25-27 Nov 2020
International Conference on Gerontechnology
樂齡科技國際會議
Report

International Conference on Gerontechnology 2020

Date: 23-25 November 2020
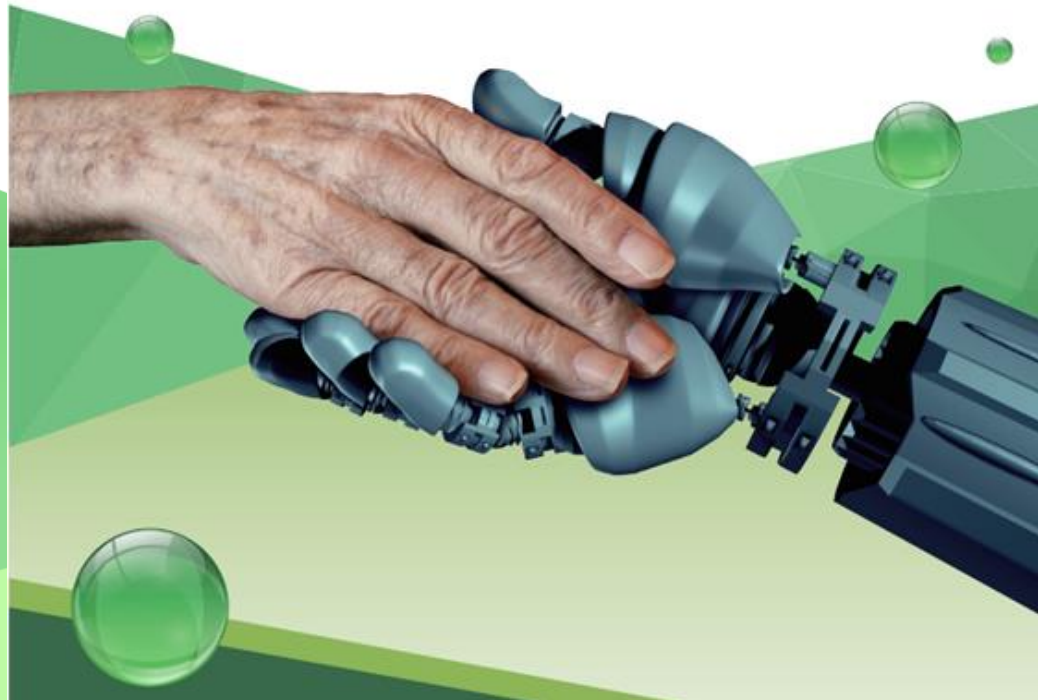
Organizer: The Open University of Hong Kong (Currently retitled to Hong Kong Metropolitan University)
Collaborating Organization: Association of Hong Kong Nursing Staff
Major Sponsor: Professional Services Advancement Support Scheme (PASS)

Programme:
5 Keynote & Plenary Presentations
3 Master Class
5 Workshops
4 Concurrent Paper & Poster Presentation

Website: http://icg2020.hkmu.edu.hk

Attendees: 600 + persons (Hong Kong & Overseas)

For more photos, please click here

600+ attendees joined ICG2020

HONG KONG VS OVERSEAS

Hong Kong 96%

Overseas 4%
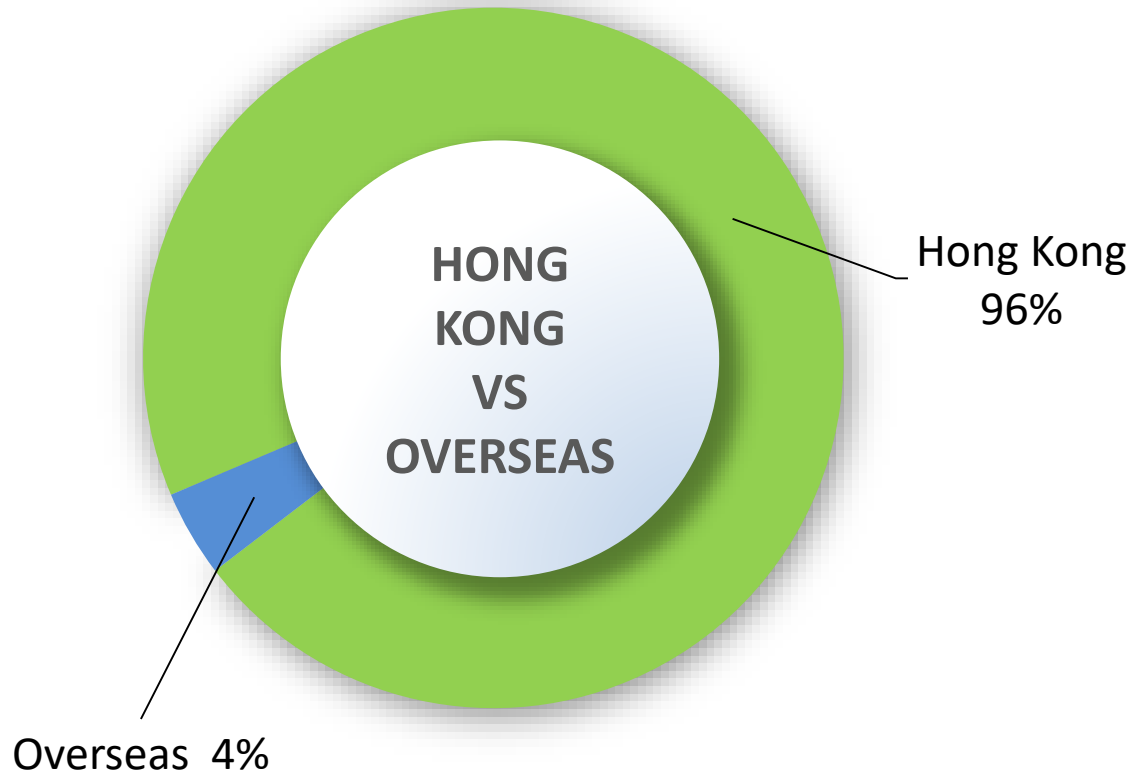
Attendees Demographic

ATTENDEES BY OCCUPATION

44%

16%

40%

Academic
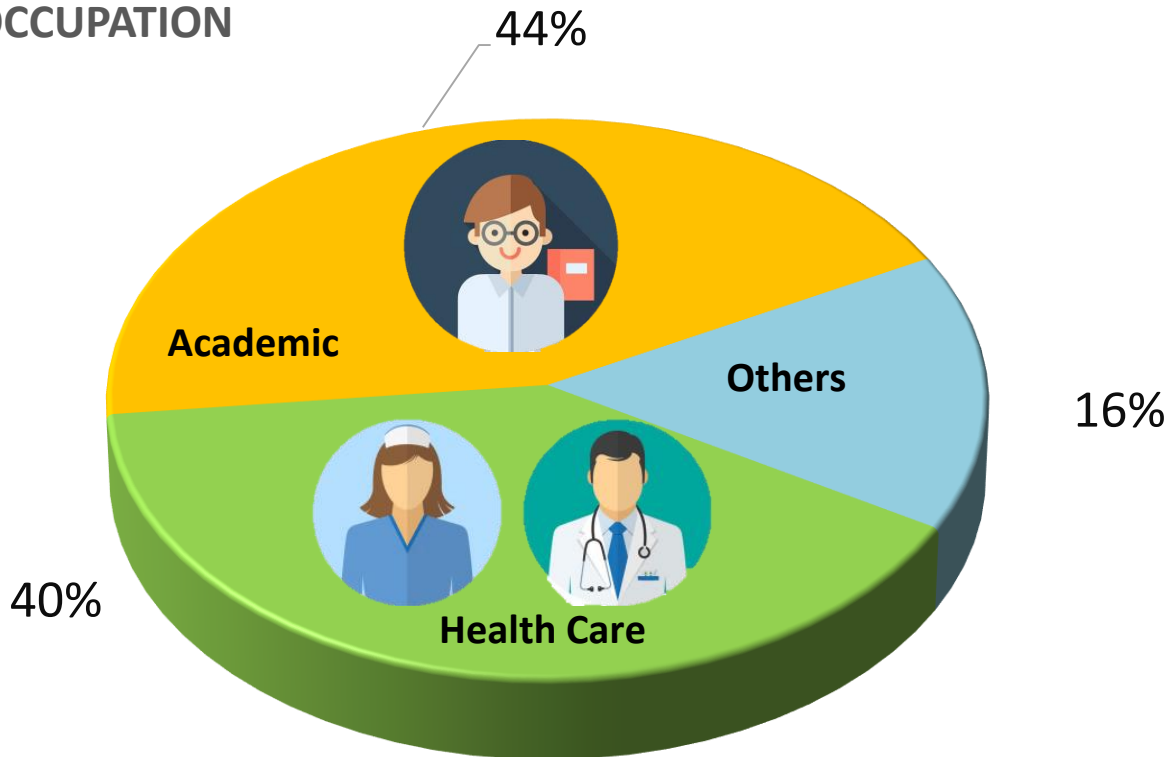
Others

Health Care

Health Care	
Nurse	96 %
Doctor	1%
Occupational therapist	1%
physical therapist	1%
Dietitian	1%

Academic	
Teachers (Nursing or others)	49%
Students (Nursing)	51%

Others	
Technology	10%
NGO	12%
Others (Management, Government & etc)	78%

How do you rate this program/training overall?

