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香港公開大學
THE OPEN UNIVERSITY OF HONG KONG

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香港護士協會
Association of Hong Kong Nursing Staff

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伍絜宜慈善基金
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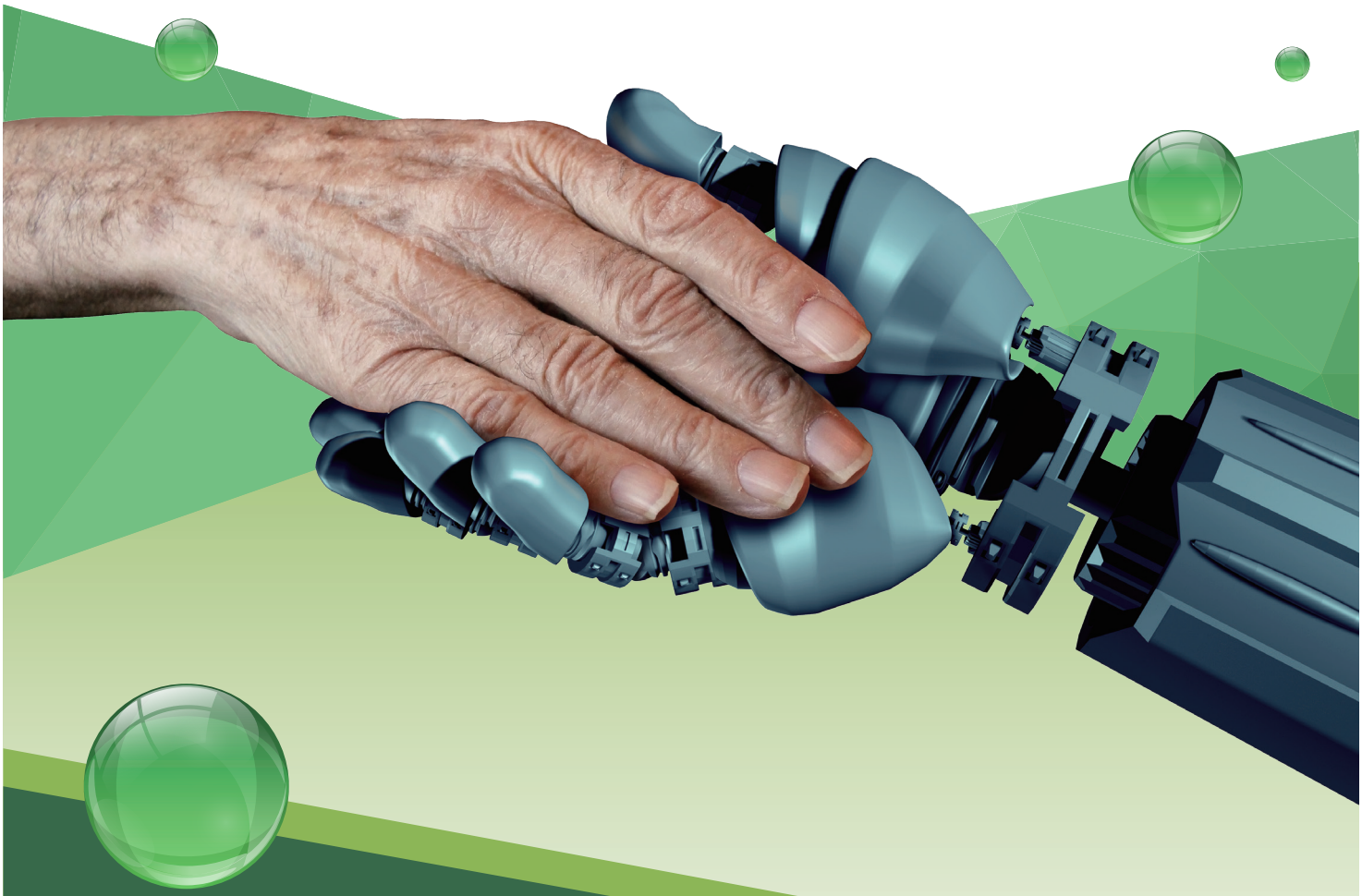
International Conference on Gerontechnology

樂齡科技國際會議

Online Conference
全視像會議



Achieving Excellence in
Elderly Care through Gerontechnology

引進樂齡科技　實現卓越老年護理

Contents

Message from the President, The Open University of Hong Kong

Prof. Yuk-Shan Wong
President
The Open University of Hong Kong

On behalf of the Open University of Hong Kong, I would like to express my warmest welcome to all of you to the International Conference on Gerontechnology. We are particularly honoured to host this event as the conference is the first of its kind being held in our University as well as in Hong Kong. May I also express my sincere gratitude to our esteemed keynote & plenary speakers from both Hong Kong and overseas, for presenting to us the latest trend of gerontechnology and the application of gerontechnology in elderly care services.

