PRESS RELEASE

Cross-disciplinary teams at NUS Medical Grand Challenge come together to solve healthcare dilemmas

Competition organised by the Yong Loo Lin School of Medicine included innovations motivated by current pandemic

Singapore, 28 August 2020 — This evening, the fourth edition of the NUS Medical Grand Challenge (MGC) took place online for the first time. The innovative solutions of 21 teams were assessed by a panel of judges representing a variety of industries such as information technology, healthcare and engineering. Each team brought their proposal to life and had their ideas judged for impact on healthcare, innovation, business strategy, marketing and commercialisation. **ARMAS** — a team that worked on a soft robotic suit for nurses, that can augment muscle functions and apply forces torque to shoulder and lower back to help nurses carry loads — swept up the top prize in the Open Category and won the hearts of the audience, clinching the People's Choice award. **APTnea** brought back top honours in the Nascent Category with a revolutionary redesign of the CPAP mask targeted at addressing Paediatric Obstructive Sleep Apnea (OSA), a condition with prevalence due to under-identification and difficult treatment.

Runner up in the Open Category, **TeleHealthHeroes**, came up with an application to be used by both exercise coaches and doctors, by allowing coaches to provide doctors with critical information on the patient's lifestyle, compliance to medications/lifestyle change and following them up during important phases of their treatment. Runners up in the Nascent Category were **Good Pupils** and **Memory Box** who worked on projects that sought to reduce myopia progression and prevalence among Singaporean children and decrease agitated behaviours, address high levels of depressive and anxiety symptoms, encourage socialisation, and potentially slow down cognitive decline in dementia patients, respectively. The Tan Ean Kiam Foundation sponsored the prizes for winners in the Nascent Category.

Organised by NUS Medicine, MGC began in 2017 and aims to inculcate a spirit of inquiry and hone problem-solving instincts among NUS Medicine undergraduates, while encouraging creativity and entrepreneurship. The multi-disciplinary nature of the competition also seeks to foster collaborative teamwork among students from different faculties and backgrounds. Over the past year, these students have gone through interdisciplinary boot camps to develop and refine their proposed solutions and prototypes, designed to address a number of existing healthcare problems.

Students from various NUS faculties such as Medicine, Nursing, Arts, Business, Computing, Engineering, Science and Law — and their counterparts from Nanyang Technological University (NTU), Yale-NUS, Singapore Management University (SMU) and Singapore

University of Technology and Design (SUTD) — presented their innovative solutions to unmet healthcare challenges that the teams identified.

"The Medical Grand Challenge is an annual platform to showcase just how innovative our students can be. It nurtures creativity while encouraging participants to cultivate inquiring and entrepreneurial mindsets that would pursue creative and innovative solutions through collaborative work arrangements. An ability to work creatively in cross-disciplinary teams and strong desire to apply skills to real-life solutions is not exclusive to the call of medicine, but to anyone striving to succeed in their field of choice," said Professor Chong Yap Seng, Dean of NUS Medicine.

Competing in two categories, teams in the Nascent Category presented proposed solutions to a clinical problem or unmet healthcare need they identified and tackled from scratch. Meanwhile, the Open Category saw teams working on projects initiated by industry experts who guided them as "Tech Mentors"; or improved on ideas offered in previous competitions. The Open Category also allowed for international teams who have previously participated in other similar competitions elsewhere, and the MGC welcomed visiting teams from the University of Utah, National University of Ireland Galway and Korea University College of Medicine (KUCM). This year's Open Category teams all chose to pair up with "Tech Mentors".

Some notable entries include a tool to improve remote assessment and triaging of potential COVID-19 patients to the right healthcare facility, a device aimed at reducing myopia progression in children, and a physician-mediated digital platform for anonymous discussions and knowledge-sharing on women's health matters.

Please refer to the Annex for more information on the Medical Grand Challenge and the 21 student projects.