Fair 3%
Poor 0%
Unknown 0%
Excellent 32%
Good 65%

- Excellent
- Good
- Fair
- Poor
- Unknown
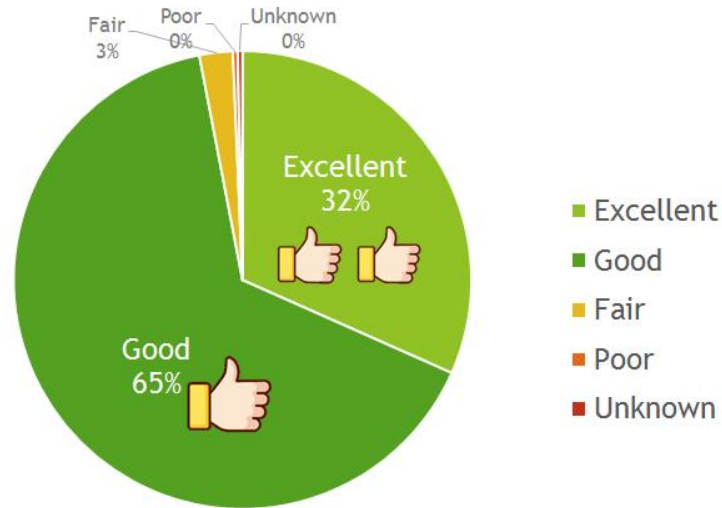
The programme was informative and useful

Strongly Agree 39%
Agree 57%
Unknown 1%
Disagree 1%
Neutral 2%

- Strongly Agree
- Agree
- Disagree
- Neutral
- Unknown

* Based on CNE Evaluation Form
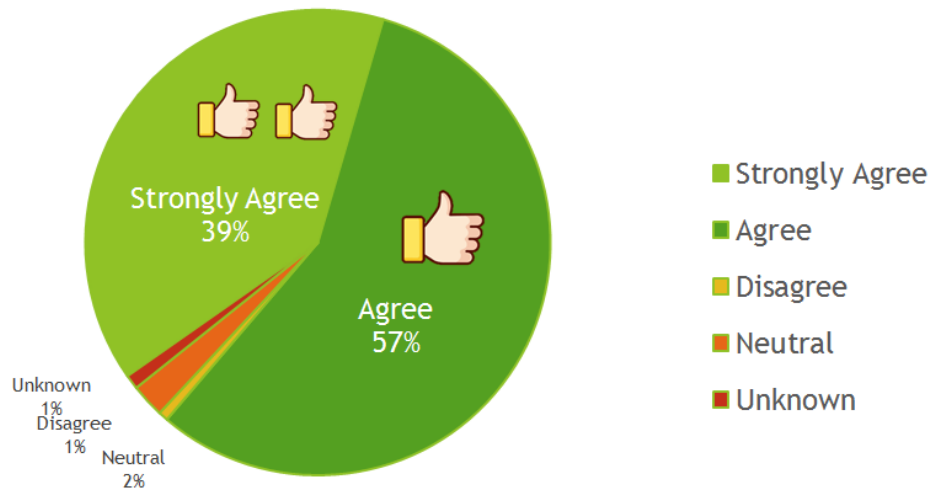
Please rate your level of satisfaction for the following
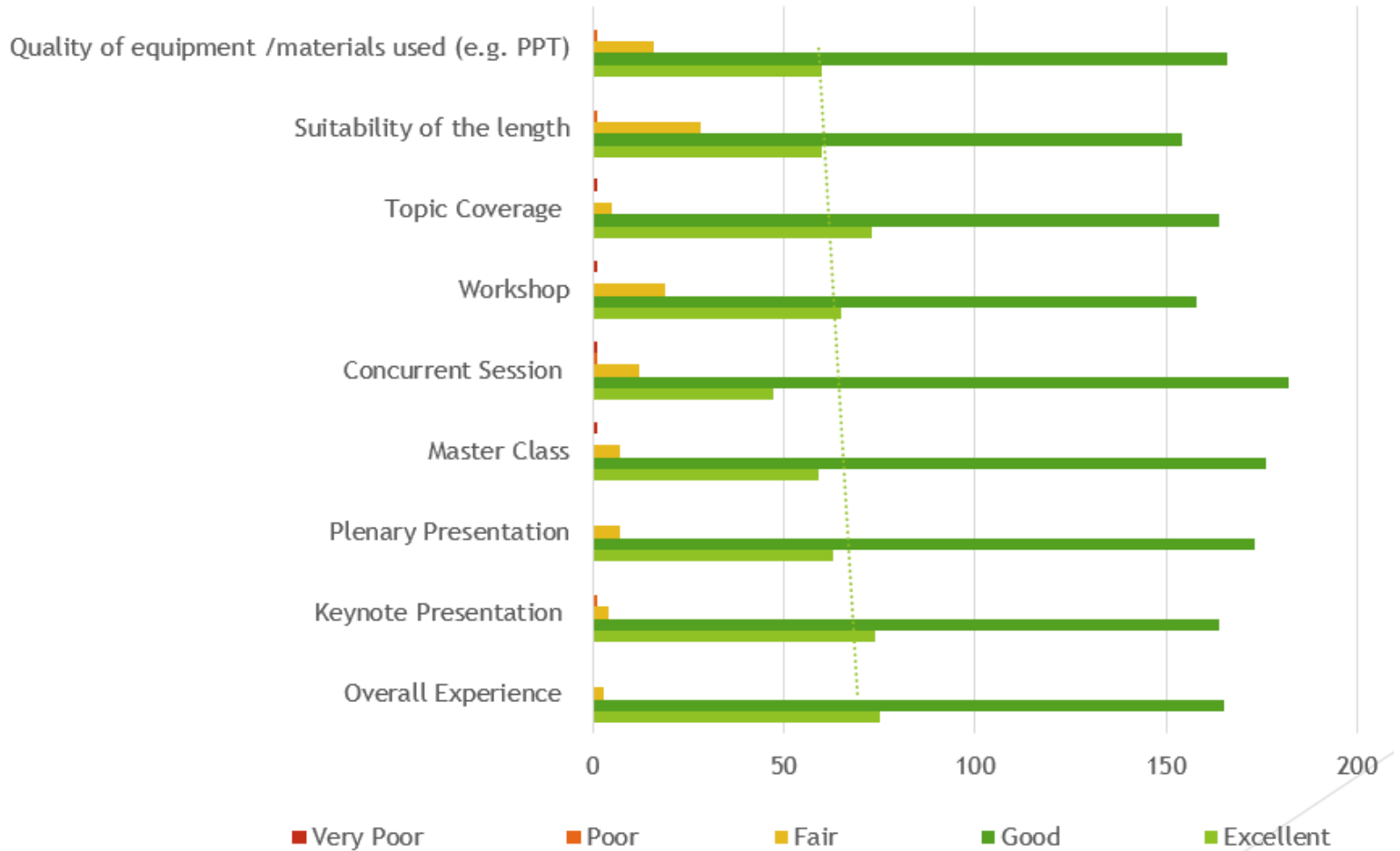
* Based on Conference Evaluation Form

Please rate your level of agreement/disagreement

* Based on Conference Evaluation Form

公開大學舉辦全港首個樂齡科技國際會議

香港公開大學 THE OPEN UNIVERSITY OF HONG KONG
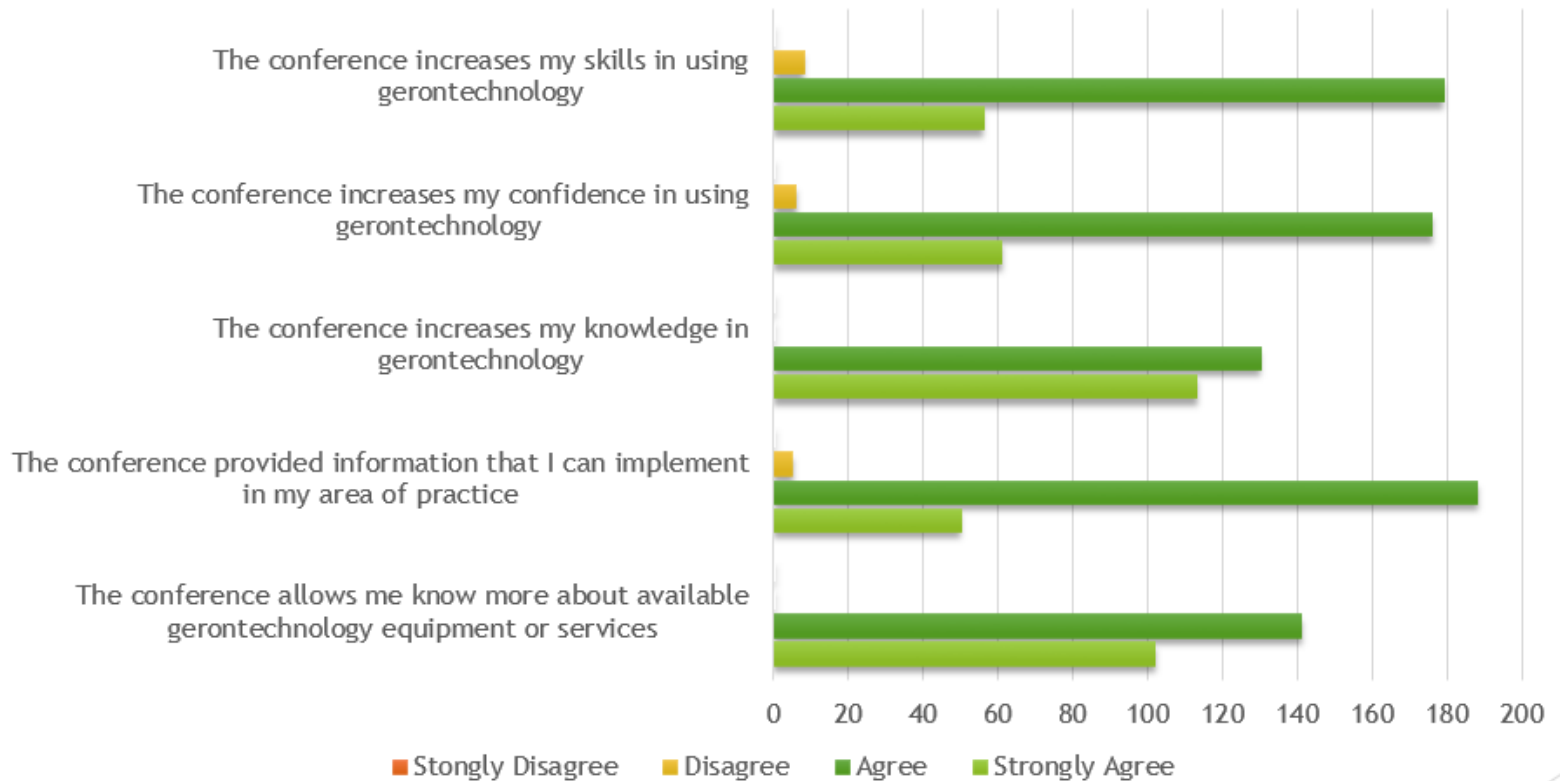
攜手應對未來挑戰

面對人口高齡化的問題，世界各地都致力尋求解決方法。近年，香港致力推動樂齡科技，令社會在人口老化的進程中得以持續發展。香港公開大學憑藉在健康護理教育的優勢，舉行國際學術會議匯聚香港及海外不同學者及持份者交流，希望為樂齡科技的發展尋找新出路。

■「樂齡科技國際會議」的開幕儀式由安老事務委員會主席林正財醫生（右二）、公大校長黃玉山教授（右三）等一同主禮。

網上會議反應熱烈
彰顯推動樂齡科技決心

由香港公開大學（公大）主辦、香港護士協會合辦的全港首個「樂齡科技國際會議」於11月25日至27日圓滿舉行。會議以「引進樂齡科技，實現卓越老年護理」為主題，一連三天以網上形式進行，邀得五位對樂齡科技饒有貢獻，分別來自台灣、美國、加拿大、日本及新加坡的海外學者，和多位本地專家逐一分享其卓越的研究成果，並吸引來自近十個國家和地區不同院校的學者、科研人才、醫護人員、產品發展商及使用者聚首一堂，共同就樂齡科技交流意見及經驗，推動跨界別的長遠合作。