Owing to the global long life expectancy rate and low birth rate, population aging is widespread across the world. Given the rising healthcare demands of the aging population, our School of Nursing & Health Studies has put great efforts and resources into nurturing the health care workforce. We started to provide nursing education since 1994 and today, we are one of the largest providers of nursing graduates in Hong Kong. In view of the aging population trend and the rising needs for healthcare in the community, we have embarked on a new campus development project to establish the OUHK Jockey Club Institute of Healthcare since 2017 and this new building has come into operation in early November and our health care professionals would be better equipped with practical skills in the more professional and spacious learning environment.

The state-of-the-art teaching and learning facilities at this new campus will bring our University's nursing and healthcare education to the next level of excellence.

To address the aging issue, we have also decided to host the International Conference on Gerontechnology to promote the development and application of gerontechnology, as a valid solution for the betterment of the elderly. Themed on "Achieving Excellence in Elderly Care through Gerontechnology", the conference aims to serve as an interdisciplinary platform for local and overseas researchers, professionals, service providers and users to present and discuss the most recent innovations, trends, and challenges encountered and solutions adopted in the development and use of gerontechnology. We hope the 3-day conference could broaden the delegates' horizon and provide all of you with new insights and knowledge.

Taking this opportunity, I would like to extend our heartfelt appreciation to the many supporters and sponsors. The conference would not be successful without the generous sponsorship of Professional Services Advancement Support Scheme of the Hong Kong Government, the Association of Hong Kong Nursing Staff and the Wu Jieh Yee Charitable Foundation.

Lastly, my gratitude goes to the organizing committee who has contributed relentless efforts to make this conference a big success amid the territory's social unrest and the dire threat of COVID-19. Hope you have a productive and enjoyable conference!

Message from Acting Dean of School of Nursing and Health Studies

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

Welcome to the International Conference on Gerontechnology!

As you may aware, aging population is a challenge that most countries and areas are facing. According to the United Nations Population Division estimates, Hong Kong has outranked Japan to have the highest life expectancy ratio in the world. In 2040, the problem will become more intensified as people at 60 years old or above will account for 30% of the total population. An aging population poses intense challenge to our society. From the health perspective, it stresses the public health care system and brings a tremendous financial demand to our society. Yet, there are always two sides to every coin; different sectors are striving to turn the unprecedented challenge into an opportunity by developing and introducing gerontechnology, which is identified to provide effective solutions to promote the self-care ability of the old people ,increase their independency, and enhance their quality of lives.

In recent years, there is an increasing trend in the adoption of various forms of gerontechnology and products in elderly care centers, elderly residential care homes, and hospitals. Being one of the major nursing and health care education institutions in Hong Kong, The Open University of Hong Kong desires not only our students and academics but also the health care practitioners in HK and other countries can have a good knowledge of gerontechnology and to be well-positioned to serve the old people. That is the reason why we have an idea to organize the International Conference on Gerontechnology. I would like to take this opportunity to extend my sincere thankfulness to our sponsors, speakers, and staff members in transforming our idea to reality and bringing significant enrichment to the conference.

Because of the unexpected pandemic, our conference has to be rescheduled from March to November 2020. Thanks to the advancement and rapid development of technology, there have been many successful examples of delivering an online conference during the pandemic. Pushing aside the obstacles and difficulties, we endeavor our best efforts to present the conference to you through the online platform. By doing so, we have overcome the restriction imposed by the physical venue and are able to increase the number of participants from 120 to 800. It is really an unexpected but desirable outcome.

Instead of stating that it is the only one, I desire to say that this conference is the first conference on gerontechnology in Hong Kong. It serves to start the momentum and initiate scientific discussion on gerontechnology, particularly in the local context. With concerted and persistent effort from various parties, I am sure that there will be more conferences and other related events on gerontechnology for the years to come. Let us extend our heart and continue to instill our effort on developing gerontechnology, to make best use of technology to complement our care to the old people, to love them and to appreciate their lives.

