

# iHealthtech

A Newsletter of the Institute for Health Innovation & Technology, National University of Singapore (NUS)

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News in Focus

## Professor Lim Chwee Teck Elected Fellow of The Royal Society



Professor Lim Chwee Teck, NUS Professor and Director of the Institute for Health Innovation & Technology at the National University of Singapore (NUS), has achieved a remarkable milestone: his election as a Fellow of The Royal Society (FRS). This prestigious honour makes him only the second native Singaporean to join the ranks of this prestigious institution.

Professor Lim's pioneering research has revolutionised how engineering principles are applied to tackle pressing health challenges. By investigating the mechanics of how cells and tissues behave, his work has led to groundbreaking advancements in diagnostic and therapeutic solutions. These innovations have not only deepened scientific understanding but also inspired the establishment of six successful startups, bridging the gap between laboratory research and real-world applications.

Founded in 1660, The Royal Society is the world's oldest scientific academy in continuous existence. It has long been associated with groundbreaking discoveries and intellectual excellence. Joining its roster of Fellows—a list that includes luminaries such as Newton, Darwin, Einstein, and Hawking—is a testament to Professor Lim's exceptional contributions to science.

Congratulations to Professor Lim Chwee Teck on this extraordinary achievement!



## UM-NUS Joint Workshop on Biomedical Engineering 2024

The inaugural UM-NUS Joint Workshop on Biomedical Engineering 2024, organised by iHealthtech and supported by the NUS Office of Alumni Relations, was held on 15 October 2024 at NUS to celebrate the enduring partnership between Universiti Malaya (UM) and the National University of Singapore (NUS). Inspired by the visionary leadership of NUS President Professor Tan Eng Chye and UM Vice Chancellor Professor Noor Azuan Abu Osman, the workshop explored cutting-edge topics like AI, IoT, nanotechnology, robotics, and bio-inspired materials, fostering collaboration among scientists, engineers, and clinicians between the two universities.



## Strengthening Singapore-China Collaboration in Education and Healthcare Innovation

During the Chinese Minister's visit to NUS on 23 April 2024, iHealthtech had the honour of welcoming the delegation led by Minister Huai Jinpeng and showcasing the institute's latest advancements in medical and health technologies. The visit underscored the essential role of education in nurturing talent and driving healthcare innovation in both countries. iHealthtech looks forward to future partnerships between Singapore and China, as we jointly pursue progress and mutual growth in education, research, and healthcare.

## NUS iHealthtech and HKU ABIC Forge New Partnership to Advance Health Technologies

The signing of a Memorandum of Understanding on 24 April 2024 between iHealthtech and the Advanced Biomedical Instrumentation Centre (ABIC) at the University of Hong Kong (HKU) represents a key step toward strengthening collaboration between NUS and top universities in Hong Kong to tackle pressing health challenges in both Singapore and Hong Kong. Through this partnership, iHealthtech and ABIC aim to advance healthcare and medical technologies by fostering collaborative research and innovation.



## Wearable Technology Workshop 2024

In collaboration with HealthTEC.SG and the Biomedical Engineering Society (Singapore), iHealthtech co-hosted the 4th Wearable Technology Workshop on 6–7 December 2024 at the Sands Expo and Convention Centre, Singapore. Held as a prelude to the 18th International Conference on Biomedical Engineering (ICBME 2024), this 1.5-day event attracted over 100 participants, including academic researchers, students, and industry leaders, all driven by a shared interest in advancing and shaping the future of healthcare through wearable technology.



## Self-Healing, Light-Emitting Fibers with Magnetic Control for Flexible Displays and Soft Robotics

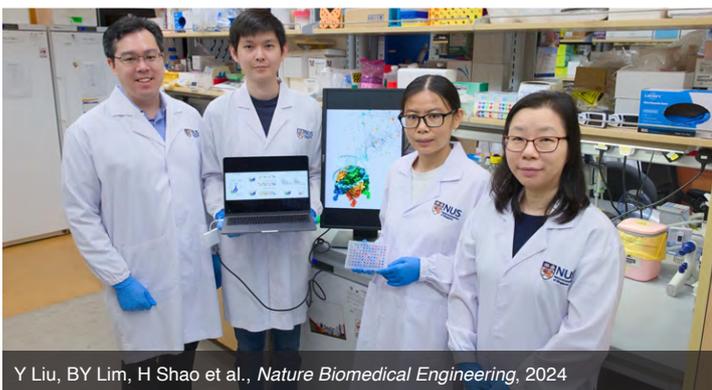
Imagine a material that self-heals, emits light, can be powered wirelessly, and controlled using magnetic forces. This remarkable invention exists, created by iHealthtech Principal Investigator A/Prof Benjamin Tee and his team, including Dr Fu Xuemei and Dr Wan Guanxiang. Their innovative work holds promise for advancing human-robot interaction, with potential applications in soft robotics, wearable electronics, and smart textiles. This new invention could revolutionise how we integrate technology into daily life and industries.



