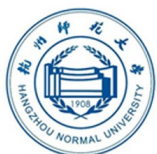# 2018 British Council – NSFC Newton Researcher Links Workshop

Workshop on health and well-being through VR and AR

基于VR与AR的医疗健康前瞻应用研讨会

June 2018
Xi'an,China
2018年6月
中国 西安

British Council – NSFC Newton Researcher Links Workshop on Health and Well-being Through VR and AR

**Jianguo Hotel, Xi'an,
2, Huzhu Road, Beilin District, Xi'an, 710048, China**

Programme Introduction

British Council – NSFC Newton Researcher Links provides opportunities for early career researchers from the UK and China to interact, learn from each other and explore opportunities for building long-lasting research collaborations.

Organised by Hangzhou Normal University (China) and Liverpool John Moores University and hosted by X'ian University of Technology (China), the workshop aims to investigate the latest developments in virtual reality and augmented reality applications for health and wellbeing to achieve sustainable healthcare development and reduce healthcare cost in UK and China.

The workshop involves a forum for researchers and practitioners to discuss research, industry practice and collaboration opportunities. The workshop will include keynotes including from industry practitioners and professors, research presentations, visits to Xi'an Science and Technology District and Xi'an Heng Ge Digital Technology Co. Ltd, and research proposal bids.

Digital healthcare research is developing at a fast pace, and a workshop to discuss VR and AR solutions in this area, and assess future challenges would benefit the participants and their institutions, and inform the research community in China and UK about the potential applications for patients and the healthcare system.

British Council – NSFC Newton Researcher Links Workshop on Health and Well-being Through VR and AR

Workshop Coordinators

Prof. Zhigeng Pan - Hangzhou Normal University, PRC

Prof. Abdennour El Rhalibi – Liverpool John Moores University, UK

Workshop Mentors

Dr Tom Dawson – Rescon Technologies, UK

Prof. Ke Lv- University of Chinese Academy of Sciences, PRC

Dr Hoshang Kolivand – Liverpool John Moores University, UK

Dr. Mingmin Zhang - Zhejiang University, PRC

Workshop Participants Selection Committee

Dr Sarmad Abdulazeez – Liverpool John Moores University, UK

Dr Dandan Ding - Hangzhou Normal University, PRC

Prof. Abdennour El Rhalibi – Liverpool John Moores University, UK

Dr Hu Guosheng - China Academy of Art, PRC

Dr Hoshang Kolivand – Liverpool John Moores University, UK

Dr Xun Luo - Tianjin University of Technology, PRC

Dr Andres A. Navarro-Newball - Pontificia Universidad Javeriana Cali, Colombia

Prof. Zhigeng Pan - Hangzhou Normal University, PRC

Dr Yuanyuan Shen – Liverpool John Moores University, UK

Prof. Ruck Thawonmas - Ritsumeikan University, JP

Dr Feng Tian - Bournemouth University, UK

Dr Xiaosong Yang - Bournemouth University, UK

Dr. Mingmin Zhang - Zhejiang University, PRC

British Council – NSFC Newton Researchers Link Workshop on Health and Well-being Through VR and AR

Project Managers

Ms Karen Moses – Consultant | Science Research Programme | Education and Society British Council, UK

Ms Kiki Liang – Head of Newton Fund, China | Education, British Council, PRC

Mr Jack Zhou – Education Manager | Cultural and Education Section of the British Consulate-General, British Council, PRC

Ms Chunhong Qiu – National Natural Science Foundation of China (NSFC), PRC

Local Organizers

Prof. Jin Hayian – Xi'an University of Technology, PRC

Dr Jie Zhang – Xi'an University of Technology, PRC

Workshop Administrators

Laura Bellinger – Liverpool John Moores University, UK

Lucy Lamb – Liverpool John Moores University, UK

Xinting Wang - Hangzhou Normal University, PRC

British Council – NSFC Newton Researcher Links Workshop on Health and Well-being Through VR and AR