Message from the Chair, Conference Organizing Committee

Dr. Moon Yuet-ying Wong
Chair
Conference Organizing Committee
Associate Professor
School of Nursing and Health Studies
The Open University of Hong Kong

I am delighted to welcome all of you to the first International Conference on Gerontechnology.

Gerontechnology is multidisciplinary in nature. By combining both gerontology and technology, it aims at enhancing the quality of life of older adults and their caregivers. Since the emergence in 1990s, it has been substantially optimizing the quality of elderly care. Gerontechnology becomes a fresh hope for today's aging society; however, the development is still at the beginning stage and there is plenty of room to grow. As such, we see the importance and the urge to introduce and promote gerontechnology to our health care, service providers and general public in helping the current and future elderly age in place.

Even under the severe influence of COVID-19, our conference has become a larger-than-expected-scale as we could accommodate more participants to attend this online event. It is our honor to have more than 800 professionals from 13 countries joining this conference, we are grateful for your participation and support.

We are also privileged to have 5 of the most influential overseas scholars who have been dedicating themselves to developing and promoting gerontechnology. They will introduce to us the latest trend of gerontechnology and their brilliant study. Besides, 3 distinguished local professors will also share their innovations and projects in bringing wellbeing to the elderly and the caregivers. Together with the workshop presented by various NGOs and universities, I am sure that the conference will certainly bring inspiration and encouragement to you!

Last but not least, I would like to thank everyone who has helped to make this conference possible. First, I would like to express my gratitude to the President and Acting Dean of the School of Nursing and Health Studies of OUHK for their enormous support. I would like to thank the speakers and moderators for taking the time to be with us and give us the benefit of their knowledge. Finally, special thanks should go to our excellent Organizing Committee members, as well as our colleagues in the Educational Technology and Development Unit for all their hard work and contributions. I hope you find this conference to be an enriching and fulfilling experience.

Organizing Committee

Chair	Dr. Moon WONG Yuet Ying	The Open University of Hong Kong
Co-Chair	Prof. Linda LEE Yin King	The Open University of Hong Kong
Members	Ms. Jackie CHAN Hoi Man	The Open University of Hong Kong
	Ms. Zoe CHAN Sze Long	The Open University of Hong Kong
	Ms. Queenie KWAN Ching Man	The Open University of Hong Kong
	Ms. Susan LAW Sin Ping	The Open University of Hong Kong
	Ms. Amy LEUNG Hoi Yee	The Open University of Hong Kong
	Dr. LIU Tai Wa	The Open University of Hong Kong
	Dr. Rebecca PANG Cho Kwan	The Open University of Hong Kong
	Dr. TAM Chun Wai	The Open University of Hong Kong
	Ms. Anna WONG On Na	The Open University of Hong Kong
	Ms. Agnes YIP Wing Ki	The Open University of Hong Kong

Programme Rundown

DAY 1
25 NOV 2020
WEDNESDAY

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

Programme Rundown

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

Programme

DAY 2
26 NOV 2020
THURSDAY

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.*

DAY 3
27 NOV 2020
FRIDAY

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

DAY 2: 26 November 2020, 17:00–18:00

Concurrent Paper & Poster Presentation Session

Room 1

Session I (Paper 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

Digital Technology for Aging Prevention
Peter Young
Bisware Technology Limited
P. 28

The First One-stop APP for Carers
Albert Au
Acesobee Limited
Moon Chan
Hong Kong Federation of Women's Centres
P. 22

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

Room 2

Session II (Poster Presentation)

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

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

Technology-based Exercise Programmes for Fall Prevention in Older People
Yuk Seng Chung
The Open University of Hong Kong
P. 24

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

Session III (Paper 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

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

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

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

Room 4

Session IV (Poster Presentation)

Astri Open API HealthTech IoT Platform
Ran Bai, Fanky Yau and Tracy Lam
ASTRI
P. 22

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

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

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

General Information

Presentations via Zoom

Owing to the ongoing situation of COVID-19, the conference transitions to online mode. The zoom link and the password for registered attendees would be provided via email. To facilitating different time zone of oversea attendees, the video link would be available for a week; they could choose to watch the video at their convenience.