會議的開幕儀式由安老事務委員會主席林正財醫生、公大校長黃玉山教授和公大護理及健康學院署理院長李燕瓊教授一同主禮。會議內容涵蓋樂齡科技的發展趨勢、在老年護理上的應用，以及臨床經驗分享等。透過不同的專題演講、講座及工作坊，以提高業界和大眾對樂齡科技的認識，並希望將科技帶到社區層面。

在多方努力及支持下，參加網上會議的人數高達800人，李燕瓊教授表示，數字令人十分鼓舞。「參與人數是我們原來目標的六倍多，可見大家對於這個議題都非常關注，發展樂齡科技實在刻不容緩。」她續說，會議舉辦的目的正正是希望建立一個平台予相

■安老事務委員會主席林正財醫生在開幕儀式上致辭。

關持分者彼此交流，了解不同的發展方向，以及大家所面對的困難及解決方法。

將挑戰轉化為機遇
培育學生與時並進

人口老化是全球的挑戰。李教授認為，人口老化的挑戰越來越明顯，大家更加要全力面對，將它轉化為機遇。結合了老年學知識和先進科技應用的樂齡科技，在護理和照顧長者上成了重要的關鍵元素，有助提昇長者的生活質素及獨立自主能力，達至居家安老。

公大在健康護理教育上具備26年的經驗及優勢，致力培育新一代健康護理人才，回應社會需求。同時，大學亦希望學生及教職員能夠在樂齡科技這個範疇上有更多的參與。「新落成的香港公開大學賽馬會健康護理學院有多個專業的教學實驗室，設有先進的教學設備，致力培訓同學對於創新科技的學習需要。」她補充，大學正構思建立一個樂齡科技學習平台，展示香港常用的樂齡科技產品，希望學生能掌握相關知識，與時並進及在畢業後貢獻社會。

社會認知不足影響發展
借鑑外地成功例子

然而，在香港發展樂齡科技仍然面對不少困難。首先是社會普遍對於科技的重要性認知不足，部分人

仍然視相關產品為輔助工具，而非居家安老的核心產品，在應用上有所卻步。其次，許多科技產品體積比較大，在狹窄的香港家居環境中使用有一定困難。對於安老院舍，他們亦欠缺資源添置合適的產品及器材，也沒有足夠的人手掌握器材的正確用途。以上各個問題無疑為本地推動樂齡科技增加障礙，因此，政府及各界的支援實在必要。

學院副教授黃月盈博士指出，現今不少國家對樂齡科技越來越重視，例如日本早於2013年已引入護理機械人，幫助長者沐浴及如廁，同時支援及監察認知障礙症患者的情況；丹麥政府設立基金，支持新科技產品的測試及推行，並於2013年開展八年計劃，目的是盡快將科技產品透過政府服務推廣至長者及殘疾人士等受惠者。她期望，香港能夠借鑑其他國家及地方，令樂齡科技在本地的應用更趨普及。

科技產品宜人性化設計
教育是重要一環

縱使樂齡科技在香港的發展仍在起步階段，但其重要性無容置疑。除了幫助長者改善生活質素，科技亦可以協助他們減慢身體機能的退化速度；另外，院舍在長期人手不足的情況下，科技產品能夠減輕護理人員的負擔及壓力；對家庭照顧者亦然，一些科技工具可以減輕他們身心的壓力。然而，學院助理教授彭楚君博士表示，即使科技產品的技術發展一日千里，但人與人之間的互動和關懷都不能完全被科技替代。在應用科技於老人護理時，必須着重「人性化」照顧這要素。「因此，在照顧長者時，應時刻關心和顧及他們感受、尊重他們的想法；而在設計產品時，要貼地、以長者為中心，亦可邀請長者參與及提供意見，從他們的角度出發，以提供符合他們需要的樂齡科技產品。」

■彭楚君博士認為，樂齡科技要有更好的發展，需要教育社會人士共同參與。

■李燕瓊教授（右）及黃月盈博士（左）均希望，樂齡科技在本地的應用更趨普及，令更多長者受惠。

她續指，樂齡科技方面的教育亦是重要一環。除了向專業護理人員提供培訓外，公眾教育也可以讓社會人士共同參與，灌輸正確的知識，提高公眾對樂齡科技的認識，令樂齡科技有更好的發展。隨着新校舍的落成，公大將與健康護理相關的課程和項目集中於新大樓開辦，期望建立一個與公眾、學術界以及公營和私營機構聯繫的樞紐，互相協作，共同為樂齡科技作出貢獻。


■共同籌備「樂齡科技國際會議」的公大護理及健康學院團隊。

（資料由客戶提供）

舉辦全港首個樂齡科技國際會議　推動優質老年護理
Hong Kong's first gerontechnology conference promotes quality elderly care

在香港以至世界其他已發展地區，人口高齡化對醫療系統均帶來嚴峻挑戰，專家和從業員一直積極探訴科技，為老年護理尋求新方案。有鑑於此，本校護理及健康學院於去年 11 月 25 日至 27 日與香港護士協會合辦全港首個「樂齡科技國際會議」。

首度舉辦的會議以「引進樂齡科技　實現卓越老年護理」為主題，邀請了五位分別來自台灣、美國、加拿大、日本和新加坡的著名學者，連同三位本地專家，就人工智能物聯網、機械人技術，以及數碼與智能技術等先進科技作主題演講、專題分享和大師班演講。會議更安排學者和資深從業員主持工作坊，講解個別科技和創新治療策略的實際應用。會議邀請到社會福利署署長梁松泰先生和安老事務委員會主席林正財醫生致開幕詞；林醫生亦同時擔任大會主禮嘉賓。

疫情下會議通過網上舉行，獲得熱烈支持，高峰期共有 800 多位參加者，可見樂齡科技備受關注，需求甚殷。本校護理及健康學院期望以新落成啟用的健康護理學院為各方合作框架，貢獻專業以至公眾教育。

In Hong Kong, as in other developed societies, the ageing population is posing immense challenges to the healthcare system, and experts and practitioners have been looking to technology for elderly care solutions. In view of this, the OUHK School of Nursing and Health Studies hosted Hong Kong's first International Conference on Gerontechnology from 25 to 27 November 2020, in partnership with the Association of Hong Kong Nursing Staff.

This first conference was themed around 'Achieving Excellence in Elderly Care through Gerontechnology'. Five prominent academics from Taiwan, the United States, Canada, Japan and Singapore, along with three local experts, were invited to speak on the application of cutting-edge technologies such as AIoT (Artificial Intelligence based on Internet of Things), robotics, and digital and smart technologies in keynote addresses, plenary sessions and masterclasses. The conference also featured practical workshops by scholars and experienced practitioners on specific technological applications and innovative treatment strategies. Director of the Social Welfare Department Mr Gordon Leung and Chairman of the Elderly Commission Dr Lam Ching-choi, who was also an officiating guest, delivered opening addresses for the event.

Held online amidst COVID-19, the conference received overwhelming support from over 800 participants at its peak, indicating great concerns and demand for gerontechnology. The OUHK School of Nursing and Health Studies hopes to contribute to both public and professional education by providing a hub for collaboration in the new IOH.

Open Link Magazine March 2021

樂齡科技國際會議

由本學院舉辦、特區政府的專業服務協進支援計劃撥款資助的全港首個樂齡科技國際會議 (International Conference on Gerontechnology: Achieving Excellence in Elderly Care through Gerontechnology)將訂於2020年11月25-27日(星期三至五)於網上舉行。

人口老化一直為各國政府所困擾，近年興起的樂齡科技是社會應對人口老化挑戰的新希望。本學院特此透過一連三天十三場精彩的視像講座，特別邀請多位美國、加拿大、東南亞的重量級學者和本地專家講解樂齡科技的發展趨勢、於老年護理的應用、分享臨床經驗，以提高業界和大眾對樂齡科技的認識並提昇長者的生活質素及自主能力。

會議讓你掌握樂齡科技的最新發展，不容錯過，更可獲取10.5 CNE學分。有興趣人士請於大會網站 http://icg2020.ouhk.edu.hk 登記和投稿，費用全免。參加者更可獲贈實用新穎的電子產品，保證令人愛不釋手。

Nursing and Health Studies Newsletter
Oct 2020

Program Rundown

14:00–14:30 **Opening Ceremony**

Welcome Address I

Professor Yuk-Shan Wong
President
The Open University of Hong Kong

Opening Address I

Mr. Gordon Leung, JP
Director
Social Welfare Department

Opening Address II

Dr. Ching-choi LAM, SBS, JP
Chairman
Elderly Commission

Welcome Address II

Dr. Moon Yuet-ying Wong
Chair, Organizing Committee of ICG2020
The Open University of Hong Kong

14:30–15:15 **Keynote Address I**

From Gerontechnology Research to Daily Applications – Development and Implementation of an AIoT Bedroom for Senior Care

Professor Yeh-liang Hsu
Professor
Yuan Ze University, Taiwan

15:15–15:45 **Break**

15:45–16:45 **Master Class I**

Exoskeleton Robotics and AR system for Rehabilitation

Professor Raymond Kai-yu Tong
Professor
The Chinese University of Hong Kong

16:45–17:30 **Workshop I**

Optimizing Management of Schizophrenia: An Update of Treatment Strategies

Dr. Victor Wing-cheong Lui
Clinical Assistant Professor (honorary)
The Chinese University of Hong Kong

DAY 2
26 NOV 2020
THURSDAY

09:00–09:45	**Keynote Address II**
	The Rise of Digital Health in Healthcare Systems: Caring for Aging Adults
	Dr. Ryan Shaw
	Associate Professor
	Duke University, The United States
09:45–10:30	**Plenary Session I**
	Neurological Therapeutic Medical Robot, PARO, for Non-pharmacological Therapy
	Professor Takanori Shibata
	Professor
	National Institute of Advanced Industrial Science and Technology &
	Tokyo Institute of Technology, Japan
10:30–11:00	**Break**
11:00–12:00	**Master Class II**
	Wearable A-I Based Fall Risk Assessment System
	Professor Jeffrey Tai-kin Cheung
	Professor
	Hong Kong Baptist University
12:00–12:45	**Plenary Session II**
	Active-user Approach to Active Ageing: Technologies to Empower Older Adults
	Dr. Younbo Jung
	Associate Professor
	Nanyang Technological University, Singapore
12:45–14:00	**Lunch**
14:00–15:00	**Master Class III**
	Gerontech Innovations for Local Seniors: Ageing in Place & Continuum of Care
	Professor Yong-ping Zheng
	Professor
	The Hong Kong Polytechnic University
15:00–15:45	**Workshop II**
	Application of Technology to Enhance the Users' Quality of Life in Residential and Community-based Rehabilitation Service
	Ms. Alice Leung & Ms. Connie Yiu
	Assistant Superintendent
	Tung Wah Group of Hospitals

15:45–16:15	**Break**

16:15–17:00 **Workshop III**

Use of Electronic Tablet Applications in Chronic Knee Pain Management for Seniors in the Community

Mr. George Kwok-cheong Wong
Senior Physiotherapist
Hong Kong Sheng Kung Hui Welfare Council Limited

17:00 –18:00 **Concurrent Paper & Poster Presentation Session I – IV**

Please refer to p.8 for details.