China Participants	UK Participants
Pan Zhigeng - Hangzhou Normal University Ke Lv - University of Chinese Academy of Sciences Zhang Mingmin - Zhejiang University Shen Yang - Lishui University Xu Guangtao - Hangzhou Normal University Ying Wenhao - Changshu Institute of Technology Cao Mingliang - Foshan University Yang Yang - Jiangsu University Hu Guosheng - China Academy of Art Sun Minghui - Jilin University Xu Li- Ningbo University of Technology Li Yi - Wenzhou University Yan Hong - Hainan University Shi Yan - Hangzhou Dianzi University Wang Liying - Nanjing Normal University Ding Dandan - Hangzhou Normal University Yan Fengting - Shanghai University of Engineering Tong Jing - Hehai University Wei Wei - Xian University of Technology Hu Zhuxin - Wenzhou University	Ed Cottam - Northumbria University Stella Doukianou - University of Greenwich Tom Dawson - Rescon Technologies Kieran Egan - University of Strathclyde Abdennour El Rhalibi - Liverpool John Moores University Maite Frutos-Pascual - Birmingham City University Carlo Harvey - Birmingham City University Leigh-Anne Hepburn - Glasgow School of Art Edmond S. L. Ho - Northumbria University Faraz Janan - University of Lincoln Yang Jiang - Robert Gordon University Hoshang Kolivand - Liverpool John Moores University Marwa Mahmoud - Cambridge University Rafaela Neiva Ganga - Institute of Cultural Capital Arlinda Cerga Pashoja - Imperial College Ran Song - University of Brighton Lili Tao – University West of England Neil Vaughan - University of Chester He Wang - University of Leeds Pauline Whelan - University of Manchester

British Council – NSFC Newton Researcher Links Workshop on Health and Well-being Through VR and AR

Programme

Day 1 - June 28th, 2018
8:30 ~ 9:00 **Morning Workshop Opening Ceremony with British Council and NSFC, Keynotes British Council and NSFC representatives Venue: Changle Hall B Chair: Prof. Zhigeng Pan** **Speakers:** - **Kiki Liang (Head of Newton Fund, China - British Council)** Title: UK–China Research and Innovation Partnership Fund - **Welcome Message, Representative from National Science Foundation China** - **Welcome Message, Representative from local organizers**
9:00 ~9:10 Group Photo
9:10 ~ 9:50 Introduction and Networking Chair: Prof. Abdennour El Rhalibi and Prof. Zhigeng Pan Venue: Changle Hall B
9:50 ~10:10 Tea Break
Workshop Health and Well-being Through VR and AR: 10:10 ~ 11:50 Venue: Changle Hall B Chair: Prof. Zhigeng Pan/ Prof. Abdennour El Rhalibi
Pauline Whelan - University of Manchester: *Virtual Reality to Improve Health and Wellbeing of Children and Young People: Digital Research @ CAMHS.Digital* Cao Mingliang - Foshan University: *Toward Cloud Avatars that Dress You Well and Impact Your Health* Edmond S. L. Ho - Northumbria University: *Patient Assessment Assistant Using Augmented Reality* Faraz Janan - University of Lincoln: *AR in Medical Image Analysis* Marwa Mahmoud - Cambridge University: Automatic analysis of face and gesture in psychological distress

Lunch 12:00 ~ 13:30
Workshop Health and Well-being Through VR and AR: 13:30 ~ 15:30 **Venue: Changle Hall B** **Chair: Dr Sun Minghui / Dr Hoshang Kolivand**
Li Yi - Wenzhou University: Haptic rendering method using penetration depth in high degrees of freedom Leigh-Anne Hepburn - Glasgow School of Art: *Visualising Complexity in Health and Care for Meaningful and Sustainable Change* Yan Fengting - Shanghai University of Engineering: WebVR Large-scale Building Crowd Fire Evacuation Based on Speech Recognition Yang Jiang - Robert Gordon University: *Mixed Reality Virtual Coach System on Gaits Analysis for Health Incentivisation* Tong Jing - Hehai University: Low-Cost 3D Modeling Technology and its application in Virtual Try-on and Other Areas Lili Tao - University of the West of England: *Computer Vision for Active and Assisted Living*
Tea Break: 15:30 ~ 15:50
Workshop Health and Well-being Through VR and AR: 15:50 ~ 18:30 **Venue: Changle Hall B** **Chair: Dr. Mingliang Cao/ Dr. Hoshang Kolivand**
Shi Yan - Hangzhou Dianzi University: *Learning as Adventure: An AR based App Designed with Gamification Elements to Facilitate Geographic information Learning* Rafaela Neiva Ganga - Institute of Cultural Capital: *House of Memories: The Impacts of a Digital Museum-led Dementia Awareness Programmes on Informal Caregivers' Subjective Wellbeing* Yang Yang - Jiangsu University: *Simulating Bokeh Effect with Kinect* He Wang - University of Leeds: *Virtual Reality for Cost-effective HumanPerception Evaluation of Urban Green Space* Xu Li - Ningbo University of Technology: *Smart Home Control System* Yan Hong - Hainan University: *Fishery Visualization in China South Sea* Wang Liying - Nanjing Normal University: *Multi-Mode Behavior Detection for Online Learning* Hu Zhuxin - Wenzhou University:
Workshop Health and Well-being Through VR and AR: 18:30 ~ 19:00 **Venue: Changle Hall B** **Chair: Prof. Zhigeng Pan / Prof. Abdennour El Rhalibi** Networking and Collaboration Discussion
Dinner 19:00-20:00