For more information, visit the website (https://medicine.nus.edu.sg/cenmed/mgc/)
and Facebook page (https://facebook.com/nusmgc)

About the National University of Singapore (NUS)

The National University of Singapore (NUS) is Singapore's flagship university, which offers a global approach to education, research and entrepreneurship, with a focus on Asian perspectives and expertise. We have 17 faculties across three campuses in Singapore, as well as 12 NUS Overseas Colleges across the world. Close to 40,000 students from 100 countries enrich our vibrant and diverse campus community.

Our multidisciplinary and real-world approach to education, research and entrepreneurship enables us to work closely with industry, governments and academia to address crucial and complex issues relevant to Asia and the world. Researchers in our faculties, 30 university-level research institutes, research centres of excellence and corporate labs focus on themes that include energy, environmental and urban sustainability; treatment and prevention of diseases common among Asians; active ageing; advanced materials; as well as risk management and resilience of financial systems. Our latest research focus is on the use of data science, operations research and cybersecurity to support Singapore's Smart Nation initiative.

For more information on NUS, please visit www.nus.edu.sg.

About the NUS Yong Loo Lin School of Medicine (NUS Medicine)

The NUS Yong Loo Lin School of Medicine is Singapore's first and largest medical school. Our enduring mission centres on nurturing highly competent, values-driven and inspired healthcare professionals to transform the practice of medicine and improve health around the world.

Through a dynamic and future-oriented five-year curriculum that is inter-disciplinary and inter-professional in nature, our students undergo a holistic learning experience that exposes them to multiple facets of healthcare and prepares them to become visionary leaders and compassionate doctors and nurses of tomorrow. Since the School's founding in 1905, more than 12,000 graduates have passed through its doors.

In our pursuit of health for all, our strategic research programmes focus on innovative, cutting-edge biomedical research with collaborators around the world to deliver high impact solutions to benefit human lives.

The School is the oldest institution of higher learning in the National University of Singapore and a founding institutional member of the National University Health System. It is Asia's leading medical school and ranks among the best in the world (Times Higher Education World University Rankings 2019 by subject and the Quacquarelli Symonds (QS) World University Rankings by Subject 2019).

For more information about NUS Medicine, please visit https://medicine.nus.edu.sg/

ANNEX: MEDICAL GRAND CHALLENGE 2020

The Medical Grand Challenge is a year-long student-led, multi-disciplinary medical innovation programme. NUS Yong Loo Lin School of Medicine (NUS Medicine) students join counterparts from the Business, Computing, Engineering, Science and Law faculties, as well as Nanyang Technological Unversity's (NTU) Business, Engineering, Medicine and Science schools, Yale-NUS and Singapore University of Technology and Design (SUTD), to form inter-disciplinary teams to develop solutions and tackle challenges and address needs faced by the healthcare industry. These solutions can be in the form of products, smartphone applications, and devices.

Over the past year, participating students took part in boot camps and workshops. They also discussed project ideas with their mentors and set to work with seed grants to develop prototypes of their projects.

In all, 21 groups of 107 participants successfully developed their proposals into prototypes in two categories. In the Nascent Category, teams identified a clinical problem or unmet healthcare need to address and devised a solution on their own from scratch. In the Open Category, teams worked on projects initiated by "Tech Mentors", industry experts from their field. Participants in the Open Category could have also included teams that worked on improving ideas from previous competitions or international teams who have participated in similar competitions. They presented their ideas to judges on 28 August 2020.

Judges

Name	Designation
Professor Lawrence Ho *(Chief Judge, Open Category)*	Director, NUHS Centre for Innovation in Healthcare
Mr Shikharesh Das *(Chief Judge, Nascent Category)*	Managing Director, Ontogenix Pte Ltd
Professor Tan Sze Wee	Assistant Chief Executive (Enterprise) of A*STAR Adjunct Professor at School of Chemical and Bioengineering and Lee Kong Chian School of Medicine, NTU Adjunct Professor at Duke-NUS Graduate Medical School Singapore
Associate Professor Audrey Chia	Management & Organisation, NUS Business School Joint Appointment at NUS Yong Loo Lin School of Medicine
Mr Adrian Chua Ping Tat	Vice President, Open Lab, ST Engineering Innosparks
Mr Jon Sugihara	Product Director, BCG Digital Ventures
Mr Sandeep Makhijani	Watson Health Leader, Asia Pacific, IBM

Objectives
To stimulate innovation, creativity, promote collaboration among students and inculcate in medical students a strong entrepreneurial spirit and interest in meeting the needs of the community.

