NUS helps PhD students get a Grip on enterprise

Programme guides and funds teams in creating their own deep-tech start-ups

Sandra Davie
Senior Education Correspondent

Most PhD students go on to become academics or research scientists in universities or industry. At the National University of Singapore (NUS), though, several are turning their research ideas into inventions and setting their sights on becoming entrepreneurs through a programme that guides postgraduate students and researchers with a good idea or invention can apply for the programme.

Selected teams spend 12 months gaining entrepreneurial skills and experience through workshops, mentorships, industry linkages and incubation support. Each team will receive funds of up to $100,000 from NUS, and have opportunities to pitch its start-up to external investors.

NUS has committed $25 million to Grip, with the aim of co-creating 250 companies over five years.

Professor Boey said that to date, more than 40 teams have graduated from the programme, with several securing significant funding of up to $1 million.

Among them is Craft Health, which was started by two pharmacy graduates who returned to NUS for their PhD studies. They discovered the technology to 3D-print tablets which can combine several medicines in one pill, with different dosages and release times.

Craft Health has raised $950,000 in funding led by Mistletoe founder Taizo Son, the Grip fund and NUS Adjunct Associate Professor Neo Kok Beng.

“In the long run, we hope that many of these Grip start-ups could become successful deep-tech companies and create innovation-based jobs in Singapore, as well as produce a sizeable number of entrepreneurs for the Singapore economy,” said Prof Boey.

AIMING FOR UNICORNS

Think of Grip (Graduate Research Innovation Programme) as a hatchery that produces lots of small fry. The more fry we push out, the better our chances that some will succeed, and one may even turn into a big salmon or unicorn.

Unicorns are start-ups valued at over US$1 billion ($1.36 billion).

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Prof Boey noted that NUS currently has about 10,700 students pursuing PhDs and master’s degrees. He said many research students, especially in fields related to engineering, science and technology, are often working on breakthrough technologies for their theses. Their ideas and inventions can be developed further and brought to market.

“With a strong talent pool and substantial R&D investment, NUS and Singapore have the potential to build more and viable deep-tech companies,” he added.

Among those riding the new wave of entrepreneurship is Dr Jia Zhunan, 26, who came from China to study at NUS and co-founded Breathonix. Her firm is working on technology that can detect cancer through a patient’s breath.

Dr Jia said: “I thought I was going to end up as a research scientist, but NUS made me see the potential of converting my idea into an actual invention that can help save lives.”

sandra@sph.com.sg

Dr Lim Seng Han (far left) and Dr Goh Wei Jiang of Craft Health with pills made using technology they discovered, which can 3D-print tablets that combine multiple active ingredients in one pill, with different dosages and release times.

SEEN MORE INSIDE

Three NUS deep-tech start-ups to look out for.

Three NUS deep-tech start-ups to look out for

Areas they could improve: Taking medicine, underwater missions, diagnosing lung cancer

Craft Health

Retired sales manager Timothy Goh takes nine pills, spread over three times a day, to manage his cholesterol, diabetes and high blood pressure. Like many retirees, the 70-year-old sometimes forgets to take the pills on time. As his eyesight worsens, he also worries about taking the wrong pills or dosage.

For Mr Goh, 3D-printed tablets that can combine several of his pills into a single one – an invention by two National University of Singapore (NUS) PhD students – will be a godsend.

Dr Goh Wei Jia, 32, and Dr Lim Seng Han, 33, who worked as pharmacists at Singapore General Hospital before going back to NUS for PhD studies, hope to make the 3D-printed tablets available to patients within a few years.

Dr Goh and Dr Lim collaborated on the idea of 3D-printed pills during their PhD studies.

Mr Goh: “We had both seen at work how patients struggle with their medication. Because patients often have multiple sachets of medicines, they find it complicated trying to keep track of which pills to take and when.”

The 3D printer they developed is capable of changing the active ingredients within the pill (including the rate of release for each active ingredient) as and when required, on a just-in-time basis.

BeeX

In the maritime industry, there is a heavy reliance on large vessels and equipment to inspect underwater and offshore assets, as well as to perform underwater tasks such as carrying heavy loads and adjusting valves. Trained divers, and the equipment required for such missions, are costly. These operations may also be hazardous.

While remotely operated vehicles (ROVs) are currently used to carry out inspections, they need to be tethered – thus restricting operations. Such ROVs are also exposed to high drag underwater and require bulky infrastructure to keep them in place.

Autonomous underwater vehicles (AUVs) in the market are typically designed for long-range operations, with limited capabilities for the hovering required for complex structural inspections.

BeeX – a start-up launched by Mr Goh Eng Wei, 31, a researcher at the NUS Advanced Robotics Centre and Ms Grace Chia, 29, an NUS mechanical engineering graduate – has built an autonomous underwater and surface vehicle which is highly manoeuvrable and can be operated wirelessly.

Thus, it does not require large manned boxes and supporting infrastructure, making missions less costly and more effective.

Less manpower could lead to cost savings of more than 50 per cent.

BeeX has just embarked on a joint research and development project with A1 Robotics Ventures, a subsidiary of the Thai national oil and gas exploration company PTTEP to co-develop inspection AUVs for their offshore assets.

BeeX, to date, has received a $500,000 Startup SG Tech grant, $100,000 from the NUS Graduate Research Innovation Programme (Grip), and another $70,000 from angel investors.

Breathonix

Imagine being able to diagnose cancer in a person by analysing his breath.

NUS start-up Breathonix is working on a technology that is able to do that. It has developed non-invasive breath tests for disease detection. It was started by Dr Jia Zhu Nan, 24, a research fellow at the NUS Nanoscience and Nanotechnology Institute; Mr Du Fang, 29, an NUS engineering graduate; and Professor T Venkatesan, director of the NUS Nanoscience and Nanotechnology Institute.

With its proprietary breath sampling device and data analysis algorithms, the company has successfully demonstrated early detection of lung cancer in a clinical study.

Lung cancer is globally the most lethal cancer, accounting for 1.6 million deaths a year. Most cases are diagnosed at late stages, when the survival rate is only 5 per cent.

Breathonix aims to save lives by detecting lung cancer in its earlier stages. The technology is also promising for other diseases such as acute coronary syndromes.

Breathonix is supported by Grip, JUMPstart (Joint University MedTech Programme), and Enterprise Singapore. The company has also received a S$1 million investment offer from external investors.

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