Day 2 – June 29th, 2018

8:30 ~ 9:00 Opening Ceremony of Edutainment 2018
(Group photo)

9:00 ~ 10:00 Keynote Speech
Chair: Prof. Abdennour El Rhalibi
Venue: Changle Hall B
Speaker: Dr Tom Dawson - Rescon Technologies, UK
Title: New approaches to data analytics in health and social care

Tea Break 10:00 ~ 10:20

10:20 ~ 12:00 Keynote Speech
Chair: Prof. Zhigeng Pan
Venue: Changle Hall B
Speaker: Prof. Hiroyuki Iida (Japan Advanced Institute of Science and Technology, Japan)
Title: Using games as the testbed for AI research
Speaker: Dr Hoshang Kolivand (Liverpool John Moores University, UK)
Title: Future Research Directions in Virtual and Augmented Reality

Lunch 12:00 ~ 13:30

Workshop Health and Well-being Through VR and AR: 13:30 ~16:30
Venue: Shuishang Hall
Chairs: Prof. Abdennour El Rhalibi / Dr Hoshang Kolivand

Ed Cottam - Northumbria University: *Enhancing user wellbeing in augmented reality mHealth apps: The role of TAM and continuance*

Wei Wei - Xian University of Technology: Gradient-Driven Parking Navigation Using a Continuous Information Potential Field Based on Wireless Sensor Network

Kieran Egan - University of Strathclyde: *Beginning with the end in mind: how can we accelerate innovative technology developments to make a real impact on health and wellbeing?*

Stella Doukianou - University of Greenwich: *Using VR, eye tracking and EEG to transform the design of care homes for people with dementia*

Arlinda Cerga Pashoja - Imperial College: *VR as treatment for Behavioural and Psychological Symptoms of Dementia*

Maite Frutos-Pascual - Birmingham City University: *Mixed Reality Healthcare System using Freehand Natural Interaction*

Ding Dandan - Hangzhou Normal University: *Convolutional neural network-based video coding methodology*

Hu Guosheng - China Academy of Art: *Color Computing and Interactive Design*

Shen Yang - Lishui University: *An Active Learning Framework for Alpha Matting*

Tea Break: 16:30 ~ 16:50

Workshop Health and Well-being Through VR and AR: 16:50 ~18:30
Venue: Shuishang Hall
Chair: Prof. Ke Lv / Dr. Mingmin Zhang

Neil Vaughan - University of Chester: *Simulators for medical procedure training with haptic feedback and virtual reality*

Carlo Harvey - Birmingham City University: *Graphical Fidelity in Virtual Reality: What is Enough?*

Ran Song - University of Brighton: *Visual Saliency: from 2D to 3D*

Xu Guangtao - Hangzhou Normal University: *Research on Chinese Middle School Students' Scientific Practices with the Affordance of Virtual World*

Ying Wenhao - Changshu Institute of Technology: *A New Clustering Method Based on Layered Hierarchical Fusion TSK Fuzzy Mapping*

Workshop Health and Well-being Through VR and AR: 18:30 ~ 19:00
Venue: Shuishang Hall
Chair: Prof. Zhigeng Pan / Prof. Abdennour El Rhalibi
Networking and Collaboration Discussion

19:00 Conference Dinner
Venue: Changle Hall B
Chair: Prof. Haiyan Jin
Declaring of Edutainment 2019
Dr Andres A. Navarro-Newball