09:30–10:15 **Keynote Address III**

Multimodal Sensors in the Wild: Case Studies in Clinical and At-home Setting

Dr. Shehroz Khan
Assistant Professor
University of Toronto, Canada

10:15–11:00 **Workshop IV**

Preparing Gerontechnology Ambassadors through a Knowledge Transfer Model: The Lingnan University's Approach

Professor Joshua Ka-ho Mok
Vice-President
Lingnan University

11:00–11:30 **Break**

11:30–12:15 **Workshop V**

Silent Chair Dance for Dementia Patients – Experience a Reminisce Music and Dance Cognitive Training

Mr. Patrick Cheung
Founder and Managing Director
The Jade Club Management Limited

12:15–12:45 **Closing Ceremony with Award Presentation**

Closing Address

Professor Linda Yin-king Lee
Acting Dean and Professor,
School of Nursing and Health Studies,
The Open University of Hong Kong

Concurrent Paper & Poster Presentation Session

Room 1	Room 2
Session I (Paper Presentation)	**Session II (Poster Presentation)**
Intention to Use Mhealth for Chronic Disease Management among Chinese Older Adults Song Dan Christina Zhejiang Chinese Medical University Pang Cho Kwan Rebecca The Open University of Hong Kong Lee Tze Fan Diana The Chinese University of Hong Kong Lee Kok Long Joseph The Open University of Hong Kong P. 27	**Reflecting on a Student Capstone Experience on Enhancing Digital Self-efficacy of Older Adults in Long-Term Care** Samson Ki Sum Wong, Kevin Cheuk Hon Tang, Cin Wing Sze Yeung, Tsz Shan Yau and Kammy Hang Yi Chan The University of Hong Kong P. 28
Digital Technology for Aging Prevention Peter Young Bisware Technology Limited P. 28	**Health @ Community (健康・友里)** Wing Yi Lo, Hon Wai Lam and Yin Lam Bonnie Cheung Hong Kong Christian Service Bliss District Elderly Community Centre P. 26
The First One-stop APP for Carers Albert Au Acesobee Limited Moon Chan Hong Kong Federation of Women's Centres P. 22	**Technology-based Exercise Programmes for Fall Prevention in Older People** Yuk Seng Chung The Open University of Hong Kong P. 24
Feasibility Study of a Digital Screen-based Calming Device for Managing BPSD During Bathing in a Long-term Care Setting Gloria Gutman, Avantika Vashisht, Taranjot Kaur, Mojgan Karbakhsh, Ryan Churchill and Amir Moztarzadeh Simon Fraser University Gerontology Research Centre P. 25	**Transforming Elderly Care with Gerontechnological Nursing Innovations** Pang Cho Kwan Rebecca The Open University of Hong Kong Song Dan Christina Zhejiang Chinese Medical University Lee Tze Fan Diana The Chinese University of Hong Kong Lee Kok Long Joseph The Open University of Hong Kong P. 27
Room 3	Room 4
Session III (Paper Presentation)	**Session IV (Poster Presentation)**
How Can Elders Enjoy a Safe, Nutritious and Delectable Diet While They Suffer from Chewing and Swallowing Difficulties? Queenie Man Culture Homes P. 25	**Astri Open API HealthTech IoT Platform** Ran Bai, Fanky Yau and Tracy Lam ASTRI P. 22
HPCA ACP/AD, A Living Will System Design and Implement Based on National Pilot Studies in Mainland Zetao Zhang Hospice Palliative Care Alliance of China Foundation Lu Bai Beijing Haidian Hospital Yi Zhu Hospice Palliative Care Alliance of China Foundation Jianping Zhao Hospice Palliative Care Alliance of China Foundation Yuan Qin Beijing Haidian Hospital Zhaoping He Ovation Health International P. 30	**HPCP Pyramid, The Integration System of Hospice & Palliative Care: A System Construction and Evaluation Based on National Pilot Studies in Mainland** Zetao Zhang Hospice Palliative Care Alliance of China Foundation Yi Zhu Hospice Palliative Care Alliance of China Foundation Zhaoping He Ovation Health International Jianping Zhao Hospice Palliative Care Alliance of China Foundation Naning Wang Hospice Palliative Care Alliance of China Foundation Lu Bai Beijing Haidian Hospital Yuling He Hospice Palliative Care Alliance of China Foundation P. 29
Virtual Reality (VR) Rehabilitation Gaming Design Lee Cheng The Education University of Hong Kong Wing Yan Jasman Pang The Education University of Hong Kong Oi Lam Charis Lee Elderly home Hon Sum Chan The Education University of Hong Kong P. 24	**A Trial Study Using Colorimeter Capnometry to Verify the Nasogastric Tube Mal-placement among Patients at General Care Settings?** Cheng PPP Yan Chai Hospital P. 23
Metal 3D Printing in Gerontechnology: Precision Surgical Instruments and Future Development Ching Hang Bob Yung and Sze Yi Mak Koln 3D Technology (Medical) Limited P. 29	**Attitudes and Barriers toward the Use of Mobile Phones among Older People Living in the Community in Malaysia** Sharifah Munirah Syed Elias and Nur Alifa Nadia Mohd Riadh International Islamic University Malaysia P. 31

Keynote Speaker I

Professor Yeh-liang Hsu
Professor
Yuan Ze University, Taiwan

Professor Hsu received his bachelor's degree in mechanical engineering from NTU in 1985, and was conferred PhD by Stanford University in 1992. He then became a professor at Yuan Ze University, Taiwan, where he has had many important roles, including Secretary General and Dean of Academic Affairs.

Professor Hsu directed his research interest in design to the field of gerontechnology, and established the gerontechnology Research Center in 2003, which is the pioneering research institute in this field in Taiwan. He has published many papers, books and patents in gerontechnology, and is a renowned academic in this field. Professor Hsu has been actively involved in the International Society for Gerontechnology (ISG). He has chaired the 9th World Conference of Gerontechnology in 2014, and is concurrently Editor-in-Chief for "Gerontechnology" and IT Director of ISG.

In 2016, Professor Hsu founded Seda GTech Co. Ltd. Working with 8 young cofounders who were his students; Professor Hsu has been pushing gerontechnology research to real products for daily applications by the older adults and caregivers.

Keynote address I

From Gerontechnology Research to Daily Applications – Development and Implementation of an AIoT Bedroom for Senior Care

Gerontechnology is only valuable if the research can be turned into real products for daily applications. After decades of development, there are many research projects and technological products aiming to help older adults and their caregivers. However, few of these technological products have been widely adopted for the care of older adults. There is a huge barrier to overcome; the fundamental problems to be solved are often design issues rather than technology issues.

Gerontechnology Research Center (GRC) of Yuan Ze University, Taiwan, was established in 2003, the pioneering research instituted in this field in Taiwan. However, it was Seda G-Tech Co. Ltd., a start-up company spin-off from GRC in 2016, that strove to sell smart care products to the homes, that completely shifted the mindset of gerontechnology development from a technologist mentality to a designer mentality. In design thinking, empathy replaces technology to become the core of the design process.

A critical goal in gerontechnology product development at GRC is to support the caregivers by providing them information on the real-time status and long term pattern of the older adult. In this regard, the Internet of things (IoT) and artificial intelligence (AI) are compelling tools. Familiar artifacts at home, such as beds, carpet, and chairs, are designed into IoT/AI products. Older adults need not change their living patterns and behaviors, or learn how to use the technologies, but live in them. In this presentation, the AIoT bedroom for senior care is used as an example to illustrate the many practical issues encountered when promoting smart care products to be used in the homes.

Keynote Speaker II

Dr. Ryan Shaw
Associate Professor
Duke University, the United States

Ryan J. Shaw, PhD, RN is an Associate Professor and Digital Health Scientist at the Duke University Schools of Nursing and Medicine in Durham, NC, USA. He is also the faculty director of the Duke Mobile App Gateway – a digital health initiative of the Duke Clinical & Translational Science Institute.

Professor Shaw works with teams of scientists and clinicians to advance the field of precision health through the use of mobile technologies, known as 'Mobile Health' — the collection and dissemination of health information using mobile and sensing technologies.

His research is funded by the US National Institutes of Health and the US National Science Foundation, among others. The Health Innovation Lab he created is used as an accelerator to test new technologies and care delivery processes in both real and simulated clinical environments. The space includes a 20,000 square foot simulated hospital. Research from the lab has led to internal and external funding, product licensing, and company formation.

Professor Shaw is an ad-hoc reviewer for the US National Institutes of Health, has been featured in local and national media, and has presented to national and international audiences. He has published over 50 peer-reviewed manuscripts in health informatics, nursing, and medical journals. Lastly, he is a guest member of the mHealth Working Group of the Genomics Roundtable, at the US National Academy of Medicine.

Keynote address II

The Rise of Digital Health in Healthcare Systems: Caring for Aging Adults

Over 80% of older adults have at least one chronic disease and many have at least two. Chronic diseases such as heart disease, cancer, stroke and diabetes account for the majority of health dollars spent and can be attributed to almost three-quarters of all deaths worldwide. Thus for most aging adults, chronic disease management is necessary for good health, improved quality of life, and lower healthcare costs.

Because the majority of chronic disease care occurs in outpatient settings, digital health technologies may have a great impact in improving care delivery and health outcomes. Digital and mobile health technologies, such as wearable or carried devices and sensors that can be placed in the home, allow for the capture of physiologic, behavioral, and environmental data from patients' in-between clinic visits. This patient-generated health data can help reveal underlying mechanisms of health by filling in information gaps, including day-to-day health insights of an individual, allowing for better strategies to prevent and management acute and chronic illnesses. Moreover, with the proliferation of smartphone ownership rising across the world, the ability to collect these data from diverse socioeconomic and geographic populations is growing.

The integration of patient-generated data from digital health tools into health systems' electronic health records is allowing for innovative models of care delivery. Healthcare systems have reached a new era where digital health tools can be leveraged to support prevention and management of acute and chronic diseases for aging adults.

Keynote Speaker III

Dr. Shehroz Khan
Assistant Professor
University of Toronto, Canada

Dr. Shehroz Khan is a Scientist in the Artificial Intelligence and Rehab Robotics Lab at the KITE, Toronto Rehabilitation Institute, Canada. He is also cross appointed as an Assistant Professor at the Institute of Biomaterials and Biomedical Engineering, University of Canada. He holds a PhD Degree from the University of Waterloo, Canada in Computer Science with specialization in Machine Learning. His Phd research is one of the first works to formulate fall detection as an anomaly detection problem. Prior to joining academics, Dr. Khan worked for around 10 years in India and Ireland in various scientific and research roles in government and corporate sector.