Best/Outstanding Paper and Poster Award

We have received notable contributions from international researchers, professionals and practitioners; we would like to recognize the best contributions to gerontechnology. We will select the Best Paper Award and the Best Poster Award. The awards will be presented to the awardees at the Closing Ceremony of the Conference.

Conference Evaluation Form

We will send an online conference evaluation form to all attendees via email. Please reply us as soon as you could. Your comments are valuable for us to improve the conference. An attractive souvenir would be given to the attendees who join half of the conference as a token of appreciation*.

CNE Points and Evaluation Sheet (For Nurse)

The conference is a Continuing Nursing Education (CNE) activity by which the nurse could be entitled to obtain 11.5 points. An evaluation sheet would be sent via email and please reply by filling out the form. The e-Certificate of CNE certificates would be given after the conference.

QR Code

Alternatively, you may scan the QR code for the conference and CNE evaluation form directly as follows,

CNE Form

Conference Evaluation Form

For assistance

Should you have any enquiry or need any assistance, please contact our secretariat below,

Contact: 852-27686897

Email: icg2020@ouhk.edu.hk

*For local attendee only due to the shipping constraints.

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.

Plenary Speaker I

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.

Master Class I

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

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

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.

Master Class II

Professor Yong-ping Zheng
Professor
The Hong Kong Polytechnic University

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

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

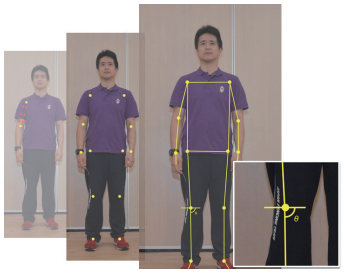
The population is getting older and we have to address the emerging changes arising from the problem of ageing. Gerontechnology therefore becomes a trend for general population as well as people with disabilities to alleviate the burden of carers as well as to increase the users' independency. Rehabilitation 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.

Workshops

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.

Lingnan University organizes the Gerontechnology Practitioner Training Course, as one of the major initiatives in the project, to attract public interested on gerontechnology, and raise public awareness about the gerontechnology development, relevant policies and practice. By adopting the concepts of knowledge transfer, participants (including elderly and care-givers) will also be invited to be the ambassadors and participated in further knowledge transfer activities and various forms of outreach and community engagements. In addition, it also helps to promote the productive aging and age-friendly environment guided by the initiative of the project.

In this workshop, the LU's project team, together with the ambassadors, will share tips about the knowledge transfer model and experiences of organizing the gerontechnology Practitioner Training Course. The ambassadors will also share their views on the gerontechnology and experiences on the impact on the aging society.

Workshop V

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

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

The Jade Club is the leader in the field of developing and delivering active ageing programs with Fun, Exercise and Social elements in Hong Kong. Our flagship program- Happy Chair-based Dance is the first created, developed, offered to solve the physical and psychosocial suffering from elders in Hong Kong.

With the positive outcomes of elders who participated in Happy Chair-based Dance in past seven years, in 2020, we develop a new proprietary program designed for people with dementia - “Silent Chair Dance”, a reminisce music and dance program based on the silent disco concept with the use of wireless Bluetooth music controller technology. According to researchers, there is increasing evidence suggestion music can bring calm to people with dementia by reducing agitation and supporting those affected to cope better with symptoms. Dancing is also a form of exercise involves both a mental effort and social interaction and that this type of stimulation helped reduce the risk of dementia.

“Silent Chair Dance” is built on reminisce by playing old time or evergreen music, and elders’ familiar Cantonese songs. It helps with their cognitive ability, the two-way interaction make them feels alive and better mood. The uses of Bluetooth technology improve the level of engagement of people with dementia, as well as lower the barrier on program delivery. The sound system and wireless headsets help the participants to concentrate much on the music and instructor voice, it provides them an immersive experience in a social group sharing laughter together. It is suitable for elderly ranges from early onset to severe dementia, and in any physical condition including those who are wheelchair bound and bed bound.

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 differnt 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.

Abstract 6

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

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.

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)

Lo Wing Yi, Lam Hon Wai and Cheung Yin Lam Bonnie
Hong Kong Christian Service Bliss 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

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

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

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

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 (β= 0.116, P=0.007), perceived usefulness (β= 0.129 P=0.042), health literacy (β= 0.181, P=0.0424), and support from healthcare providers (β= 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

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

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 aremetal 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.

