Student-built prototypes to improve quality of life for the elderly and people with disabilities

SINGAPORE, 12 April 2019 – Wheelchairs fitted with a smart cushion, foot-tapping pad and mobility game that work together to prevent users from getting pressure ulcers, and a personal mobility device that can act as a shopping trolley.

A smart knee brace that can monitor the recovery of patients who have undergone knee replacement, and a safety device that can alert caregivers if the gas stove at an elderly's home is switched on for too long.

These are some of the award-winning entries that students from the ITE, polytechnics and universities have built at the **7th National Assistive & Rehabilitation Technologies Student Innovation Challenge**.

The competition targeted at tertiary students is co-organised by the Rehabilitation Research Institute of Singapore (RRIS) at Nanyang Technological University, Singapore (NTU Singapore) and the Centre for Healthcare Assistive and Robotics Technology (CHART) at Changi General Hospital (CGH).

About the competition

- Encourage students to develop solutions that help improve the quality of life for the elderly and people with disabilities.

- 24 qualified entries which were exhibited at Sengkang General Hospital today.

- Guest-of-Honour Prof Christopher Cheng, Chief Executive Officer, Sengkang General Hospital, graced the prize presentation ceremony.

- The winning teams, including the silver and bronze recipients, will have the opportunity to represent Singapore at the Global Student Innovation Challenge for Assistive Technology at the 13th International Convention on Rehabilitation Engineering and Assistive Technology (i-CREATe 2018), Canberra, Australia from 26-29 August 2019.

- Judging Guidelines

    - Creativity / Idea Novelty (20%)
    - Impact on Society and/or Professional Practice (20%)
    - Commercialisation Potential (20%)
    - Prototype Design and Implementation (Design category) or Prototype Engineering (Technology Category) (20%)
    - Usability / Ergonomics (20%)

Winners: Technology Category

Project	Brief description	School	Prize
Smart Ulcer Prevention System for Wheelchair Users	A smart cushion, foot-tapping pad and mobility game to prevent wheelchair users from getting pressure ulcers	Temasek Polytechnic	Gold Award
Smart Rehabiliation Knee Brace	Knee brace that can track recovery progress through measurement of the knee bend angle during therapy	ITE College Central	Silver Award
i-REMINDER	Device that plays pre-recorded messages to remind the elderly of their daily tasks	ITE College Central	Bronze Award
POWAAR – Pouring Water Assessment with Augmented Reality	Using augmented reality to simulate pouring water action in reviewing recovery of patients with upper limb impairment	Singapore Polytechnic	Merit
MySMART Key AMD (Alarm, Message, Detection)	System with light and buzzer to remind the elderly or people with dementia to remove their keys from the lock after using it	ITE College East	Merit
Smart Rehabiliation Knee Brace	Knee brace that can track recovery progress through measurement of the knee bend angle during therapy	ITE College Central	Best Prototype Award
Calf Sleeve to Assist Walking	Walking aid device for patients with foot drop problem, where the ball of their feet would land first instead of the heel when walking.	Singapore Institute of Technology	Best Presentation Award
Calf Sleeve to Assist Walking	Walking aid device for patients with foot drop problem, where the ball of their feet would land first instead of the heel when walking.	Singapore Institute of Technology	Best Poster Award

Winners: Design Category

Project	Brief description	School	Prize
Troll-E; Improving the mobility and independency of the elderly population	A personal mobility vehicle that can act as a shopping trolley	Singapore Institute of Technology	Gold Award
EasyPull	A device that allows users with muscle weakness to remove plugs from electric sockets easily	ITE College East	Silver Award
SENSISTOVE	Unobtrusive gadget that can detect when the gas stove is switched on or off, notifying caregivers when it has been switched on for too long.	ITE College East	Bronze Award
Integrated Parallel Bar and Staircase	Integrated two commonly used and bulky rehabilitative equipment--the parallel bars and staircase--into one equipment to save space	Singapore Institute of Technology	Merit
Crutch Sentry	Device with an alarm to discourage improper use of an underarm crutch, such as resting body weight on the crutch for prolonged period	ITE College Central	Merit
EasyPull	A device that allows users with muscle weakness to remove plugs from electric sockets easily	ITE College East	Best Ergonomic Design Award
Troll-E; Improving the mobility and independency of the elderly population	A personal mobility vehicle that can act as a shopping trolley	Singapore Institute of Technology	Best Presentation Award
Integrated Parallel Bar and Staircase	Integrated two commonly used and bulky rehabilitative equipment--the parallel bars and staircase--into one equipment to save space	Singapore Institute of Technology	Best Poster Award