X Fu, G Wan, JS Ho & BCK Tee et al., *Nature Communications*, 2024

## Innovating Health Monitoring with Wearable Skin-Adhering Devices

iHealthtech PI Dr Liu Yuxin and Dr Yang Le from A\*STAR's IMRE have developed an innovative wearable device that adheres to the skin. This device absorbs and analyses solid biomarkers secreted through the skin, offering a non-invasive, cost-effective alternative to traditional biofluid analysis. It can be used to track athletes' lactate levels and holds promise for early detection of cardiovascular diseases and stroke, paving the way for more accessible and proactive healthcare solutions.



Y Liu, BY Lim, H Shao et al., *Nature Biomedical Engineering*, 2024

## TETRIS: Revolutionising Cancer Diagnostics and Protein Interaction Analysis

iHealthtech PIs, Associate Professors Shao Huilin and Brian Lim, have pioneered Tandem Elongation of Templated DNA Repeats for Interacting Protein Analysis (TETRIS), an innovative cancer diagnostic technology delivering precise results in mere hours. Beyond cancer detection, TETRIS unveils complex protein interactions, providing deep insights into cellular mechanisms. Demonstrated using breast cancer biopsies, it accurately identified cancer subtypes and tumor aggressiveness, offering transformative potential in disease understanding and drug development.



RT Arwani, L Yang, Y Liu et al., *Nature Materials*, 2024

## Harnessing Magnetic Therapy for Cancer Prevention and Muscle Health

Exercise reduces cancer risk through mechanisms like myokine release, improved immune function, and hormonal balance. Research by A/Prof Franco-Obregón and Dr Alex Tai Yee Kit reveals that their magnetic therapy mimics these benefits, promoting muscle regeneration and slowing aging. Remarkably, the therapy stimulates the tumour-suppressing protein HTRA1, offering potential cancer-preventive effects. This finding could revolutionise how we approach cancer prevention and muscle health, providing non-invasive alternatives for those unable to engage in regular physical activity.



YK Tai, JN Iversen, A Franco-Obregón et al., *Cells*, 2024



## Innovator Pitch Fest 2024: Driving Health Tech Innovation

iHealthtech, Alumni International Singapore (AIS), and HealthTEC.SG co-hosted the inaugural Innovator Pitch Fest, bringing together 11 health and medical technology startups and over 100 participants, including potential investors. Held at iHealthtech's NUS Engineering in Medicine building on 21 May 2024, the event provided a platform for startups to showcase disruptive diagnostic technologies. Organisers focused on fostering collaborations between startups and investors, aiming to accelerate the delivery of health innovations to the public. The strong turnout highlighted the vibrant ecosystem supporting health tech entrepreneurship in Singapore.

## Personal Journeys in Science: Inspiring Stories from iHealthtech's Principal Investigators at People Fest 2024

iHealthtech was honoured to have the institute's Principal Investigators—Professor Lim Chwee Teck, Associate Professor Alfredo Franco-Obregón, and Dr Andy Kah Ping Tay—speak at the People Fest event organised by NUS Human Resources on 19 April 2024. During the event, they shared pivotal moments and life-changing experiences that inspired their journeys into science and engineering. They recounted personal stories behind their research, the challenges they faced, and the moments of brilliance that shaped their academic careers and fueled their passion for scientific discovery. Their inspiring sharing supports the University's efforts to recognise the boundless potential within each of us and to empower individuals to harness their unique talents for collective progress.



## iHealthtech Research Retreat

On 23–24 March, 2024, iHealthtech held its much anticipated research retreat at Sentosa, Singapore, focusing on unmet clinical needs and fostering innovation. The event included teamwork-building insights from Dr Jenson Goh, emphasising the limitless potential of collaboration. Distinguished speakers like Professors Abe Lee and Lawrence Ho highlighted challenges in aligning PI ambition, institute strategy, and societal impact. The retreat underscored the importance of shared goals, collective effort, and family support in driving groundbreaking advances for future generations.

## Celebrating a Legacy: The CN Lee Professorship in Medical Sciences

Professor Lee Chuen Neng, affectionately known as CN, is a foundational figure in iHealthtech, serving as its Clinical Director and one of its founding members. A renowned cardiac surgeon in Singapore, Prof Lee's contributions transcend life-saving surgeries, bridging medicine and engineering to advance healthcare innovation. In recognition of his exceptional contributions to surgery, leadership at NUS Yong Loo Lin School of Medicine, and forward-thinking advancements in healthcare, the NUS School of Medicine has established the CN Lee Professorship in Medical Sciences.