Day 3 – June 30th, 2018

8:30 ~ 9:20 Keynote Speech
Chair: Dr Andres A. Navarro-Newball
Venue: Changle Hall B
Speaker: Prof. Ruigang Yang (Baidu, USA)
Title: Single-View Reconstruction and View Synthesis for AR/VR

9:20 ~ 9:50 Invited talk
Chair: Prof. Ruck Thawonmas
Venue: Changle Hall B
Speaker: Prof. Jim Chen (Editor in Chief of IEEE CiSE. George Mason University, USA)
Title: Preparing high-quality papers for international journals

9:50 ~10:10 Tea Break

10:10 ~ 10: 50 Invited talk
Chair: Prof. Xun Luo
Venue: Changle Hall B
Speaker: Dr. Mingmin Zhang (Zhejiang University, China)
Title: HCI in Elderly Healthcare

10:50 ~ 12: 10 Invited talk
Chair: Dr. Dandan Ding (Hangzhou Normal University, China)
Venue: Changle Hall B
Speaker: Dr. Sun Minghui
Enhancing Naturalness of Pen-and-Tablet Drawing through Context Sensing

Speaker: Prof. Ke Lv
Facial Landmark Detection Methods and Multi-target Reconstruction Technology

Lunch 12:10 ~ 13:30

Workshop Health and Well-being Through VR and AR: 14:00 ~18:00
Scientific Visit (Medical Research Center)

British Council – NSFC Newton Researcher Links Workshop on Health and Well-being Through VR and AR

Keynote/Invited Speech Schedule

29th June

1. Dr. Tom Dawson(Rescon Technologies, UK)：
    New approaches to data analytics in health and social care

2. Prof. Hiroyuki Iida(Japan Advanced Institute of Science and Technology, Japan)：
    Using games as the testbed for AI research

3. Dr Hoshang Kolivand(Liverpool John Moores University, UK) :
    Future Research Directions in Virtual and Augmented Reality

30th June

1. Prof.Yang Ruigang (USA, Baidu)：
    Single-View Reconstruction and View Synthesis for AR/VR

2. Prof. Jim Chen, the Editor in Chief of IEEE CiSE:
    Preparing high-quality papers for international journals

3. Prof.Mingmin Zhang(China, Zhejiang Univ., PRC)：
    HCI in Elderly Healthcare

4. Dr. Sun Minghui (Jilin University, PRC):
    Enhancing Naturalness of Pen-and-Tablet Drawing through Context Sensing

5. Prof. Ke Lv (University of Chinese Academy of Sciences, PRC):
    Facial Landmark Detection Methods and Multi-target Reconstruction Technology

British Council – NSFC Newton Researcher Links Workshop on Health and Well-being Through VR and AR

Speakers Bios, Titles, and Abstracts

**Kiki Liang
Head of Newton Fund,
China | Education
British Council, Cultural
and Education Section of
the British Embassy, PRC**

Biography

Kiki Liang graduated from Beijing Institute of Technology in 2009 and got the PhD degree in Rocket Science. She joined the China Association for Science and Technology as Assistant Research Fellow after her graduation in Science Communication. She has been the key member of several international joint projects with universities in the UK, Canada and US. She has published series of academic papers and reports with international colleagues. She then joined the China Academy of Sciences as the Project Manager of International Programmes in 2013 and was awarded as Associate Professor. Kiki joined the British Council as the Head of Newton Fund in 2015 and is in charge of British Council programmes under Newton Fund in China.

梁琦于 2009 年毕业于北京理工大学，并获得飞行器动力工程博士学位。毕业后她进入中国科学技术协会作为助理研究员，担任了许多国际合作研究项目的核心课题组成员。她研究的领域为科学传播学，同来自英国、加拿大和美国等地区高校的教授及学者共同发表了多篇学术论文及学术报告。她于 2013 年进入中国科学院工作，担任国际项目合作的项目主管，并获得副高级职称。梁琦于 2015 年加入英国大使馆文化教育处工作，作为牛顿基金项目在中国区的执行负责人。

Title:

UK–China Research and Innovation Partnership Fund

Synopsis:

introducing the background information, structure, funding mechanism and delivery partners of UK-China Research and Innovation Partnership Fund (also known as the Newton Fund), roles and responsibilities of British Council China, SIN and UKRI. Funding opportunities would also be shared at the end. The ppt will be share with you few days before the workshop once finalized.

