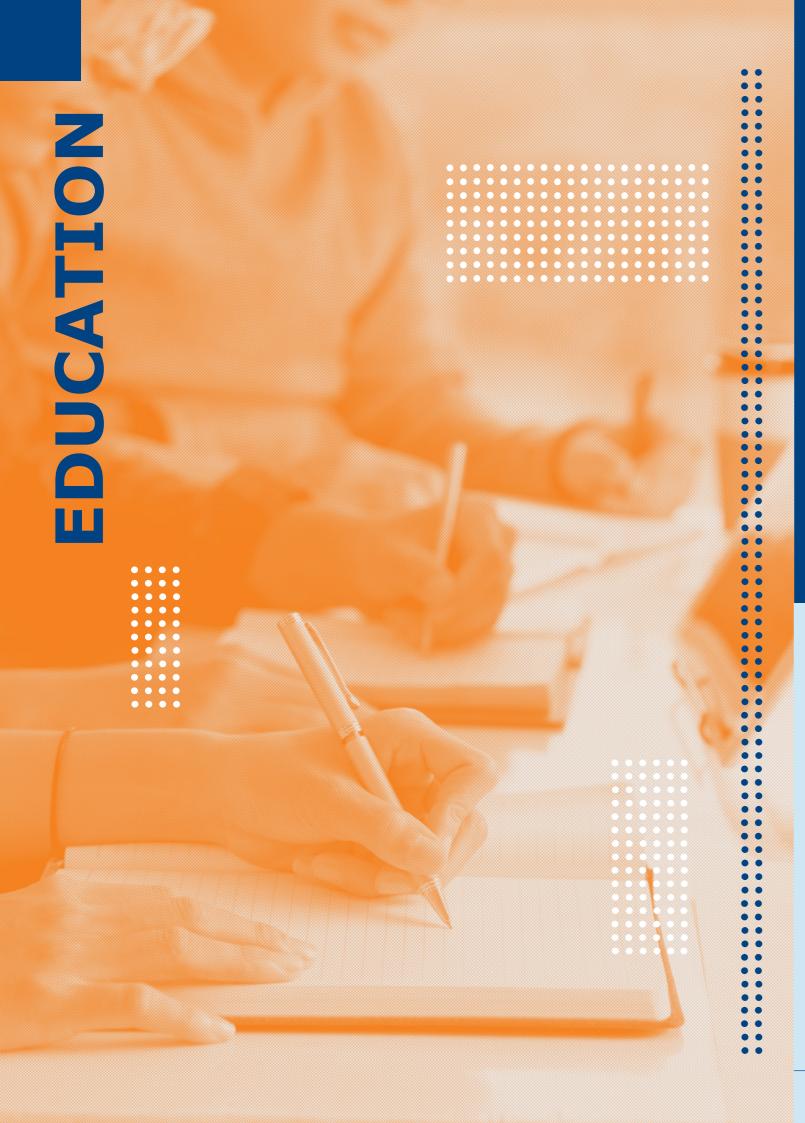


As varied as these areas may seem, they are important to building a sustainable energy future. In the last three years, the EMCC has also secured research funding in China at both national and provincial levels.



Aerial view of the Tianjin University-National University of Singapore Joint Institute in Fuzhou.







NUSRI China offers educational programmes that integrate research and innovation (or enterprise), and complement the industries in which our research institutes are based. These programmes are also channels for our research institutes to attract and cultivate talent together with the local governments in different regions of China.

The NUSRI China "3+1+1" joint programme is grounded in this approach to ensure both research and industry knowledge are at its core. Students who attend the "3+1+1" joint programme will spend the first three years of their study at their home university followed by a one-year bridging course at a NUSRI. They will then round out this chapter with a one-year master's degree by coursework at NUS in Singapore.

First launched in 2016 at NUSRI Suzhou and extended to NUSRI Chongqing in 2022, the programme is a collaboration between NUSRI, NUS and partner universities across China. Graduates from the programme have progressed to develop fruitful careers in academia and industry.