No.	Title / Problem	Home faculties of team members
Nascent Category Teams		
1	**SimplyPush:** This project aims to tackle the issue of poorly designed wheelchair handles and fixed wheelchair height handles with a horizontal bar handle attachment that is adjustable in height and can be fitted on any wheelchair.	NUS Medicine, Engineering
2	**Sanctum:** This project aims to create a reusable surgical mask to meet the increasing demands of our population due to the current COVID-19 situation. Singaporeans can use them on a daily basis while effectively disinfecting them with boiling water/detergent at home.	NUS Medicine, Law, Yale-NUS, NTU Medicine, NTU Biological Sciences
3	**Simpilly:** This project aims to design a smart pill box that caters to the visually impaired, ranging from mild impairment to total blindness. The pill box is connected to a mobile application that functions primarily through audio prompts, with the ability to capture prescription information. The application will also contain a database of drugs, informing the patient/caretaker of the potential drug-drug interactions should multiple conflicting drugs be registered in the pill box. The individual compartments of the pill box will have an auto-lock function which opens only at appropriate timings controlled by the application, ensuring medication safety and spillage prevention. This measure will also allow the application to reliably measure drug compliance.	NUS Medicine, Business, Engineering, SUTD
4	**Indispensable:** This project aims to increase patients' drug-compliance and to ensure that patients consume their medication correctly and timely. They would like to propose a new process where prescriptions are individualised. The process will integrate a packing machine that helps to sort and pack medications for the patient. The packing machine also includes a remote tracking system on the packaging.	NUS Medicine, Engineering, Law
5	**Good Pupils:** This project aims to reduce myopia progression and the prevalence of myopia among Singaporean children by creating a product which impacts and modifies their behaviour and lifestyle. They propose a wearable device, which monitors and recommends changes in behaviour. This creates awareness when reading distance is too close and ultimately improve their body posture during close work. It also aims to prevent overly long periods of eye strain.	NUS Medicine, Engineering, SUTD

6	**APTnea:** This project is targeted towards Paediatric Obstructive Sleep Apnea (OSA). They aim to address not only OSA as just a condition, but also as a condition with prevalence due to under-identification and difficult treatment. They would like to propose to create a revolutionary CPAP mask that has a low adoption cost, drastically increased comfort levels, as well as minimal leakage that guarantees a drop in the user's Apnea-Hypopnea Index.	NUS Medicine, Engineering
7	**Memory Box:** This project aims to develop a "memory box" device application; a reminiscence therapy to help mild to moderate dementia patients recall familiar memories from their past using personalised information, pictures, videos, music, and personal experiences. The goal is to help retain patient's identity, decrease agitated behaviours, address high levels of depressive and anxiety symptoms, encourage socialisation, and potentially slow down cognitive decline. The secondary outcome is to reduce caregiver stress, and inspire conversations with family members and with care staff.	NUS Medicine, Computing, Computer Science, Engineering, SMU Business
8	**Elderlift:** This project targets sarcopenia in elderly by installing Elderlifts: a pedometer-like device paired with a smartphone app to track number of repetitions each user does on exercise machines in underutilised physical fitness corners, so as to incentivise & gamify experience for elderly users. Points collected from doing exercises can be used to redeem rewards.	NUS Medicine, NTU Medicine, NTU Engineering, SUTD
9	**Project Eve:** This project aims to develop a drug delivery system that incorporates usage of microneedles, so as to deliver painless drug delivery for a wide variety of vaccines and drugs - for inpatient care, outpatient care and humanitarian aid.	NUS Medicine, Engineering, Science
Open Category Teams		
1	**Project Contagion:** The project aims to educate players on the various types of infections (airborne, vector-borne, droplet-borne etc), implications of certain societal practices to outbreak progression, outbreak containment and management. Students will be involved in game design, prototype building, business model planning and more. *Tech Mentor:* MOH Holdings	NUS Medicine, Information Systems
2	**FIT.R:** The project involves ideation and development of a free verifiable source of fitness and	NUS Medicine