Biography

Dr. Tom Dawson D.Phil (Oxon), MB.ChB, B.Med.Sci, DSportsMed is a clinician technologist who comes from a clinical and academic background. He was the director of The Science and Medicine of Athletic Performance at the University of Oxford until 2009 and has held a variety of clinical posts, mainly in Sports Medicine. He has a wide cross sector background having been the military medicine theme leader for the Haldane-Spearman Consortium and is an independent technical advisor to the Defence Sciences Advisory Council (UK).

In 2011 Dr Dawson founded Rescon, and has since been working with his team on developing performance and biological system evaluation frameworks incorporating advanced analytics capabilities that utilise sensors, self-reporting and observational evaluation. These have been developed in concert with assessment and development of state of the art wearables, funded by the US military (DARPA) and the European Space Agency. Tom is the lead author on multiple patents with 11 having been granted to date.

**Dr Tom Dawson
Rescon Technologies Ltd, UK**

Title:

 New Approaches to Data Analytics in Health and Social Care

Synopsis:

This talk will outline a self-healing network model approach to health and social care analytics. Top level inputs will be described along with looped actions leading to a self-improving model based on iterative feedback. The practicalities of data collection and fusion will be discussed along with real world examples to illustrate utility. Opportunities for new research and development of standards frameworks will also be outlined.

Biography

Hoshang Kolivand is an active researcher in Computer Graphics. He received his MS degree in applied mathematics and computer from Amirkabir University of Technology, Iran, in 1999, and his PhD from Media and Games Innovation Centre of Excellence (MaGIC-X) in Universiti Teknologi Malaysia (UTM) in 2013 in the area of Realism of Mixed Reality. He has completed Post-Doctorate research in Interactive Augmented Reality in UTM. Previously he worked as a lecturer in Shahid Beheshti University, Iran and then as a Senior Lecturer in UTM. Currently he is a Senior academic and researcher at Liverpool John Moores University. He has published numerous articles in international journals, conference proceedings and technical papers, and book chapters in computer graphics and virtual reality. He is an active member of many conferences and international journals, and the General Chair of the International Conference on Digital Media 2018, organised in UK. He has also published many books in object-oriented programming and mathematics. His research interests include Computer Graphics, Virtual Reality and Augmented Reality.

Dr Hoshang Kolivand
Liverpool John Moores University, Liverpool, UK

Title:

Future Research Directions in Virtual and Augmented Reality

Synopsis:

This talk will introduce the recent development in VR and AR illustrated by a number of recent projects and applications from Cultural Heritage to Medical Applications, I have been involved in, in the last few years. There is no doubt that Augmented Reality (AR) and Virtual Reality (VR) have the potential to become a fascinating widespread technology not only in computer graphics but also in many other subjects. In about two decades, AR or in general, Mixed Reality (MR) has turned into one of the most attractive topics in computer graphics with many researchers attempting to improve realism and interaction with the virtual environment. Realism and robust AR system is still an open issue. I will introduce in particular the techniques I have developed for the realism, robustness and interaction of AR systems and present possible future directions toward these enhancement. Moreover, interaction between real and virtual objects

Biography

Dr. Hiroyuki Iida was born in 1962, who has has been an enthusiasm researcher in the domains such as computer games and entertainment computing, while acting as important roles of international activities such as conference chair, program chair and journal editor. He has also organized Mind Sports Computer Olympiad as the secretary/treasurer of ICGA (International Computer Games Association) for each year since early 2000. He supervised many master and PhD students until now, while acting as PhD committee member (external assessment) for PhD candidates in western countries such as Maastricht University and Tilburg University in the Netherlands. He also served as an external assessment for international research funding in western countries such as Canada and the Netherlands

Prof. Hiroyuki Iida
Japan Advanced Institute of Science and Technology, Japan

Title:

Using games as the testbed for AI

Synopsis:

A brief history of research in this direction is introduced together with my own approach including opponent-model search (speculative play), understanding master's thinking way, game refinement theory and force-in-mind.

Dr Zhang Mingmin is an associate professor of Computer and Engineering Department, Zhejiang University. She got the Bachelor degree from Computer Science Dept, Nanjing University in 1990, the Master degree and the PhD from Computer Science and Engineering Department, Zhejiang University in 1995 and 2008 respectively.

