



# Greening Industries for Sustainability

SIT showcases two sustainable engineering initiatives that aim to reduce carbon footprint

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The Singapore Institute of Technology (SIT) is examining innovative ways in greening industries for a more sustainable future through the following two initiatives – utilising solar energy to power rooftop hydroponic farms and helping companies discover and implement energy efficiency improvement measures.

## Harnessing Solar Energy for Rooftop Hydroponic Farms



Setting up the hydroponic farm at SIT@Dover campus.

With Singapore moving towards a more sustainable future, it has prioritised greater self-sufficiency in local food production and adoption of renewable energy resources. An SIT project is targeting both areas in the form of rooftop hydroponic farms that harvest electricity from the sun and use probiotics to better grow leafy greens and herbs.

“The project aims to address competing needs within limited land in land scarce Singapore,” said principal investigator Assoc Prof Steve Kardinal Jusuf, Engineering cluster, SIT. “If both renewable energy and agricultural needs can co-exist together, Singapore won’t have to sacrifice one for the other.”

The three-year project, which started in December 2020, is funded by a grant from Temasek Foundation. Singapore-based agritech company Archisen is lending its expertise to the project. It provides seedlings and seed germination, and also advises on the crops and plant growth.

Assoc Prof Jusuf shared that the main challenge is figuring out the best way to place the solar photovoltaic panels for maximum crop growth. While gaps need to be created in between the panels to allow sunlight to reach the crops below, this also means that there is a reduction in the number of panels installed to generate electricity. Therefore, probiotics could help to promote crop growth and yield despite less sunlight available for vegetables to grow.

## Training SMEs to be More Energy Efficient



The team at Energy Efficiency Technology Centre (EETC) aims to promote and develop energy efficiency capability as well as adoption of new technologies in the local energy ecosystem for industrial sectors: (From left) Mr Jeryl Yep, Centre Manager, EETC; Ms Liao Ting Ting, Asst Director, Applied Research, Innovation and Enterprise, SIT; Prof Lock Kai Sang, Head, EETC; Prof Tseng King Jet, Programme Leader, Engineering, SIT; and Mr Steven Huang, Energy Specialist, EETC. They are also supported by (second from left) Mr Joel Lai, Final Year Chemical Engineering student, and (second from right) Mr Amos Ong, Year 3 Electrical Power Engineering student, who are on their Integrated Work Study Programme.

The [Energy Efficiency Technology Centre \(EETC\)](#) at SIT was launched in 2019 and it has been helping companies discover and implement energy efficiency improvement measures, as well as build up local industrial energy efficiency capabilities. As a collaboration between SIT and the National Environment Agency (NEA), the centre also trains a pipeline of SIT engineering undergraduates and upskills existing energy efficiency practitioners in industrial energy efficiency.

The centre has made energy assessments more accessible for small and medium enterprises (SMEs), which typically lack the capabilities and resources to identify and implement energy efficiency improvement measures. SMEs receive a diagnosis of their energy performance and recommendation on areas of improvement, and their staff are trained in energy assessment skills for continual improvement.

Five assessments have been completed for companies so far, and they include Far East Packaging Industrial, Aalst Chocolate, and Denka Advantech. NEA will subsequently work with the companies to support the implementation of the recommendations through the Energy Efficiency Fund.

“Energy efficiency is a least-cost measure in Singapore’s vision of a more sustainable future,” said Prof Lock Kai Sang (Engineering cluster), who helms the EETC. “Some energy efficiency measures can be implemented through changes in human behaviour and business operation, while others can be achieved by using established energy efficiency technologies.”

The EETC also launched two upskilling programmes for existing professionals this year – the [Electrical Installations Audit and Analysis Programme](#) in May and the Energy Efficiency Upskilling Programme in January. Another six more programmes are in the pipeline. Through these programmes, aspiring engineers and energy managers can train towards becoming certified Energy Efficiency Opportunity Assessors and Chartered Engineers.



# Impactful P.L.A.Y.

A new bursary at SIT will be open to undergraduates from all academic disciplines

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In this coming Academic Year 2021/22, a new bursary at SIT will be made applicable to all Singaporean and Singapore Permanent Resident undergraduates who qualify for financial aid. This is the **P.L.A.Y. Lam Family Fund Bursary** which was established recently in June 2021 (the letters P, L, A, and Y are the initials of the family's members).