	healthy lifestyle information for preventive medicine, and also the ideation and development of a free Online Health Community that equips doctors with tools to counter medical information and encourage physical activity. ***Tech Mentor:** AskDr and Axiom*	
3	**ARMAS:** This project involves creating a soft robotic suit for nurses (especially those working in nursing homes) which can augment muscle functions & applies forces torque to shoulder and lower back to help nurses carry loads. ***Tech Mentor:** NUS Biomedical Engineering (Mr Rainier)*	NUS Medicine, Nursing, Science
4	**Med Scientists:** This project aims to target a specific aspect of rehabilitation, and develop a tool that can be used by remote patients for virtual consults and to improve the patient care journey. ***Tech Mentor:** MyDoc*	NUS Medicine, Computing, Computer Science, Arts & Social Science (Psychology)
5	**Project M:** This project seeks to address the ideation and validation of a tool to improve remote assessment and triaging of potential COVID-19 patients and collate travel history prior to attending healthcare facilities. It also involves the validation of a centralized avenue for the sharing of verifiable medical information between healthcare providers and the general public in the context of this outbreak. ***Tech Mentor:** AskDr*	NUS Medicine, Information Systems, SMU Law
6	**.DOC:** This project aims for the ideation and validation of a Doctors-Only platform for discussions about anonymised Cases, knowledge sharing to improve patient care and Continuing Medical Education (CME). ***Tech Mentor:** AskDr*	NUS Medicine, Engineering, SUTD
7	**Project Altherapy:** This project aims to develop a platform to connect patients with alternative practitioners in a multi-ethnic community, to assist with resolving misinformation and to direction patients to alternative therapy, where appropriate. ***Tech Mentor:** AskDr*	NUS Medicine, Engineering, Business, Information Systems Technology and Design

8	**LadyBug: Women's Health Digital Community:** This project aims to create a physician-mediated digital platform for anonymous discussions and knowledge sharing about women's health matters such as fertility and perinatal care (a free online health community to counter misinformation on women's health). ***Tech Mentor:** AskDr, MOH Holdings*	NUS Medicine
9	**TeleHealthHeroes:** The project aims to create an application that can be used by both exercise coaches and doctors, so as to support General Practitioners. Health and exercise coaches will build a good relationship with the patients through the app while providing doctors with critical information on the patient's lifestyle, compliance to medications/lifestyle change and following them up during important phases of their treatment. ***Tech Mentor:** Stat Medical (Dr Ng Joon Hwee)*	NUS Medicine, Engineering, Science, Yale-NUS
10	**Call The Shots:** This project involves the ideation & validation of a Free Open-Source Digital Magazine for the public to access articles regarding essential medical topics such as Vaccinations and Health Screening contributed by providers, so as to counter medical misinformation and promote health. ***Tech Mentor:** AskDr*	NUS Medicine
11	**Kimia:** This project targets challenges in physiotherapy for musculoskeletal disorders so as to improve physiotherapy outcome, via experiment design, clinical liaison, patient education, technical development, product development, and more. ***Tech Mentor:** Kinexcs*	NUS Medicine
12	**Foot+:** This project aims to develop a cost effective mat which can detect both static and dynamic foot plantar pressures to allow patients to assess their foot more frequently in a more objective manner. As such, once clinically validated, it is hoped that this mat can augment and value add to current diabetic foot screening protocols. ***Tech Mentor:** NUH (Dr. Andrew Arjun Sayampanathan & Dr Amit Nirmal Cuttilan)*	NUS Medicine, Engineering, Computing