## Startup News

### QuantumTX Named "Startup of the Year" at Ageing Asia 2024 WORLD AGEING FESTIVAL

QuantumTX, a startup specialising in muscle therapy through its uniquely developed magnetic mitohormesis technology, co-founded by A/Prof Alfredo Franco-Obregón, has been honoured with the prestigious "Startup of the Year" award at the Ageing Asia 2024 WORLD AGEING FESTIVAL. This accolade highlights QuantumTX's contributions to health innovation and aging care.

### Sunbird Bio Secures \$14 Million to Advance Blood-Based Diagnostics for Neurological Disorders

Sunbird Bio, co-founded by A/Prof Shao Huilin, is pioneering blood-based technologies for diagnosing and treating neurological disorders and early-stage cancer. The startup has raised an additional \$14 million to advance its platform, focusing on Alzheimer's and other neurological conditions. New investors Eli Lilly and EDBI join existing backers ClavystBio, Polaris Partners, and S32, highlighting confidence in Sunbird Bio's innovative approach to disease diagnostics and treatment.

## Awards and Honours

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|--|---|
| Liu Yuxin, Andy Tay, Gao Yujia   | ICBME 2024 BME Rising Stars Awards  |
| Roger Ho, Lim Chwee Teck, Benjamin Tee, John Ho, Wu Changsheng, Subbu Venkatraman, Ali Asgar Bhagat, Brian Lim | World's Top 2% Scientists 2024  |
| Gao Yujia  | UAE's Next Mastermind Awards & Conference 2024  |
| Andy Tay   | 2024 Micro and Nano Engineering (Elsevier) Young Investigator Award                         |
| Roger Ho   | 2024 Highly Cited Researcher by Clarivate Analytics, NUS Medicine Research Excellence Award |
| Jin Yuxia  | 3rd place at the Falling Walls Lab Singapore 2024 for her innovative project, NeuroEdge     |
| Shou Yufeng  | ibidi Paper Award 2024  |
| Lim Chwee Teck   | Elected Fellow, The Royal Society   |
| Lee Chuen Neng   | CN Lee Professorship in Medical Sciences  |
| Shao Huilin  | Top 50 Asia Women Tech Leaders 2024   |

## New Principal Investigator



**Dr Gao Yujia**  
Junior Academic Fellow  
Department of Surgery  
Immersive Technology and its Application in  
Clinical Care and Education

Congratulations!

## Staff Promotions

NUS Vice President (Ecosystem Building)  
**Benjamin Tee**

Associate Professor with Tenure  
**Brian Lim**

Associate Professor with Tenure  
**Catherine Ong**

## Selected Publications

X Fu, G Wan, H Guo, H-J Kim, Z Yang, YJ Tan, JS Ho & BCK Tee. Self-healing actuatable electroluminescent fibres, *Nature Communications* (2024)

Q Zeng, X Tian, DT Nguyen, C Li, P Chia, BCK Tee, C Wu & JS Ho. A digitally embroidered metamaterial biosensor for kinetic environments, *Nature Electronics* (2024)

S Ling, X Tian, Q Zeng, Z Qin, SA Kurt, YJ Tan, JYH Fuh, Z Liu, MD Dickey, JS Ho & BCK Tee. Tension-driven three-dimensional printing of free-standing Field's metal structures, *Nature Electronics* (2024)

Y Liu, NR Sundah, NRY Ho, WX Shen, Y Xu, A Natalia, Z Yu, JE Seet, CW Chan, TP Loh, BY Lim & H Shao. Bidirectional linkage of DNA barcodes for the multiplexed mapping of higher-order protein interactions in cells, *Nature Biomedical Engineering* (2024)

RT Arwani, SCL Tan, A Sundarapandi, WP Goh, Y Liu, FY Leong, W Yang, XT Zheng, Y Yu, C Jiang, YC Ang, L Kong, SL Teo, P Chen, X Su, H Li, Z Liu, X Chen, L Yang & Y Liu. Stretchable ionic-electronic bilayer hydrogel electronics enable in situ detection of solid-state epidermal biomarkers, *Nature Materials* (2024)

S Chen, Z Qiao, Y Niu, JC Yeo, Y Liu, J Qi, S Fan, X Liu, JY Lee & CT Lim. Dissecting gut-microbial community interactions using a gut microbiome-on-a-chip, *Advanced Science* (2024)