Abstract 16

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

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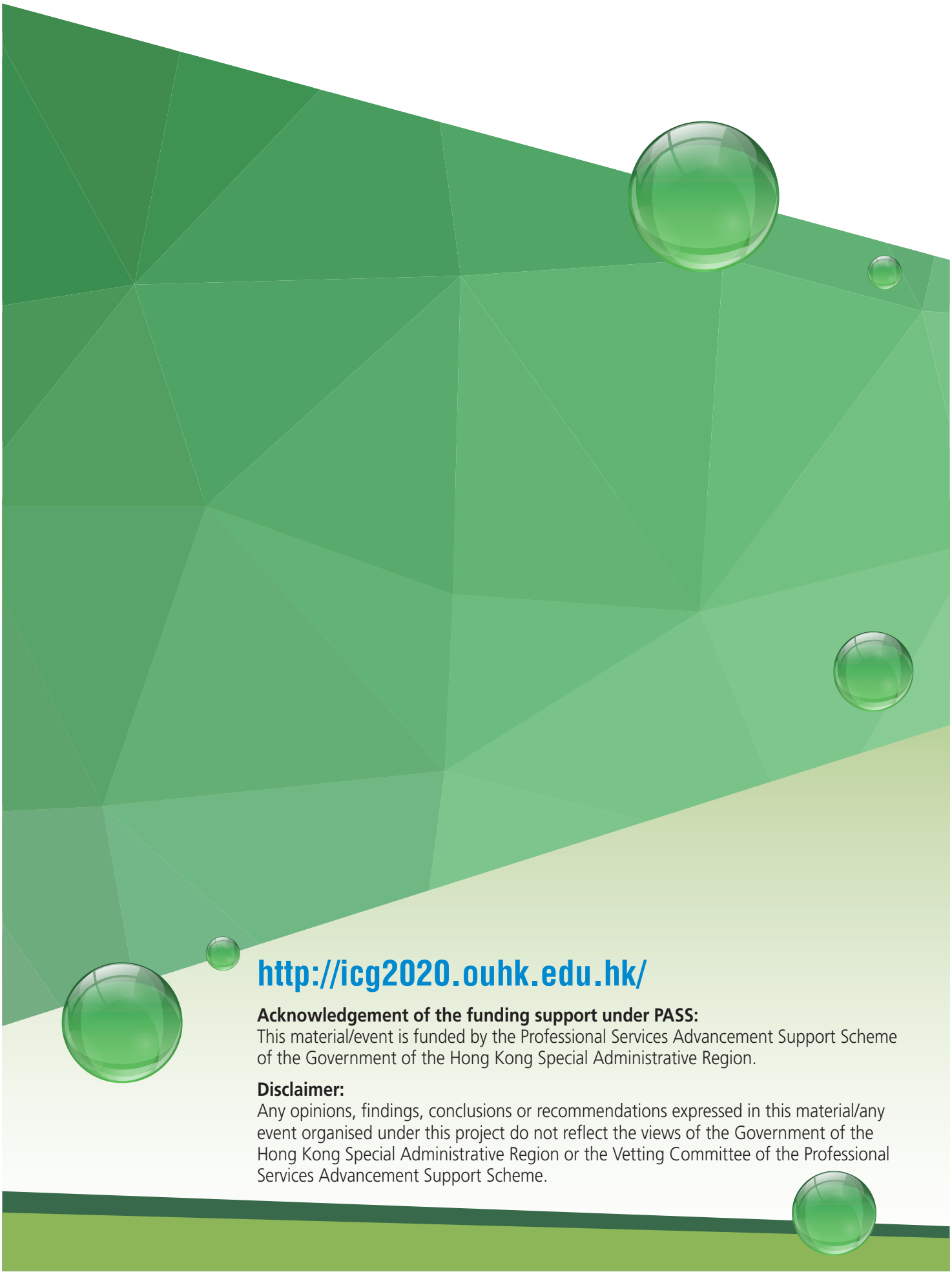
Background:
The use of mobile phones as a platform to assist older people manages and controls their chronic diseases is highly recommended. However, older people may not be able to utilize mobile phones to their fullest due to limited fine motor control, lack of visual acuity, and audio acuity, or technologically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



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