Here, present and past students from the "3+1+1" joint programme share how their experiences have shaped their career and perspective.

### **A New Journey Awaits**

Previously only offered at NUSRI Suzhou, the "3+1+1" joint programme has now expanded to NUSRI Chongqing, with the first intake in September 2022. The pioneer batch comprised students studying computer engineering.

Jiang Zhenxiang is part of this inaugural batch of 48 students.

After attending an information session about the "3+1+1" joint programme at Sichuan University, Jiang was convinced that the programme would provide him with the opportunity to develop both his technical skills in computer science and engineering and his entrepreneurship skills.



**Jiang Zhenxiang** (right) is part of the inaugural batch of students of the NUSRI Chongqing "3+1+1" joint programme. He co-founded Yinlai Yinwang Smart Cloud Printing Co, a company that offers cloud server development and services.

"I want to enrich my knowledge through postgraduate study and experience the well-established entrepreneurial ecosystem of NUS, I believe I can do so with the "3+1+1" joint programme at NUSRI Chongqing," says Jiang, who also wears the hat of co-founder of Yinlai Yinwang Smart Cloud Printing Co., a company that provides cloud server development and services. Two years of entrepreneurial experience made Jiang realise that knowledge and practical experiences were equally important in progressing his career.

Indeed, Jiang can now share that entering the "3+1+1" joint programme helped bridge the gap between local universities in China and NUS, presenting students like himself with an invaluable opportunity to get a head start in their careers.



**Luo Zhiyao** graduated from the "3+1+1" joint programme at NUSRI Suzhou. He is now in his second year at the University of Oxford undertaking a Doctor of Philosophy in Computer Science.

### Never Too Young To Strive

Luo Zhiyao joined the programme in NUSRI Suzhou in 2018 while he was still attending his undergraduate degree programme in Mechanical Engineering at Northwestern Polytechnical University, Xi'an, China.

"During my time at NUSRI Suzhou, I had the opportunity to connect with fellow students from various academic backgrounds," shares Luo, now in his second year at the University of Oxford undertaking a Doctor of Philosophy in Computer Science. "NUSRI Suzhou is a multi-cultural community—it opened up

a new channel to expand my network and learn from other people."
Under the tutelage of his supervisor Assistant Professor Guillaume
Sartoretti from the NUS Department of Mechanical Engineering,
Luo discovered his interest in computer science.

At the end of his master's course, Luo not only graduated with flying colours, but also published a paper based on his master's project in one of the top robotics and computer engineering journals, IEEE Robotics and Automation Letter.

Aside from his academic achievements, Luo is a keen entrepreneur—he is the head of department of mechatronics at Meet Hive Intelligence Co. Ltd. Within a year, Luo produced 11 patents and led his team to win the national golden medal of the 6th China International College Students' "Internet+" Innovation and Entrepreneurship Competition, ranking in the top 20 among over 300 teams nationwide.

"NUSRI and NUS provided me with the training and opportunities to achieve all of these," says Luo. "It really was a once-in-a-lifetime experience."

When discussing his future, Luo remarks, "Working in academia is always on the top of my list. I'd love to work in NUS in the future if I have the chance."

### **Returning Home With A Purpose**

For many students, the "3+1+1" joint programme provides them with more than just an opportunity to study abroad—it empowers them to discover new interests and develop new skills, setting them up for success be it at home in China or elsewhere.



Yang Boxiang (last row, third from the left), pictured here in Singapore with his "3+1+1" joint programme coursemates, took on the role of a structural engineer at Huawei Technology Co. Ltd in China after graduating from the programme.

Yang Boxiang, an NUS 2021 and NUSRI 2020 alumnus, did just that.

Majoring in Material Forming and Control Engineering in Sichuan University, China before joining the "3+1+1" joint programme in 2020, Yang discovered that NUSRI Suzhou had a joint programme with the School of Mechanical Engineering at Sichuan University during his second year of undergraduate study.

Seizing the opportunity, Yang applied for the "3+1+1" joint programme and was accepted into NUSRI Suzhou in 2020.