Said Mr Lam Yi Young, who made possible this bursary together with his family, "SIT plays an important role in providing tertiary education opportunities to students and in helping them gain practical job skills and be work-ready. My family and I are pleased to be able to support students at SIT in their higher education journey. In particular, we hope to be able to support those who may not be among the neediest group that already qualify for the most support, but who nevertheless require further assistance to make ends meet."

The **P.L.A.Y. Lam Family Fund Bursary** will be open to financially disadvantaged undergraduates from all academic disciplines at SIT. It is expected to be even more impactful for bursary recipients whose monthly household per capita income (PCI) range from \$1,001 - \$2,250, as this group of undergraduates are eligible for relatively less support from public bursaries. (They are eligible for the Higher Education Bursary that is valued from \$1,350 - \$3,200, while those whose PCI is \$1,000 and below are eligible for the Higher Education Community Bursary that ranges from \$5,000 - \$6,200). In comparison, tuition fees for a Singaporean undergraduate at SIT in the current Academic Year 2020/21 start from \$7,500 annually.

Said Prof Tan Thiam Soon, President, SIT, "We are very appreciative of this bursary made possible by Mr Lam and his family. Many of our students are the first in their families to attend university and this bursary will give more of our students the extra financial help they may need to pursue their studies no matter their financial background."



# Innovative Foods for the Future

3D-printed Peanut Butter Chocolate Cookies, Vegan Chilli Crab Pie, Plant-based Seaweed Chicken with Spirulina – these top three winners at the recent Food Technology Project Exhibition and Industry Engagement Day are all products created by final-year stud

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Identified as a key industry for Singapore’s economic growth, food technology is set to help triple the country’s food self-sufficiency to about 30% by 2030. Urban farming and plant-based alternatives are seen as promising means to achieve this goal, and the government has provided support in various forms, from provision of research grants to formulating new food guidelines. Held on 16 April 2021 by the Singapore Institute of Technology and Massey University, the annual ‘Food Technology Project Exhibition and Industry Engagement Day’ was a culmination of learning outcomes from the final-year Food Technology students. Graduating students applied the knowledge acquired over their four years of studies as they pitched their food products and businesses cases to both faculty and industry partners. These innovative projects included a comprehensive look into the SITizens’ idea generation, prototyping, proposals for scaling up, capital and operating costs estimates, food safety and risk analyses. The following projects emerged as the top three winners for featuring novel ingredients and manufacturing methodologies, winning certificates as well as cash prizes for the respective teams:

### Best Product: Plant-based Seaweed Chicken with Spirulina



The team comprising (from left) Ng Mun Yee, Nuha Iesa, Grace Chua, Quek Xing Yu, and Loke Yin Theng, with industry partner Tracy Lim, Technical Developer, Roquette (fourth from left), with their creation – Plant-based Seaweed Chicken with Spirulina.

Riding on the popularity of finger food seaweed chicken, the team – comprising Ng Mun Yee, Nuha Iesa, Grace Chua, Quek Xing Yu, and Loke Yin Theng – partnered with leading industry ingredients manufacturer Roquette to create the plant-based Seaweed Chicken with Spirulina.

The SITizens’ version of the product is infused with spirulina, a superfood that contains high nutritional benefits, such as high proteins and a balanced amino acid profile. It is targeted at consumers who are consciously making informed choices and seeking healthier, more environmentally sustainable dietary options. The plant-based version comprises pea protein, a blend of seasonings, and spirulina as an alternative to the meat portion of the product. It is then wrapped with seaweed for a boost of flavour and nutrition. The team’s ingenious combination of nutritious and novel ingredients earned the praise of the panel of judges, comprising academic leaders from the Chemical Engineering and Food Technology cluster, as well as members of the Industry Advisory Committee (IAC) from Nestle R&D Centre, KH Roberts Group, and Tereos Asia.

### Best Market Potential Product: Vegan Chilli Crab Pie



(From left) Julene Chua, Nur Afiqah Binte Mohammad Yusof, Wong Siew Eng, Ong Wai Peng, Chua Wei Xuan, and Kam Xue Ting, posing with their creation – ready-to-eat Vegan Chilli Crab Pie.