About Nanyang Technological University, Singapore

A research-intensive public university, Nanyang Technological University, Singapore (NTU Singapore) has 33,000 undergraduate and postgraduate students in the Engineering, Business, Science, Humanities, Arts, & Social Sciences, and Graduate colleges. It also has a medical school, the Lee Kong Chian School of Medicine, set up jointly with Imperial College London.

NTU is also home to world-class autonomous institutes – the National Institute of Education, S Rajaratnam School of International Studies, Earth Observatory of Singapore, and Singapore Centre for Environmental Life Sciences Engineering – and various leading research centres such as the Nanyang Environment & Water Research Institute (NEWRI) and Energy Research Institute @ NTU (ERI@N).

Ranked 12th in the world, NTU has been placed the world's top young university for the past five years. The University's main campus is frequently listed among the Top 15 most beautiful university campuses in the world and it has 57 Green Mark-certified (equivalent to LEED-certified) building projects comprising more than 230 buildings, of which 95% are certified Green Mark Platinum. Apart from its main campus, NTU also has a campus in Singapore's healthcare district.

For more information, visit www.ntu.edu.sg.

About the Rehabilitation Research Institute of Singapore

Rehabilitation Research Institute of Singapore (RRIS) is a collaboration between Nanyang Technological University (NTU), Agency for Science, Technology and Research (A*STAR) and National Healthcare Group (NHG). RRIS was conceptualised through years of strong collaborative research in rehabilitation between NTU's School of Mechanical and Aerospace Engineering (MAE), Institute for Infocomm Research (I2R), Tan Tock Seng Hospital (TTSH) and Institute of Mental Health (IMH). As RRIS is established against the backdrop of a rapidly ageing Singapore society that expects a high quality healthcare system which delivers highly effective and productive services, it is expected to play a significant role in facilitating more collaborative rehabilitation researches at a national, if not, regional level.

RRIS envisions becoming a world-class institute with focus on interdisciplinary research and innovation in rehabilitation science and technology for quality healthcare delivery. With a strong tripartite partnership between clinicians, scientists and engineers, RRIS is strategically located in LKC Medicine @ Novena to encourage frequent interactions between the three parties as well as to facilitate meaningful engagement of potential industry partners. Leveraging on world class research outcomes from NTU and A*STAR as well as strong industry relations from TTSH's Centre for Advanced Rehabilitation Therapeutics (CART), RRIS is well positioned to create an ecosystem which synergizes all stakeholders, including

healthcare providers, academic and research institutions, industry and community. The initial research and development activities of RRIS will include (i) Psychosocial Rehabilitation, (ii) Neuro-Rehabilitation, (iii) Advanced Technology for Rehabilitation Continuum of Care and (iv) Database for Functional Assessment.

About Changi General Hospital (CGH)

Changi General Hospital (CGH) is an award-winning public hospital with over 1,000 beds serving a community of more than 1 million in eastern Singapore. CGH offers a comprehensive range of medical specialties and services, helmed by a highly experienced and skilled team of healthcare professionals who consistently deliver excellent health outcomes and care for patients. CGH is a member of the SingHealth cluster of healthcare institutions.

About Centre for Healthcare Assistive Robotics Technology (CHART)

Established with the support of the Ministry of Health (MOH) and Singapore Economic Development Board (EDB), the Centre for Healthcare Assistive & Robotics Technology (CHART) is a platform set up at Changi General Hospital that enables healthcare professionals to work closely with industry, academia and research institutions to co-develop and testbed impactful healthcare solutions in assistive technologies and robotics. CHART also works with the National Robotics Programme, a multi-agency initiative to coordinate and support the end-to-end development of robotics technologies.

CHART will achieve its objectives through conducting technology roadmapping with solution providers to identify synergies between healthcare & technological requirements and providing user insights to co-design and develop healthcare solutions. CHART also provides testbedding space and works with healthcare providers across health systems to conduct trials to validate effectiveness of solutions and solutions adoption.

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