Dr. Khan's main research focus is the development of zero-effort machine learning and deep learning algorithms within the realms of Aging, Rehabilitation and Independent Assisted Living. He currently leads the study on detecting agitation in people with dementia using multi-modal sensors. He is the project leader on an AGE-WELL funded study to validate a commercial wearable device from an industrial partner for developing spatio-temporal health indices for clinical support. He is a co-principal investigator on developing smart sensors framework to detect functional decline and social isolation in older adults post-hip surgery. He is a principal investigator on a study to assess the clinical validity of smart watches in cardiac rehab program. He is also a co-investigator on studies on developing predictive models on fall detection and sleep apnea.

Keynote address III

Multimodal Sensors in the Wild: Case Studies in Clinical and at-Home Setting

Wearable sensors provide a great opportunity to collect different modalities of health data, such as motion, heart rate, muscle movements, etc. These indicators are of great value to clinicians and caregivers to detect adverse events, monitor health conditions, or changes in behaviors. Multi-modal sensing provides a great opportunity to monitor various health indicators and build contextual profile of a person. Multi-modal sensing also leads to more robust predictive models. We will discuss two research studies that involve deploying multi-modal sensors in the wild, in a clinical and at-home setting. In the first study, we installed multi-modal sensors in a specialized dementia unit to detect episodes of agitation in people living with dementia. These sensors include a multimodal wearable device, sleep mat, ambient sensors and video cameras. We collected this unique data from 20 participants for over 600 days, and showed that multimodal wearable data significantly outperforms single sensors, and can detect agitation with 0.85 AUC. The challenges incurred in this study led to the development of an innovative system to seamlessly collect and store data on an encrypted cloud platform, to facilitate easier predictive modelling and saving time spent (human hours) on data collection. The second study is ongoing and is aimed at deploying multi-modal sensor system in an at-home setting to monitor functional decline and social isolation in older adults after discharge followed by post-hip surgery. This research further led to ethical questions around data collection, domestic surveillance, control and access people should have on their personal data.

Professor Takanori Shibata
Professor
National Institute of Advanced
Industrial Science and Technology &
Tokyo Institute of Technology, Japan

Professor Takanori Shibata received B.S., M.S. and Ph.D. in Electronic and Mechanical Engineering from Nagoya University in 89, 91 and 92 respectively. He was a research scientist at AIST from 93 to 98. Concurrently, he was a visiting research scientist at the Artificial Intelligence Lab., MIT from 95 to 98. At the AIST, Dr. Shibata was a senior research scientist from 98 to 13. He was the Deputy Director for Information and Communication Technology Policy, Cabinet Office of Japan in 2009 and 2010. Since 2013, he has been the current positions.

His research interests include human-robot interaction, robot therapy, mental health for astronauts in long-term mission (e.g. to Mars), and humanitarian de-mining. He was certified as the inventor of a seal robot named PARO, the World's Most Therapeutic Robot, by the Guinness World Records in 2002. He received many awards including the Japanese Prime Minister's Award in 2003, and The Outstanding Young Person of the world by the Junior Chamber International in 2004. In 2015, PARO was awarded the "Patient Trophy" as innovation of non-pharmacological therapy for dementia by the AP-HP, France. In 2018, Dr. Shibata was awarded the "Ryman Prize" that is the most prestigious award in the fields of geriatric medicine, welfare and health. In 2019, he had an invited talk at a symposium on "AI for Older Persons" at the headquarters of United Nation.

Plenary address I

Neurological Therapeutic Medical Robot, PARO, for Non-pharmacological Therapy

PARO, seal type robot, has seven types of movement (eyes, head up-down and right-left, front and back legs), a number of sensors (light, tactile sensors on the whole body and whiskers, microphones for speech recognition and sound localization, temperature sensor for controlling body temperature, posture, etc.), and artificial intelligence for learning specific functions (name and character features) and performing autonomous behaviors as mimicking living animals, especially Canadian baby harp seals.

Shibata conducted clinical trials of PARO in order to investigate its therapeutic effects and benefit those interacting with the device. In addition to further his research, he has collaborated with many researchers, physicians, practitioners, therapists, and professional and informal care-givers in medical and welfare fields around the world.

Research indicates that interaction with PARO promotes the psychological benefits of improving mood, reducing anxiety, decreasing perception of pain, improving depression, decreasing feelings of loneliness, enhancing sleep, and impacting Quality of Life through the provision of comfort and a sense of purpose. In addition, physiological effects include improved vital signs (reduction in blood pressure and pulse rates) and decreased stress, and social effects include improved communication skills.

In the case of elderly with dementia, PARO is noted to reduce BPSD (behavioral and psychological symptoms of dementia). In PTSD (post-traumatic stress disorder) and/or other disorders, interaction with PARO is reported to reduce or suppress negative symptoms such as aggression, agitation, and wandering. In the case of cancer patients, interaction with PARO can improve anxiety, reduce pain and mitigate fatigue. As PARO improves behavioral and psychosocial symptoms, dosage of traditional psychotropic medications can often be reduced or eliminated.

As the results of numerous clinical trials, including randomized control trials (RCTs), PARO was introduced into senior care. Now, more than 6,000 PAROs have been used in more than 30 countries in the world.

Plenary Speaker II

Dr. Younbo Jung
Associate Professor
Nanyang Technological University,
Singapore

Dr. Jung is Associate Professor and Associate Chair - Academic at the Wee Kim Wee School of Communication and Information, Nanyang Technological University, Singapore. Dr. Jung earned his Ph.D. at the Annenberg School for Communication and Journalism at the University of Southern California.

In teaching, Dr. Jung received four teaching-related awards at NTU, including Nanyang Education Award (University) - Bronze in 2014. He is the inaugural fellow of Teaching Excellence Academy since 2014. In research, his interests include socio-psychological effects of interactive media such as video games, virtual reality systems, human-robot interaction, and their applications in education and medical aids for seniors. For example, his research examined the use of virtual reality and haptics-enhanced systems for learning motor functions in stroke rehabilitation, patient/clinician distribution platform with tele-rehabilitation application, the internet and computer training for seniors, the effect of social robots' embodiment on their meaningful social interaction with humans, and the use of video games and social TV for seniors' subjective well-being and intergenerational bonding. Dr. Jung supports interdisciplinary research and has successfully collaborated on many research projects with scholars in computer science, electrical engineering, physical therapy, and social work.

Plenary address II

Active-user Approach to Active Ageing: Technologies to Empower Older Adults

Human beings have long desired to live longer, and now our advances in technology and medicine have made this dream possible. However, greater life expectancy comes with a price. As the elderly population rise, we are facing inevitable challenges such as social isolation, loneliness, and increased depression rates among the elderly. While there have been several initiatives with good intentions in mind, involving innovative uses of technology, such as smart sensors or remote monitoring systems at home, they may be limited in their ability to allow the elderly to truly live independently. Many current innovations targeted at the elderly are designed to help those who are weak and frail. But this stereotypical image of the elderly is hardly an accurate description of many seniors who can and want to lead an active life with dignity and autonomy. As such, an important question is how to support the elderly in developing the appropriate capacities to flourish in a fast-changing society. In this talk, I will present my research that takes an active user approach where technology is used to empower the elderly to live independently and with dignity in the envisioned smart nation of Singapore. The presentation will include studies that address a common myth related to the elderly and their use of new technology, and empirical data supporting the effectiveness of technology on the enhancement of seniors' subjective well-being and intergenerational bonding.

Exoskeleton Robotics and AR system for Rehabilitation

Professor Raymond Kai-yu Tong is a biomedical engineer and he is currently a professor and chairman in the department of Biomedical Engineering, CUHK. His research interests include Rehabilitation Robotics (e.g. Hand of Hope), Brain-Computer Control Interface (BCI), Neural Engineering, Functional Electrical Stimulation(FES) and Cognitive Assessment Software. Prof. Tong is recognized for his accomplishment in innovation and applied scientific research in neuro-rehabilitation for stroke patients and the elderly. Over the years, he has made great strides in developing a wide range of rehabilitation devices. His innovative work on rehabilitation robot system "Hand of Hope" was the first Hong Kong invention to have received the grand prize in the 40-year history of the International exhibition of inventions of Geneva. His research, innovation and service have received awardee of the 2013 Hong Kong Ten Outstanding Young Persons; Winner Award (e-Health) in the Asia Pacific ICT Award 2012; and HKIE innovation awards for young members(2008), gold awards in international invention exhibitions (04', 07',10',15' &16'). http://www.bme.cuhk.edu.hk/kytong

Professor Raymond Kai-yu Tong
Professor
The Chinese University of Hong Kong

Abstract:

Effective motor recovery after stroke depends on intensive voluntary practice of the paretic limbs. We developed interactive control strategies to control different rehabilitation training systems for hand and lower limb training in clinical trials using exoskeleton rehabilitation robot. The system incorporated the EMG and EEG as the bio-parameters to indicate the voluntary effort from a subject. We applied these engineering-based technologies in the field of Neurorehabilitation, robotic system uses electric motor to provide external assistive force during the rehabilitation training. Wearable designs had been developed to attach the exoskeleton system on hand and lower limb to generate functional movement for training. The clinical studies showed functional improvement in the clinical outcome measures on the upper limb and lower limb after the exoskeleton robotic training for 20-session on stroke survivors.

Another technology is AR System which is an intelligent platform with interaction, motivation for real-time monitoring of the body movements of the user during an exercise programme. It uses the state-of-the-art 3D body tracking technology to provide objective, accurate and comprehensive data on movement range, response, time and accuracy. Visual and audio feedback are provided to make the training more relaxing, interesting and convenient. Fifteen exercises (10 generic and 5 tailor-made exercises based on individual center's requirements) are provided to cover a wide variety of options. Instant AR visual and audio feedback assist the subjects to complete the exercise tasks correctly, without the need of continuous assistance and monitoring by a clinical staff.

Gerontech Innovations for Local Seniors: Ageing in Place & Continuum of Care

Professor Yong-ping Zheng
Professor
The Hong Kong Polytechnic University

Professor Yong-ping Zheng has been serving as the Founding Head of the Department of Biomedical Engineering in The Hong Kong Polytechnic University (PolyU) during 2012-2020. He is currently the Director of the Jockey Club Smart Ageing Hub. He has been appointed as Henry G. Leong Professor in Biomedical Engineering since July 2017. Professor Zheng received the BEng and MEng in Electronics and Information Engineering from the University of Science and Technology of China. He received PhD degree in Biomedical Engineering from PolyU in 1997. After a Postdoctoral Fellowship at the University of Windsor, Canada, he joined PolyU as an Assistant Professor and was promoted to Professor in 2008, and Chair Professor in 2019. He served as the Associate Director of the Research Institute of Innovative Products in PolyU from 2008 to 2010. He also serves as the Director of Jockey Club Smart Ageing Hub since 2017. Prof. Zheng's main research interests include biomedical ultrasound, wearable sensors for healthcare, and smart aging technologies. He is a Senior Member of Institute of Electrical and Electronics Engineering (IEEE), a Fellow of Hong Kong Institution of Engineers (HKIE), Secretary of World Association of Chinese Biomedical Engineers (2017-2019). He has trained 12 PhD and 9 MPhil students, and over 10 postdoctoral fellows. He is currently supervising 9 PhD. He is also an inventor of more than 50 patents, published over 250 journal papers, and wrote a book "Measurement of Soft Tissue Elasticity In Vivo: Techniques and Applications", several technologies invented by his team have been successfully commercialized, including Scolioscan (http://scolioscan.com), an ultrasound device to provide radiation-free assessment of scoliosis. He also served as Associate Editor and Editorial Board Members for many journals.