SITizens Julene Chua, Nur Afiqah Binte Mohammad Yusof, Wong Siew Eng, Ong Wai Peng, Chua Wei Xuan, and Kam Xue Ting created a vegan version of the Chilli Crab Pie in response to the increasing demand for meat-free alternatives. Through their market research, focus group sessions and consumer surveys, they discovered that there were limited options for meat-free Asian products. The team collaborated with industry partner Tee Yih Jia Food Manufacturing (TYJ), to extend their range of meat-free products, and successfully developed a ready-to-eat Vegan Chilli Crab Pie, which is also convenient for the busy consumer. They conducted extensive trials and multiple experimentations with novel plant-based ingredients to replicate the taste of meat and flavour. The high protein product requires minimal preparation and provides the full experience of a chilli crab dish – without the mess that comes with deshellng the crabs. The team was commended for marrying a popular local dish with an unconventional product concept, and for making the product a convenient dish to prepare.

### Most Innovative Product: 3D-Printed Peanut Butter Chocolate Cookies



(Front, from left) Ernest Oo Jun Lin, Esmond Ong Hong Bao, (back row from left) Koh Rui En, Sylvell Neo Yan Ting, and Cao Li Ming took on the challenge of producing tasty and intricate 3D-printed cookies.

The team consisting of Koh Rui En, Sylvell Neo Yan Ting, Cao Li Ming, Ernest Oo Jun Lin, and Esmond Ong Hong Bao, identified a huge growth opportunity in the 3D-printed food market in Asia Pacific. They ideated 16 different ready-to-eat products before finalising their creation, ‘Peattur Chockies’ – 3D-printed peanut butter chocolate cookies. The idea is to sell Peattur Chockies in vending machines, where customers can observe the cookies being printed on the spot after customising their desired sweetness level, shape, and size. The team also proposed that pre-orders can be made through a mobile app, and the product to be sold at \$3.00 for a 40-gram packet (estimated eight pieces). The judges lauded the team’s effort in overcoming challenges, such as printing the cookie batter through a narrow nozzle. The team managed to modify the process and formulation to overcome the constraint, and developed a product that is unique, innovative, and attractive. “The SITizens have outdone themselves. Most of them addressed technically-challenging problem statements, and did a good job in developing potentially scalable and marketable products that are appealing and tasty,” said Assoc Prof Wang Mei Yin, Programme Lead, Food Technology, SIT. “I wish them all the best as they venture into the working world.”



# SIT’s CLASIC Approach to Social Innovation

Launched in October 2020, the Community Leadership and Social Innovation Centre (CLASIC) has since set in motion a grant scheme, a module revamp, as well as a pipeline of projects aimed at benefitting the community

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Asst Prof Intan Azura Mokhtar, Deputy Director, CLASIC (extreme left), Ms Lee Mui Hoon, Senior Assistant Manager, CLASIC (second from left) and Prof Yaacob Ibrahim, Director, CLASIC (extreme right) met up with representatives from Engineering Good in November 2020 to discuss collaboration opportunities. The CLASIC team now also includes Senior Lecturer Dan Chia as Assistant Director.

The problems of today’s world are often multifaceted and need to be looked at from all angles with the relevant contexts in mind.

Social innovation projects allow students to apply diverse approaches to achieve impactful solutions for challenging issues and promote a more resilient community that strives for continuous improvement.

With a mission to strengthen the SIT-DNA value of being ‘Grounded in the Community’, the Community Leadership and Social Innovation Centre (CLASIC) at SIT has been set up as a one-stop centre that curates, coordinates, and oversees community and social innovation projects and initiatives across the university. CLASIC aims to make SIT an academic partner of choice amongst philanthropic, community and industry partners for community-related projects and initiatives.

One such partner is the Yangzheng Foundation, which aims to “promote, foster, develop and improve education in Singapore and to provide financial support for the needy students and other charitable bodies to aid social development of the society”. The Foundation made a generous term gift of \$150,000 in December 2020 to make possible the **Yangzheng Foundation Community Leadership and Social Innovation Grant** to support programmes and projects under CLASIC.

## Empowering Future Talents to Lead with Impact

By drawing on the expertise of SIT academic staff and complemented by SITizens’ involvement across various clusters and domains, CLASIC curates projects that would enhance the quality of life of identified beneficiaries. Each project will involve at least two SIT students, who will be mentored by a faculty member or a Professional Officer. Students will be exposed to community projects that enable them to be more attuned and sensitised to the needs of different segments of the community, informed of their industry practices, and motivated in the exploration of innovative solutions that benefit the wider community.