Eventually, his time at NUSRI influenced his career path, with him diving into the topic of additive manufacturing of metal materials as

his final-year project. He continued pursuing his interest in metal materials additive manufacturing during his master's course at NUS.

"I believe NUSRI's and NUS' strong focus on innovation and application has set a solid foundation for me to establish a robust career in mechanical engineering," says Yang, who is now a structural engineer at Huawei Technology Co. Ltd in China. "It's because of the exposure gained in the past two years that gave me the opportunity to be part of a global enterprise like Huawei."



Wang Yang graduated from the "3+1+1" joint programme at NUSRI Suzhou in 2019 and is now a process integration engineer at Micron Singapore.

### **Forging A Career** In Singapore

While some students return to China to implement their knowledge and experience, some choose to continue their career paths in Singapore.

Wang Yang, an NUS 2020 and NUSRI 2019 alumnus, is one such student.

For Wang, who is currently a process integration engineer at Micron Singapore, the "3+1+1" joint programme was more than just a single line

of "overseas experience" on his resume. Throughout his time at NUSRI, he participated in various activities and training seminars, which helped him to make a smooth transition to his master's course at NUS.

When he first arrived in Singapore in early August 2019, Wang planned to pursue a PhD to advance his career in the area of semiconductors. After his first semester however, he discovered that his interests lie more in technology application rather than in research.

Following his heart, Wang actively attended career fairs organised by NUS and had successfully received several job offers. Eventually, he chose to begin his career at Micron Singapore, a company that innovates memory and storage solutions.

"The "3+1+1" joint programme has equipped me with strong problemsolving skills," reflects Wang. "It's truly reshaped my thoughts and equipped me with the essential skills to face uncertainties in this ever-changing world."

### **New Opportunity, New Possibilities**

With the continued success of the "3+1+1" joint programme, NUS has developed a new programme in partnership with Tianjin University (TJU) the TJU-NUS Double-Master's Degree Programme.

Introduced as a two-year postgraduate programme, students will attend their first semester at NUS and complete the rest of their studies at the TJU-NUS Joint Institute in Fuzhou, China.

The programme draws on the strengths and resources of two leading universities in Asia and aims to cultivate global talents specialising in chemistry, physics and chemical engineering, with an emphasis on developing future-ready skills in graduates to prepare them for careers in the academia and industry. Alongside their research projects, students receive mentorship from experienced business leaders through their industry practice projects.

Upon graduation, students will be conferred both the Academic Master's Degree by TJU and the Master's Degree by coursework by NUS. There are also opportunities for top graduates to be directly admitted to fullscholarship doctoral programmes at the TJU-NUS Joint Institute in Fuzhou.

The programme will welcome its first intake of students in 2023. To find out more, visit www.tju-nus-fz.org.cn.