Abstract:

Background

Hong Kong is facing big challenge of a rapidly ageing population. The estimated ratio between the working to elderly population will be 2:1 by 2035, while it is about 4:1 now, and 10:1 in 1980. With joint effort of researchers and developers, many innovative technologies are being developed for tackling this global phenomenon. To bridge the gap between research and practice use of gerontechnology devices, it is crucial to build a common platform to bridge different stakeholders for providing innovative while effective technological solutions for ageing.

Methods

With a generous support of HKD48M (US$6.2M) from The Hong Kong Jockey Club Charities Trust, The Hong Kong Polytechnic University launched the project entitled "Jockey Club Smart Ageing Hub (JCSAH, http://www.polyu.edu.hk/ageing)", in Dec 2017. JCSAH provides an interdisciplinary platform for researchers, industrialists, caregivers, non-government organizations, professionals, ageing service providers, elderly, students, policy makers, etc. to interact with each other to develop and adopt innovative and quality technology products that best fit for the elderly. Through showcasing cutting-edge gerontechnology and assistive products from around the world, the project aims to raise public awareness about the benefits of applying innovative technology in supporting ageing in place and continuum of care.

Results

JCSAH has attracted great interests of various stakeholders, A "Day Experience Centre" was established within The Hong Kong Polytechnic University campus (the "Centre")in Oct 2018. The Centre contains 4 key areas: a thematic zone for raising public awareness on common elderly health issues, an interactive experience zone for trial of advanced technology, a smart home show flat installed with various innovation technologies and a resource library for display and trial of categorized gerontech items. Through showcasing gerontechnology products, conducting demonstrations, exhibitions, workshops and experiential activities, the Centre aims to demonstrate the application of ageing-in-place technology to the public. Besides, JCSAH collaborates with 4 non-governmental organizations to set up "Real-life Hostels" as examples of adoption of gerontech in elderly nursing hostels. Appropriate gerontechnology devices, such as eNightLog, Smart Interactive Dolls etc. were installed in hostels for the staff to support elderly, thereby relieving the work pressure of frontline staff. Industrial visits were arranged in 2019, to let cross-boundary stakeholders see in-person the implementation of the gerontech and to encourage the industry to make good use of technology for providing quality elderly services.

Discussion

Since 2017, the JCSAH project has built a cross-region & cross-sector network with worldwide working partners. The project drew thousands of visitors from far and wide to visit the Day Experience Centre and Real-life Hostels, joined gerontech-related exhibitions, workshops, seminars and symposiums that were organized by the JCSAH. Thus, the potential for bridging of such an interdisciplinary hub has already been demonstrated. JCSAH is eager to collaborate with more stakeholders working on gerontechnology.

Master Class III

Professor Jeffrey Tai-kin Cheung
Professor
Hong Kong Baptist University and
Booguu Company Ltd.

Wearable A-I based Fall Risk Assessment System

Dr. Jeffrey T. Cheung graduated from Harvard University with a PhD degree in Chemistry. After working for two years in Oak Ridge National Laboratory, he joined Rockwell International Science Center and spent the next 31 years working on a diversity of challenging projects including synthesizing new materials by high power laser ablation, thin film devices, and harvesting power from random ocean waves. After retirement, he joined Hong Kong Baptist University as a visiting professor in the Department of Physics for 6 years and ventured into a new research area to study human motion both in static state and dynamic state with inertial measurement unit. In 2016, he founded Booguu Company to commercialize his inventions. His dream to invent something that is socially relevant is finally realized in the "A-I based Fall Risk Assessment System". In his spare time, he pursues his hobby in origami as a way to relax and keep his mind busy at the same time.

Abstract:

As demography is shifting toward an aging population, elderly fall has become a significant health care challenge. Traditional task-based fall risk assessment methods such as Timed Up and Go, Romberg's Test and few others lack sufficient sensitivity and breadth to take all fall-causing factors into consideration and are effective only with those highly frail and at significant risk. However, the moderately at-risk elders that make up more than half of the elderly population in Hong Kong also need an accurate fall risk assessment to raise their early awareness and receive intervention to reduce risk. Advanced medical equipment such as Electronic Walkway and Balance monitoring apparatus are effective in this aspect. But their usefulness is limited due to their bulkiness, high cost, operational complexity and scarce availability. We have developed an award-winning portable fall risk assessment system to address this need. The core hardware is a triaxial inertial measurement unit (IMU) with accelerometer, gyro and magnetometer to capture motion with high position and temporal accuracy during a series of activities. The data will be analyzed on a cloud platform to extract information relevant to fall risk such as the sensor functionality, neuro-musculoskeletal interaction during static Postural Balance; the gait variability/symmetry during walking; and the lower limb strength during Sit to Stand test. Results are compared with golden standard to generate an A-I based Fall Risk Assessment score and report in less than five minutes. The time saving feature, low cost, high performance and versatility make this system an ideal tool to serve a large community or be used for personal health monitoring.

Workshops

Workshop I

Optimizing Management of Schizophrenia: An Update of Treatment Strategies

Dr. Victor Wing-cheong Lui
Clinical Assistant Professor (honorary)
The Chinese University of Hong Kong

Schizophrenia is a chronic, disabling, and relapsing psychiatric condition that has a significant impact on the quality of life of both patients and their caregivers. The antipsychotic treatment has been the mainstay treatment for schizophrenia since the 1950s. With the advance in technology, more treatment options are available, so that the clinical outcome can be optimized while the burden of patients and their caregivers can be minimized. This lecture will review various treatment options, including the latest second-generation long-acting injectables, and how these options improve the quality of life of patients and their caregivers.

Workshop II

Application of Technology to Enhance the Users' Quality of Life in Residential and Community-based Rehabilitation Service

Ms. Alice Leung and
Ms. Connie Yiu
Assistant Superintendent
Tung Wah Group of Hospitals

The population is getting older and we have to address the emerging changes arising from the problem of ageing. Gerontechnology therefore becomes a trend for general population as well as people with disabilities to alleviate the burden of carers as well as to increase the users' independency. Rehabilitation plays an essential role in such an aspect to improve the functional abilities and to maximize the potential of our health declining clients. In enhancing the quality of life and promoting respect for the inherent dignity of our users in residential and community-based service, we have applied new technology in recent years. The application of Virtual Reality in rehabilitation training, 3D printing technology in fabricating of rehab aids, D3-bladder and intelligent fitness equipment in active aging and computerization of Central Drug Management System, are the milestone and strategic directions to the future development of rehabilitation service.

Workshop III

Use of Electronic Tablet Applications in Chronic Knee Pain Management for Seniors in the Community

Mr. George K.C. Wong
Senior Physiotherapist
Hong Kong Sheng Kung Hui Welfare
Council Limited
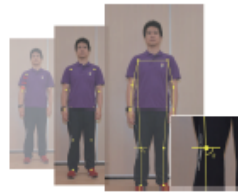
Chronic knee pain, which may be consequential to degeneration, is one of the most common concerns and causes of disability of the elderly. With updates in healthcare knowledge, it is well-known that traditional medication can only achieve short-term symptom relief for degenerative knee pain. Intervention for degenerative knee pain nowadays does not focus solely on pain and physical disability, but also on the impacts to the elders in their various psychosocial aspects, which lead to negative impact on their social life circle and quality of life. Healthcare practitioners have adopted patient empowerment, weight control and regular exercise as the keys to successful chronic pain management.

However, even the benefits of exercise have been widely spread, the nurture of relevant exercise skills and the formation of a regular exercise habit for the elderly are always difficult to healthcare practitioner in the community. In recent years, incorporation of new technologies to assist and facilitate the practitioners in these aspects have received astonishing positive feedback. The choices vary from simple machinery device to giant complex robotic facility. In our "E-Generation Chronic Knee Pain Management Project for Senior", instead of producing groundbreaking hardware from nothing, we made use of one of the most commonly used electronic product, even among senior citizens, the electronic mobile tablet, to achieve our purpose to promote chronic knee pain management. The combination of simple elements of game, exercise and electronic tablet applications gives us mind-blowing insight for our future practice in the community.

Workshop IV

Preparing Gerontechnology Ambassadors through a Knowledge Transfer Model: The Lingnan University's Approach

Professor Joshua Ka-ho Mok
Vice-President
Lingnan University

With the nomination for the "HKSAR Chief Executive's Community Project List", The Hong Kong Jockey Club Charities Trust donated a three-year project (2019-2022) to Lingnan University. The project named 'LU Jockey Club Gerontechnology and Smart Ageing Project' aims to promote gerontechnology and support smart aging socialpreneurship development. This project also serves as an educational platform to provide training courses and workshops on "Gerontechnology in Healthcare, Dining, Living and Transport'. Baseline studies will be conducted to build a database in the areas of gerontech products and services, social innovation, and startups, with a vision to offer policy recommendations to the industry and Government.

Abstract of Papers

Abstract 1

The First One-stop APP for Carers

Albert Au
Acesobee Limited

Moon Chan
Hong Kong Federation of Women's Centres

Background

Community carers are always shadowed by their principal care recipients in mainstream services. Many carers suffer from mental and physical health problems due to the social isolation and financial insecurity arising from prolonged caring of their beloved ones. They can hardly access or adjust their caring routine to reach social services and support. A one-stop carer-centred APP was developed as the solution.

Process

The All Brilliant Carer (ABC) APP funded by the Hong Kong Jockey Club mapped the carer needs through the perspective of a carer journey in a life planning approach. At their fingertips, the carers get:

1. supportive information/resources and practical tips
2. nearby carer classes/cafes for learning and relaxation
3. nearby part-time job opportunities for employment and connection
4. carer life planning

Preliminary observations

Since the launch of the App in Oct 2018, more than 1,200 carers registered, and 80% are carers of elders. The APP empowers the carers to self-serve in their own pace and convenient time. The online class registration, waitlist and class attendance alerts provide peace of mind for the carers.

It attracts both the hidden and the busy carers and facilitates the matching up of needy carers to social workers for follow-up. The digital approach provides the real-time evidence of carers' needs/interests such that the social workers can plan and respond timely and effectively.

At time of COVID-19, the APP finds its value – not merely a platform for dissemination of news and information, but also the hub of the much needed emotional support for the frustrated and stretched carers.