## Change Management Module Refresh

SIT is also expanding the breadth of its curriculum to afford greater interdisciplinarity in learning. Complementing students’ learning in their domain expertise, the curriculum will be enhanced with knowledge in understanding how change occurs, why it occurs, and what can be done to anticipate, encourage, and manage it. CLASIC has recently revamped the ‘Change Management’ module to incorporate a stronger focus on social context elements. These elements will develop a student’s keen understanding of how situations and problems need to be assessed holistically, and the skills for arriving at diverse sets of ideas and meaningful solutions. The module refresh will be introduced for selected programmes in Academic Year 2021, and is scheduled to be rolled out across all SIT degree programmes by AY2023.

## Creating Practical Solutions through Impactful Projects

A CLASIC project grant scheme has been established to fund service-learning, social innovation, or community-related projects undertaken by SIT students under the mentorship of faculty members and Professional Officers. Project proposals will be evaluated based on criterion such as the opportunity for students to interact with community members, academic staff to leverage their professional expertise, and the community impact they hope to achieve.



Both CLASIC and the National Centre of Excellence for Workplace Learning (NACE@SIT) will jointly engage the elderly residents and staff of Kwong Wai Shiu Hospital to understand their needs and expectations of the hospital’s upcoming nursing home in Potong Pasir.

The CLASIC team is currently facilitating 10 projects (and counting) and working with a wide spectrum of partners, including industry leaders, secondary schools, and social service agencies. One of the projects includes a collaboration with Kwong Wai Shiu Hospital (KWSH) to engage the elderly residents and staff of KWSH to better understand their needs and expectations of the features in their new nursing home in Potong Pasir.

“Working together on community projects will allow students across disciplines to learn that to formulate practical solutions for issues that impact society often require a holistic assessment of the environment and its stakeholders. This is where they can further develop their creativity, as well as analytical and critical thinking skills, which are crucial for the future economy,” commented Prof Yaacob Ibrahim, Director, CLASIC. “Do keep us in mind if you have ideas for a community project!”

Click here for more information on [Community Leadership and Social Innovation Centre \(CLASIC\)](#).



# Bringing Necessities, Easing Anxieties

Amid the pandemic, Krithi Pushpanathan spent many hours at the frontlines to provide assistance and daily essentials to migrant workers

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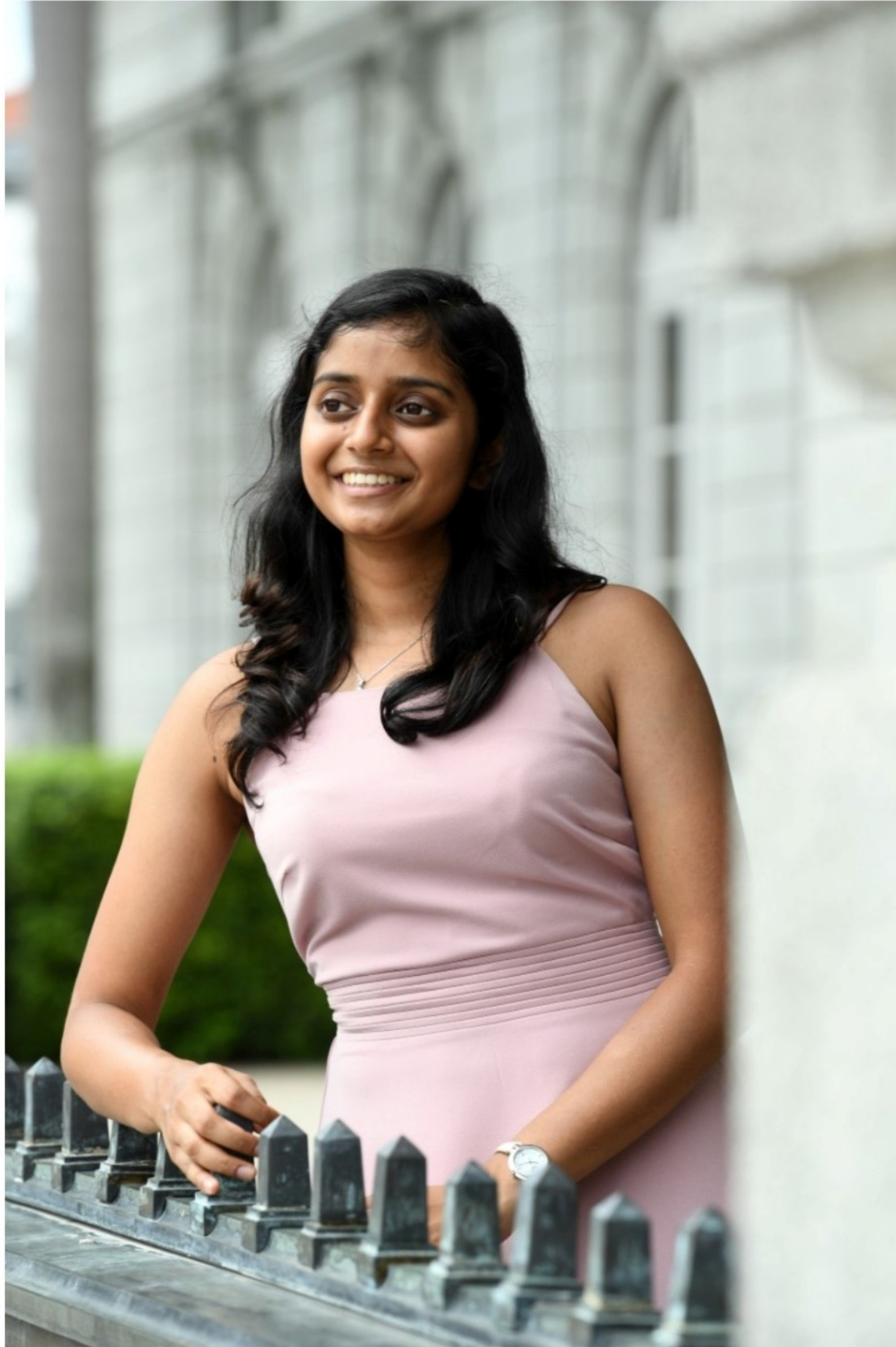