### Students enrolled in the "3+1+1" joint programme (by programme of study)

**January-December 2022** 

**Cumulative as at December 2022** 



Electrical and Computer Engineering



Engineering



Materials Science and Engineering



**Industrial Systems Engineering** and Management





**Environmental Science** and Engineering



Computer Engineering



Food Science and Technology



Engineering



Chemistry

#### Students enrolled in NUSRI-affiliated PhD programme (by programme of study)

**January-December 2022** 

**Cumulative as at December 2022** 



Electrical and Computer Engineering



Mechanical Engineering



Materials Science and Engineering



Food Science and Technology



Chemistry



Physics



Industrial Systems Engineering Environmental and Management



Engineering



Engineering



Biological Sciences



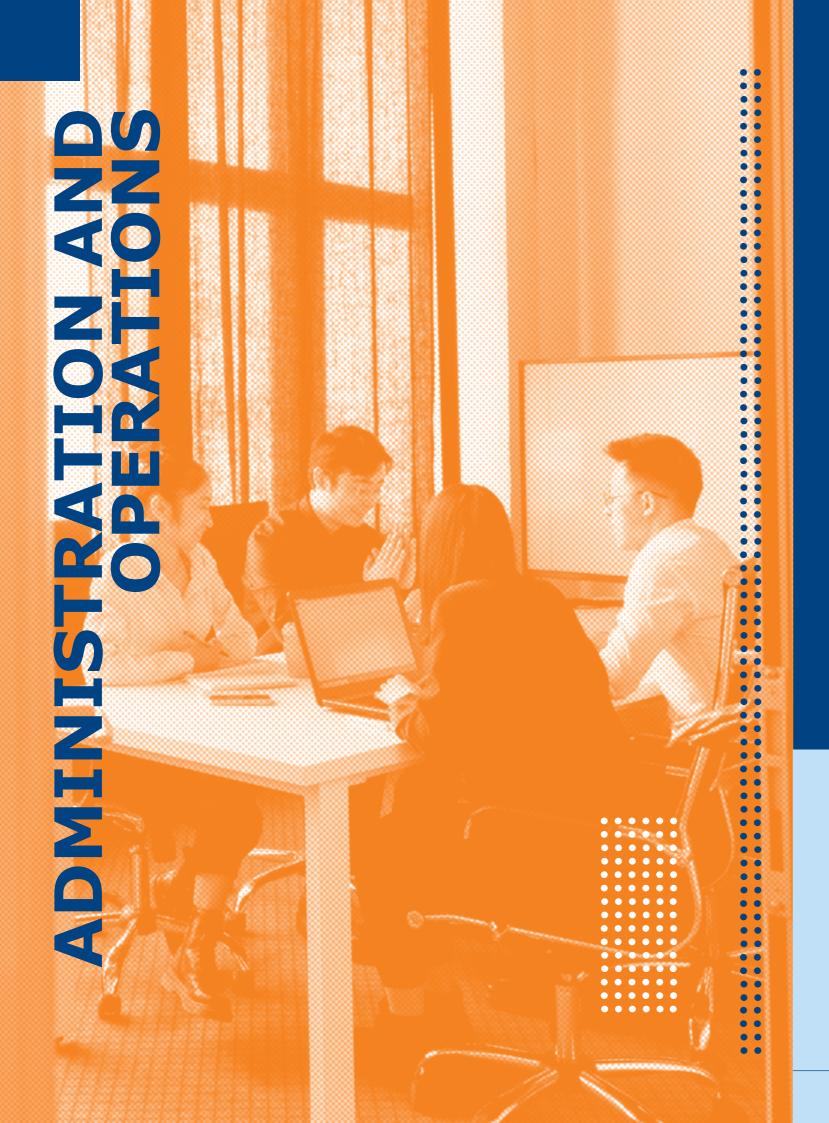
Science (Math)





Chemical and Biomolecular Engineering







Since its inception, NUSRI China has been operating in modern, best-in-class facilities for integrated research and learning. Its cutting-edge research laboratories, classrooms, training rooms and office spaces for startups, among other facilities, are spread across its campuses in China. NUSRI China has provided specialised training grounds for eminent scientists, budding researchers and aspiring entrepreneurs to hone their skills in scientific research, collaborate, as well as achieve breakthroughs in innovation and technology.

As it looks ahead, NUSRI China is not resting on its laurels, with further commitments to enlarging its footprint and impact across the country.

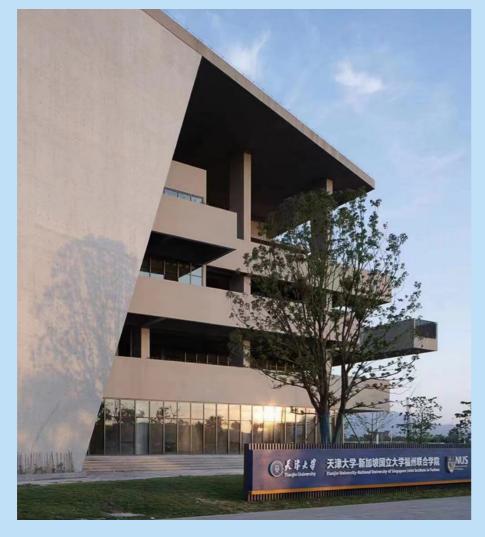
### New Campus Of TJU-NUS Joint Institute In Fuzhou

The Tianjin University-National University of Singapore Joint Institute officially opened its doors to its new campus in Fuzhou on 20 September 2022 with an academic year opening ceremony attended by over 400 students, principal investigators and staff affiliated with the TJU-NUS Joint Institute in Fuzhou (Fuzhou RI).