Conclusion

The development and utilization of the ABC APP go beyond traditional IT or social service delivery. The strategic alliance of like-minded partners, e.g. IT, NGOs and funders can ignite new ideas into practical tools to benefit the broader community.

Abstract 2

Astri Open API HealthTech IoT Platform

Ran Bai, Fanky Yau and Tracy Lam
ASTRI

Astri Open API HealthTech IoT Platform (AOAHIP) is an IoT platform for healthcare service providers.

Nowadays, multiple sensing devices are widely deployed at the healthcare service center. However, it is hard to manage these various sensing devices, as they are from different organizations and run by different computing platforms. Our AOAHIP aims to increase the efficiency of healthcare service of the aged, by providing a unified IoT platform to manage the healthcare sensing devices as well as their back-end computing systems. In this way, effective and efficient IoT devices management and provisioning are achieved by using AOAHIP. On the other hand, data collecting from different sensing devices, i.e., data silos, prevent from seeing the big picture of the elderly's

health conditions. So Upon AOAHIP, we develop a data integration tool to integrate data from different sensing devices effectively. It is an important tool as it may help to reveal more scientific finds between elderly's living habit and health conditions. Also, by using this data integration tool, along with AI and BI tools, healthcare service providers can analyze, monitor and evaluate the health level of the elderly more efficiently. In ICG, we'd like to present our AOAHIP as a poster.

Abstract 3

A Trial Study Using Colorimeter Capnometry to Verify the Nasogastric Tube Mal-placement among Patients at General Care Settings?

Cheng PPP

Yan Chai Hospital

Background

The gastric aspirate pH checking ≤ 5.5 & X-ray imaging are considered as gold standard and widely accepted as the most reliable test to assess Nasogastric tube (NGT) placement. This study aims to demonstrate the reliability of colorimeter to serve an additional screening tool for identification of tube placement if the gastric aspirate could not be obtained.

Objectives
- To ascertain the accuracy of colorimeter, with radiographic examination as the reference standard, to verify the NGT placement for patients
- To assess the time lag from change of NGT to resume feeding of the patient.

Method
- A prospective descriptive study by convenience samplings were obtained from Medical extended care wards.
- The colorimeter device was used for testing the presence of CO_2 in the NGT.
- Patients with undetermined NGT placement were firstly tested by the colorimeter device at the bedside, then sent to X-ray imaging for further verification.

Results & Conclusion
- 70/71 episodes of undetermined NGT placement (positive cases) were verified by both the colorimeter and X-ray imaging.
- The sensitivity of CO_2 colorimeter for confirmation of NGT location was 98.6%.
- The positive predictive value was 100% indicating the accuracy of CO_2 colorimeter forruling out tracheobronchial insertion.
- Due to lack of negative X-ray confirmation cases, the specificity and the negative predictive value of the CO_2 colorimeter were unable to determine in this study.
- On average, the cases may need to wait 6 – 7 hours after NGT change before feeding resumed. The waiting time involved X-ray imaging and physicians' interpretation.
- The combination of epigastric auscultation with colorimeter capnometry is found highly sensitive for ruling out NGT tracheal or bronchial insertion. The device acts as an alternative to confirm NGT placement when X-ray examination is not accessible. It is easy to perform, saves time and money, and helps to minimize patient unnecessary exposure to radiation.

Abstract 4

Virtual Reality (VR) Rehabilitation Gaming Design

Lee Cheng
The Education University of Hong Kong

Wing Yan Jasman Pang
The Education University of Hong Kong

Oi Lam Charis Lee
Elderly home

Hon Sum Chan
The Education University of Hong Kong

Recent advancements in communication and computer technology have made available and affordable the immersive technology necessary for broader applications beyond entertainment and industrial use. Research in healthcare and medical professions has attempted to utilize the immersive and motivational effect for rehabilitation, which revealed the benefits as well as precaution to be taken for the practice of VR rehabilitation in clinical and therapeutic settings. However, little attention has been given to the application of VR for the healthcare treatment of the elders and people with disabilities (PWDs). With the growing population of the elders and the uprising minority rights of the PWDs, this presentation reports the work-in-progress of the development of a serious game in the form of virtual reality (VR) for the rehabilitation training of the elders and PWDs.

Taking care of the educational affordance and the learning needs of the targeted participants, the VR gaming software includes a range of mini-games that could be easily achieved and entertained while at the same time do not require excessive motoring input from the players. Preliminary idea of those mini-games incorporates interactive elements for music and arts therapy, as well as rehabilitative exercises such as cognitive and physical training in the daily life context. Further study direction includes clinical research that examines the effectiveness of VR gaming for rehabilitative.

Abstract 5

Technology-based Exercise Programmes for Fall Prevention in Older People

Yuk Seng Chung
The Open University of Hong Kong

Background:
Falls are common in aging population and always result in severe injuries or even death. Disorders with gait and balance, and loss of muscle strength are the major causes of falls in this population. Regular exercise strengthens the muscle and improve balance and coordination. Studies suggested technology is a way to address this important health issue.

Aim of the study:
To provide an overview of technology used in exercise training for older people to prevent fall.

Methodology:
The review used key terms and Boolean operators in Scopus, Biological Science Database, MEDLINE/PubMed, Science Citation Index Expanded, and ProQuest Research Library for research articles related to the area of enquiry. Fifty-eight articles met the inclusion criteria, 36 discarded due to duplication and 16 removed since irrelevant material. Six articles were included in the literature review.

Results and discussions:
Several new technologies were identified to engage older people to exercise training, including virtual reality environment, robotic devices, exergames, and digital application. Participants in these studies showed positive attitudes toward using the new resources. Most of them enhanced their muscle strength, balance, and cognitive function after joining the exercise programmes. However, only one study assessed and proved that the fall risk score of its participants had been significantly improved.

Conclusion:

Using technology to promote exercise in older people is feasible with good acceptance from the users. This innovative approach motivates older people to exercise regularly so as to improve their cognitive and motor function. Further studies are needed to determine the effectiveness of these technologies in reducing fall risk in older people.

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Abstract 6

Feasibility Study of a Digital Screen-based Calming Device for Managing BPSD During Bathing in a Long-term Care Setting

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Background:

Behavioral and psychological symptoms of dementia (BPSD) are common and disturbing and can deter or disrupt the care process1. Bathing is associated with the highest frequency of BPSD2, triggering a fear response in dementia patients3. As part of a larger feasibility/pilot study this investigation explored whether exposure to MindfulGarden (MG), a digital screen-based calming device, can minimize BPSD during bathing – an activity well-documented to be problematic for both residents and staff.

Methods:

8 Long Term Care home residents (5F, 3M) mean age 86.00 ± 8.16, diagnosed with dementia and reported by care staff as exhibiting BPSD were observed while being showered in their en suite bathroom. On Days 1 and 2 staff followed usual bathing procedure; on Day 3 exposure to MG was added. A 26 item checklist developed in a previous study, based on the Cohen-Mansfield Agitation Inventory and the work of Gutman, MacFadgen and Killam, was used to record type and frequency of BPSD, time of staff entry and exit from the resident's room was recorded, and on Day 3 staff rated MG exposure as having positive, neutral or negative effect.

Results:

Days 1 -2 yielded highly similar results – an average of 4 BPSD per resident and an average bathing time of 13 minutes, with the most common BPSD on both days being physical resistance, verbal resistance and screaming, and complaining and strange noises. Subsequent to exposure to MG (Day 3) trends were observed towards reduction in number of BPSD and bathing duration.

Conclusion:

MG shows some promise in calming residents, reducing resistance to care and allowing bathing to proceed more quickly.

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Abstract 7

How can Elders Enjoy a Safe, Nutritious and Delectable Diet While They Suffer from Chewing and Swallowing Difficulties?

Queenie Man
Culture Homes

Caregivers and institutions are recently on the search for diet options beyond just blended meals or porridge, but diet options that enable elders to truly enjoy their meals in a safe, dignified and enjoyable manner. During the session, Culture Homes will share with you Japan's dysphagia diet solution, and their experience in creating and implementing softmeal dishes in elderly homes and at home.

Abstract 8

Health @ Community
(健康・友里)

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District Elderly Community Centre

Background:
The Polytechnic University of Hong Kong's research exploring age-friendliness of Kwun Tong District in 2016 identified seniors with special needs experienced insufficient community support and health services. Hong Kong Christian Service thus, launched "Jockey Club Age-friendly City: Health@ Community" Project with support from the university's research team.

Aims:
- Raising senior's awareness of prevention and self-management of chronic diseases;
- Building up neighborhood support network for encouraging and sustaining healthy lifestyles;
- Promoting inter-sectoral primary healthcare system in the community.

Methodology:
The intervention was divided into 3 tiers:

1.	Awareness Enhancement:	• Conducted community education to promote self-management of chronic diseases and encourage in using Mobile Apps for self-monitoring of health conditions.
2.	Neighborhood Support:	• Senior volunteers and nursing students co-designed accessible and affordable recipes and aerobic exercises to seniors and shared it widely through E-platforms.
3.	Risks Identification:	• Set up Community Clinic by multi-professionals to provide regular health consultation and case management for seniors with chronic diseases. • Adopted Telemedicine to support seniors with less mobility to attend the Community Clinic. • Volunteers used home-based technology and communication assistance for seniors to receive medical consultations from pharmacists via Social Networking Service at home.

Results and discussions:
1. Knowledge and confidence in disease management and prevention, especially on areas related to chronic diseases of 261 seniors and 33 senior volunteers were increased ($p=0.05$).
2. Both seniors and volunteers acknowledged positive experience of detailed and immediate medical consultation from professionals through Telemedicine, which demonstrated Telemedicine as an age-friendly way to help seniors with special needs in health management.
3. Sense of self-efficacy and empowerment of the volunteers to contribute to community were enhanced.
4. Community-based primary healthcare system by progressive and client orientated intervention evolved.

Conclusion:
The project signified "Enhancing individual self-management of health", "Strengthening Neighborhood Support" and "Promoting Medical-Social Collaboration" as key factors of primary health care-oriented and age-friendly community.

Abstract 9

Transforming Elderly Care with Gerontechnological Nursing Innovations

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Lee Tze Fan Diana
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The population in Hong Kong is ageing rapidly. It is estimated that the number of people aged 65 or above will be increased from 1.16 million (16.6% of the total population) in 2016 to 2.59 million (36.6% of the total population) in 2066. This rapidly ageing population poses various challenges to the health and social care services in Hong Kong. It is suggested that technological interventions could help to tackle these challenges and to improve the quality of life of older adults and facilitate ageing-in-place. Nevertheless, it has been considered that an over emphasis on applications of technology in aged care could only result in a simplistic, mechanistic and narrow-focused view of caring. It is therefore argued that a comprehensive gerontechnological caring framework is necessary to help instigating the delivery of a CARE-focused [i.e. customized, active, rejuvenating and enabling] gerontechnological nursing innovations so as to compensate and assist aged care support and organization. The proposed framework could also act as a guide for evidence-based clinical practice to support healthy & active ageing, and to help countering declines in physiological functioning, physical skills & activities, cognition & perceptual abilities, and social interaction of the elders. Using clinical possibilities, how the said framework could help initiating gerontechnological nursing innovations to promote health & self-esteem, assist daily living, enhance communication, facilitate independent living and compensate frailty of older adults will be explicated and discussed.