Photo credits: SINDA.

During the circuit breaker period, Krithi Pushpanathan volunteered with Transient Workers Count Too (TWC2) five times a week to help migrant workers affected by the lockdown. She worked with the Small Essential Needs team, contacting workers stuck in the dormitories and bringing them daily necessities to help them cope with the anxiety of their situation.

The Class of 2020 Pharmaceutical Engineering alumna has also been tutoring primary school children at Cheng San Family Services Centre for the past four years.

When asked why volunteering is such a big part of her life, Krithi replied that she used to feel that she had been living life mostly for herself instead of others. “The basic commitment with TWC2 and tutoring was just one time a week each. I also had a friend who told me stories about what migrant workers were going through, and I felt I wanted to help this vulnerable group of people. So I just tried it, made friends with fellow volunteers who are very passionate, and didn’t look back.”

Krithi is still volunteering with TWC2 today, and another part of her role involves helping with case work, assisting workers to write to the Ministry of Manpower if they have work issues requiring intervention. Her two volunteering activities are balanced together with her work as a Research Engineer in SIT, which involves researching methods of bringing down the cost of expanding T-Cells through development of serum-free media.

When asked how she finds the time to volunteer regularly, Krithi said that it was a matter of finding the right passion for oneself. “When you do have the opportunity to help, it’ll be something you remember easily if you want to do it. You’ll definitely make time for it if it is something that you like. It’s just a matter of finding out what you like to do and how you would like to give back.”

*Krithi is a SINDA Excellence Award 2020 winner, SIT Scholar and recipient of the AbbVie Outstanding Student Award in Pharmaceutical Engineering (2020). She will be going to Imperial College London later this year to pursue a Master’s degree in epidemiology.*



# Strength and Control through Pilates

SITizens focus on taking things slow through Pilates, a simple yet effective home workout to train your body's muscle control and coordination

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The workout incorporated exercises such as bicycle crunches (top), which trains one's upper core muscles, as well as stretches to strengthen your spine (bottom).

On Saturday, 5 June 2021, SIT alumni gathered online to try Pilates, the latest instalment in a series of home workouts organised by the SIT Alumni Sports Network. The class of 25 alumni was led by Ms Betsy Chen from Pilates studio Off Duty Pilates.

Pilates is a low-impact workout that helps to strengthen, lengthen and tone your muscles through controlled, repetitive movements. Ms Chen started the session with simple stretches to get the participants moving and warm up the spine. She focused on slow, concentrated movements, which got the participants' muscles burning in no time.