The September's opening ceremony took on a hybrid format, with the first part of the programme taking place at the Fuzhou campus and live streamed to the other two event venues of TJU and NUS. Participants viewed a video of the new Fuzhou campus and witnessed speeches delivered by Professor Chen Tsuhan, Deputy President (Research & Technology) of NUS, Professor Hu Wenping, Executive Vice President of TJU, a principal investigator representative and a student representative.

The second part of the programme was a sharing session at the NUS venue by senior PhD students, who spoke about their research and student experiences at NUS. The event concluded on a joyful note with a networking lunch.

The Tianjin University-National University of Singapore Joint Institute in Fuzhou officially opened its new campus in September 2022.



## NUSRI Suzhou marked its 10<sup>th</sup> anniversary on 6 January 2022 with a

celebration event attended by

academics, industry players

and representatives from

government agencies.

### A Decade Of NUSRI Suzhou

NUSRI Suzhou celebrated its 10<sup>th</sup> anniversary on 6 January 2022 in the eastern Chinese city, with the celebration event showcasing the achievements and progress of the institute towards Singapore-China cooperation in the areas of technology and education over the past ten years. Themed 'Innovation for a Brighter Future', the event brought together professionals, academics, entrepreneurs, corporates, investors, technology startups, and government agencies in an exchange of ideas and experiences.

At the event, a new research centre focusing on biomedical engineering was launched. The Innovation Centre for Biomedical Engineering (BME Centre) will focus on researching and developing digital medicine, smart health technologies and medical equipment. The centre will house principal investigators from the NUS Department of Biomedical Engineering, and together with local teams, will tackle some of the key problems in biomedical engineering.



NUSRI Suzhou is NUS' first overseas research institute, and is the first research institute in China that is independently operated and managed by a top foreign university. While the launch of BME Centre is another testament to NUSRI China's continued success in Suzhou and China, it also signifies NUSRI Suzhou's commitment in continuously serving as a platform for NUS to contribute to China and the rest of the world through in-depth cooperation with various parties from China in areas of technology and education.

### **NUSRI Chongqing Gets A New Home**

Over at NUSRI Chongqing in its newly renovated building in Chongqing Internet Industrial Park II, staff and students are benefiting from various facilities spread over eight storeys. Covering 7,100 square metres of floor space, the building has facilities for meetings, training, conferences, staff offices and even office spaces for startups in different growth stages.

Almost 40% of NUSRI Chongqing's floor space is dedicated to facilities for research. Its four research centres—Advanced Manufacturing and Materials, Intelligent Sensing and Artificial Intelligence, Modern Logistics, and Finance

NUSRI Chongqing's newly renovated building in Chongqing Internet Industrial Park II. The eightstorey premise offers over 7,000 square metres of floor space for various facilities



and Financial Risk Management—are housed in the new building, where researchers collaborate and work in specially equipped laboratories.

Construction of a new 15,000-square-metre building is currently underway at the Liangjiang Collaborative Innovation Zone, a new urban district in Chongqing dedicated to research and development. Expected to be ready by the end of 2024, NUSRI Chongqing will move into the new premises in its next phase of expansion.

### **Gaining Traction Online**

Even as it worked to expand its presence on the ground in China, NUS also ensured that its efforts in China were visible online too. The NUSRI China Programme Office launched its website in January 2022. The website, built with key stakeholders such as industry and academic partners in mind, contains comprehensive information on NUSRI China and the key research areas.

Visit the website at nusrichina.nus.edu.sg