Abstract 10

Intention to Use Mhealth for Chronic Disease Management among Chinese Older Adults

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Background:
Mobile health (mHealth) apps might have the potential to promote self-management of older people with chronic diseases. However, it is known that older adults continue to lag behind their younger counterparts when it comes to mobile technology adoption.

Objective:
The aim of this study was to examine factors that influence intention to use mHealth among Chinese older adults.

Methods:
The Unified Theory of Acceptance and Use of Technology (UTAUT) model was used to guide this cross-sectional correlational study. Convenience sampling was used to recruit participants from 2 community healthcare centers.

Results:
A total of 251 older adults participated in this study. Perceived health threat ($\beta = 0.116$, $P=0.007$), perceived usefulness ($\beta = 0.129$ $P=0.042$), health literacy ($\beta = 0.181$, $P=0.0424$), and support from healthcare providers ($\beta = 0.272$, $P<0.001$) were significantly associated with intention to use mHealth.

Conclusions:
Researchers should consider using participatory approach in developing their interventions and provide more technical support for older adults to facilitate the uptake of mHealth among older adults.

Abstract 11

Reflecting on a Student Capstone Experience on Enhancing Digital Self-efficacy of Older Adults in Long-Term Care

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Tsz Shan Yau and
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Background

Scholars (Gatti et al., 2017) believe that enhancing digital self-efficacy of seniors would be a key to closing the digital divide, which poses barriers to Active Ageing. Researches (Schutter and Vandenabeele, 2008; Jung et al., 2009) suggest that entertainment game-play could serve beyond cognitive training to improve older adults' self-image, self-esteem and willingness to adapt to the information age.

Aim of the Project

At HKU, five gerontology students sought to enhance digital self-efficacy of residents of a long-term care facility, by optimizing a positive intergenerational leisure gaming experience for seniors.

Intervention

Four one-to-one personalized tablet gaming sessions were held at a care-and-attention home. Participants were five baby boomers residing in long-term care with little or no prior experience in using smartphones. Exclusion criteria include aphasia, severe stroke and compromised fine motor skills.

Residents were introduced to a selection of entertainment games such as arcade games (e.g. Fruit Ninja) and cooking simulation games (e.g. Cooking Mama) to co-play and to compete with students. Pre and post measurement of perceived game enjoyment, self-efficacy and perception towards use of information technology were administered.

Abstract 12

Digital Technology for Aging Prevention

Peter Young
Bisware Technology Limited

Last year, I was invited by Institute of Active Aging(IAA), Polytechnic University of Hong Kong to design and teach a 5-day course on digital technology for its members. This course is funded by the Office of Government Chief Information Officer (OGCIO)via a program called "Enriched ICT Training Program for the elderly". The objective of this program is to enhance the elderly's ability and interest in using digital technology. My course, "First Step for Building a Robot", has three parts in each of the five sessions. The first part is a video show on a robot (I call it Bobbybot) created by me in 2017,the second part is a lesson on Arduino related stuff (a microcontroller board used widely in small robots)and the third part is a DIY workshop. Students (all of them above 60 years old) are required to use the knowledge and skill learned in the second part to do some tasks with an Arduino board. At the end of the course, students are expected to understand the concept of building simple electronic-driven device(s)but they are not required to make a robot.

The course was well-received by most students. Only 1 (out of 20) student dropped-out after the first session. IAA wants me to continue with this project. Unfortunately, the arrangement was prevented by last year's social unrest then followed by recent virus epidemic. Hopefully, I can restart this project after the virus attack. My conclusion is that digital technology can be used in life-long learning for aging prevention. Therefore, I want to share it as a Case Study in your conference

Abstract 13

Metal 3D Printing in Gerontechnology: Precision Surgical Instruments and Future Development

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3D printing is a rising star in the hypermodern technological era where the market is looking for customized solutions tailor made to their needs, and an area the emerging field of gerontechnology can look to benefit from. Currently in use in Hong Kong are metal 3D printed Precision Surgical Instruments(PSIs), customized to each patient's unique anatomy and particularly benefits geriatric patients with ailing skeletal health. Elderly patients commonly suffer from chronic conditions, degenerative arthritis being the prime culprit of joint pain amongst higher age groups. Customized PSIs allow surgeons to preplan the exact surgical solutions and execute them in a consistent and timely fashion. The multitude of post-operative benefits is particularly imperative to elderly patients. Decreased surgical incision size commonly enables quicker recovery time and superior surgical efficacy. Reduced surgical time also lowers risks of anesthesia related complications prevalent in the elderly population such as postoperative delirium and infection. The Customized PSIs' design and manufacture time of 2-5 days perfectly complies with the pre-operative time scale of such an operation, giving ample time for surgeons to map out surgical procedures yet short enough so to resolve the condition quickly. Customized PSIs have seen increasing surgical prevalence in the past two years in Hong Kong, being used in over 20 clinical cases, assisting surgeons in tackling orthopaedic conditions ranging from pelvic fractures to knee degenerative arthritis. Surgeons in Mainland have taken Customized PSIs to the next level by introducing them in minimally invasive–percutaneous surgery. It overcomes the challenge of extensive use of imaging instruments, which is fairly time consuming whilst potentially harmful to patients and exacting a heavy financial burden on the hospital. We see immense potential in the future development between the confluences of these two fields and anticipate breakthroughs in 3D printed medical devices and implants.

Abstract 14

HPCP Pyramid, The Integration System of Hospice & Palliative Care: A System Construction and Evaluation Based on National Pilot Studies in Mainland

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Background:
Mainland is facing a rapidly aging population, and the number of elderly suffering from terminal illnesses has also escalated correspondingly. The gap in Hospice & Palliative Care for end-of-life patients is huge. Broken medical systems and fragmented medical services, lack of gerontechnology support, the advancement of the first regional pilot program of hospice palliative care from 2016, and many obstacles at the policy and institutional levels, which restrict the piloting of hospice palliative care and the promotion of its experience.

Objective:
Based on the continual improvement of two batches of national pilot studies in Mainland that the authors participated in, establish a pyramid network & system "Hospice Palliative Care Initiative/Pyramid"(HPCP), optimize service delivery methods, improve system efficiency, integrate and reshape service systems, and provide a set of sustainable medical and social integration solutions with Chinese characteristics.

Methods:
ABCDE(AI+Blockchain+Cloud+bigData+Edge) computing technologies guided by theories from Synergetics, ICF(International Classification of Functioning, Disability and Health), PSP(Primary Service Provider), Interorganizational Network, Comfort for Outcomes, and adopted integration strategies with

TDT(Trans-Disciplinary Team), MDT(Multi-Disciplinary Therapy), Multi-Agency Service Pathway and IDS(Integrated Delivery Systems).

Results:
Established the HPCP hospice palliative care model and informatics system and improve the model with Mitchell score-based approach and Delphi method based on system perspective. Evaluated the application of this HPCP system using the combination of qualitative and quantitative methods.

Conclusions:
The authors shared the pathway to partner across disciplines, with policy makers, and in research, education and practice. The construction of HPCP integration of hospice palliative care system with Chinese national conditions based on pilot studies in multiple regions, will provide a more scientific and effective basis and important reference value to establish the National Hospice Palliative Care system in Mainland, also achieve the optimization of end-of-life medical and social care resources allocation and the improvement of the quality of death.

Abstract 15

HPCA ACP/AD, A Living Will System Design and Implement Based on National Pilot Studies in Mainland

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Background:
Living Will(Guardianship by Conduct) is recognized as an integral part of care for everybody especially elder people or patients with advanced progressive disease. Medical treatment and care plan decisions must be carefully made according to the best interests of the aged or patient, taking into account his/her expressed wish, preferences and values, and weighing benefits, risks and burdens of treatment options.

Creating and executing a Living Will is cumbersome and disjointed process today in Mainland, is manual and inefficient.

Aim:
Based on the national pilot studies that the authors participated in, "Hospice Palliative Care Initiative/Advance Care Planning & Advanced Directives"(HPCA ACP/AD) system is developed to provide practical guidance, and serves to standardize forms to facilitate Living Will in clinical operation.

Methods:
Digitizing the Living Will and making it available to the concerned parties, provides a legal consensus platform for healthcare patients and providers on Blockchain. Addresses key fundamental issue of patient identity across care continuum, consensus based legal framework, patient centered and participant driven decision making and immutable transaction entry into the Blockchain for traceability, legal and compliance purposes.

Results:
System with Blockchain technologies to eliminate intermediaries while providing a single source of record on the distributed ledger to all the care team participants, family members, regulators, health plans and the national health network. Consensus mechanism, logs and ensures the chain of custody and helps with matching the patient with their Living Will.

Conclusions:

With Cryptographic hashing technology, Interoperability and Cybersecurity issues can be solved. REST API's can connect to FHIR enabled Electronic Medical Records.

Having system with Living Will available in the time of need by medical and social service professionals avoid unnecessary steps and procedures performed against the patients will, harm to the patient and increased cost to the healthcare systems, especially at the end-of-life stage.

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Abstract 16

Attitudes and Barriers Toward the Use of Mobile Phones among Older People Living in the Community in Malaysia

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Background:
The use of mobile phones as a platform to assist older people manages and controls their chronic diseases is highly recommended. However, older people may not be able to utilize mobile phones to their fullest due to limited fine motor control, lack of visual acuity, and audio acuity, or technologically unskilled.

Aim of the study:
This study aimed to determine the attitudes and barriers toward the use of mobile phones among older people.

Methodology:
A cross-sectional study design was employed in this study involving 171 older people living in the community in Malaysia. A set of questionnaires was used that consisted of three parts; (1) Part A: Sociodemographic, (2) Part B: Mobile phone usage among older people, (3) Part C: Attitudes toward the use of mobile phones among older people and (4) Part D: Barriers toward the use of mobile phones among older people. The data analysis involved descriptive and inferential analysis using software (IBM Statistical Package Social Sciences version 20.0).

Results and discussions:
The majority of older people used mobile phones for calls (98.2%). The least used of mobile phones were for email at 1.2%. It was found that there was a significant correlation between age and attitude towards the use of mobile phones ($r = -0.16$, $p = 0.04$). There was also a significant correlation between attitudes and barriers of older people toward the use of mobile phones ($r = 0.4$, $p = 0.000$).

Conclusions:
Generally, most of the older people in this study used only basic functions in mobile phones. Future studies should promote the various mobile phone applications available to older people to help them improve their attitudes and reduce the barriers toward mobile phones.

Highlights of the Conference