Ms Tracy Tay, a Hospitality Business alumna, joined the session to try something different from her usual exercise routine, which includes spinning and HIIT. "The instructor was very clear, and I felt my whole body aching the next day!" she said. "I think with frequent practice of Pilates, I can tone parts of my body and build muscle strength."

Mr Jonas Chandra, a Systems Engineering (ElectroMechanical Systems) alumnus enjoyed how engaged his body felt during and even after the workout. "I usually do HIIT workouts, so I thought Pilates would not be that straining. I was so wrong," he recalled. "The exercises felt very targeted and my muscles ached at places it never ached before. I would definitely go for more classes and recommend my friends to join me."



A fruitful Saturday morning with a satisfying workout!



# A Therapeutic Match

The SIT Alumni Mentoring Programme concluded its successful inaugural cycle in March 2021. We catch up with a trio of participants from the Health & Social Sciences cluster to find out how their mentoring journey went

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After months of only communicating via text messages and Zoom calls, (clockwise, first from left) mentor Sharifah, and mentees Marcus (clockwise, sixth from left) and Darren (clockwise, seventh from left) finally met in person at the mentor-mentee dinner, together with pairs from other clusters.

The SIT Alumni Mentoring Programme had a rather rocky start. It launched amidst the COVID-19 pandemic, meaning its participants would mostly only be able to meet virtually, not the most ideal situation for a mentoring relationship. Nevertheless, the programme is currently mid-way through its second cycle – and gaining traction among SITizens.

Among the SITizens who joined the programme looking to learn from each other through their academic and professional experiences are alumni mentor Ms Sharifah Rawiah and her two student mentees, Mr Darren Lim and Mr Marcus Oon.

Sharifah, an Occupational Therapy alumnus, decided to take on the role of a mentor for the first time through this programme. Her interest is in grooming future therapists and sharing real-life experiences about working in the healthcare industry, such as the difference between working in a hospital setting and the social service sector. “Back when I was in school, we could only have such candid conversations with therapists in the workforce during clinical rotations. But that can be stressful as you are being supervised, or you simply may not have the time,” she explained. She also emphasised the importance of maintaining a work-life balance. “Prioritising and managing our time starts from when we are students, and it is good practice as a stepping stone for when we enter the workforce,” she said.

She was matched with Darren and Marcus, both Year 2 students in the Physiotherapy degree programme. Sharifah recalled that the mentees were initially worried that her being in a different discipline would limit the learning experience. However, the difference between the two professions actually helped them better understand the difference and how physiotherapists and occupational therapists work together.

Sharifah has also learned to be a better communicator through her mentor role. “My mentees have very different personalities and I had to be mindful of being adaptable in the way I communicated with each of them. In the beginning, they were both a bit shy and unsure, so I had to do most of the talking. When they became more comfortable, they would ask more questions and we could joke with one another.”

Darren said he was thankful to have a senior open his eyes to the workings of his future career. “My mentor is very nurturing, and I appreciate that apart from academics, she also taught me important soft skills as a Physiotherapist,” he said. “I learned that it is important to identify the professional version of me at work and the personal me at home, so that I can manage my emotions, especially when dealing with critically ill patients.”

Marcus said the programme has given him a deeper understanding of the healthcare industry. “I got to learn more about the different healthcare settings available and whether it would fit my career goals. I found that Intermediate and Long-Term Care is a good fit for me,” he said.

The trio has plans to keep in touch through social media and messaging apps, now that their mentoring cycle has concluded. And it appears that the SIT Alumni Mentoring Programme has found legs beyond SIT: Having been inspired to use her newfound mentoring knowledge, Sharifah has started a mentoring programme at work within her team, where new therapists are paired with seasoned therapists. She also supports them by facilitating reflection sessions throughout their mentoring journey.



## The SIT Alumni Mentoring Programme

This is a six-month-long programme bringing together SIT alumni and students to foster personal and professional growth, as well as exchange knowledge and skillsets through mentorship. Organised by the SIT Advancement & Alumni Division and supported by SIT Student Life, the programme’s first cycle was officially launched in September 2020.

A total of 43 Alumni mentors were matched with 52 Student mentees in Cycle 1, where each mentor could choose to take on one or two mentees. The programme will soon be completing its second cycle in August 2021, where 45 mentors were matched with 50 mentees. As many as 10 mentors have joined the programme for the second time since the first cycle.