Since 1993, she has been working on several research and industrial projects related to computer graphics, virtual reality, multimedia, and HCI. She has published more than 40 papers on international journals, national journals, and conferences in recent years. Moreover, she won the second class prize of National Science and Technology Progress Award in 2013 and the second class prize of Natural Science Award of Zhejiang Province in 2015. She also has visited several universities or research institute, performing cooperative projects with some experts and researchers.

Prof. Mingmin Zhang
Zhejiang University, China

Title:

HCI in Elderly Healthcare

Synopsis:
The elderly people prefer VR games more than younger one. They are more solitude, need VR games to pacify their emotions. However, the gradually degenerated vision impedes accepting books and lower resolution screen, the poor response ability impedes accepting keyboard and mouse. We apply natural HCI methods to help elders to play VR games and communicate with other persons local or remote.

Gestures play an important role in our daily life, and they can help people convey information and express their feelings. Dynamic gestures recognition is the main research field and gets much attention of scholars. Aimed at the present situation that dynamic hand gestures recognition rate is low and the effect is not ideal, we use Sobel operator to detect the edges in gesture image sequences, enhancing the edge features in dynamic gesture image.

Facial expression is another natural way of inner world revelation. It plays a vital role in our social interactions. With it, we can express our feelings, and infer other people's attitude and intention. We are capable of telling other people's facial expressions at a glance, but not for machines. Facial Expression Recognition (FER) system makes machines being able to understand human emotions and intentions, which is very helpful for Human- Computer Interaction (HCI). Inspired by the advances Convolutional Neural Networks (CNNs) have achieved in image recognition and classification, we propose a CNN-based approach to address this problem.

	Dr Ruigang Yang is a professor of Computer Science at the University of Kentucky. He is currently on leave from the University and joins Baidu as its currently Chief Scientist for 3D Vision at Baidu Research.
Prof. Ruigang Yang Baidu, USA	He obtained his PhD degree from University of North Carolina at Chapel Hill and his MS degree from Columbia University. His research interests span over computer graphics and computer vision, in particular in 3D reconstruction and 3D data analysis. He has published over 100 papers, which, according to Google Scholar, has received close to 10000 citations with an h-index of 48 (as of 2017). He has received a number of awards, including US NSF Career award in 2004 and the Dean's Research Award in 2013. He is currently an associate editor of IEEE TPAMI and a senior member of IEEE.

Title:

Single-View Reconstruction and View Synthesis for AR/VR

Synopsis:

In this talk, I will discuss our recent work on 3D reconstruction and view synthesis using a single camera (with or without depth). While very high-quality dynamic 3D contents could be obtained with a camera array, we believe that using a single view will dramatically improve the accessibility for 3D content creation, in particular for user-generated contents. In this talk I will present our work on body-tracking, body reconstruction, and face modeling, all using a single camera as input.

Jim X. Chen
Department of Computer Science, George Mason University, USA

Dr Jim X. Chen is Professor of Computer Science, and the director of the Computer Graphics Lab at George Mason University (GMU), Fairfax, Virginia. In 1995, he received his Ph.D. in Computer Science from the University of Central Florida and joined the Computer Science Department at GMU as Assistant Professor. Jim is editor-in-chief of AIP/IEEE Computing in Science & Engineering (CiSE). He served as associate editor-in-chief of International Journal of Virtual Reality between 2006 and 2008, general co-chair of Edutainment2008, general co-chair of IEEE VR2006, program co-chair of IEEE VR (2002, 2003, and 2004), and guest editor for IEEE Computational Science & Engineering, CiSE, and PRESENCE. He has been an active reviewer/appraiser for NSF and other funding agencies. He is a senior member of IEEE and a professional member of ACM. Jim's research interests include computer graphics, virtual reality, visualization, networking, and simulation.

Title:
Preparing high-quality papers for international journals

British Council – NSFC Newton Researcher Links Workshop on Health and Well-being Through VR and AR

Presentation Abstracts

Speaker	Institution	Presentation
Ed Cottam	Northumbria University	**Enhancing user wellbeing in augmented reality mHealth apps: The role of TAM and continuance** The international health community strongly endorses public and patient involvement in healthcare (Charles & DeMaio, 1993; Department Health, 1999; Health Canada, 2000, Neuwelt, 2012). Advances in technology and evolving health legislation have driven the rise of health management applications, or mhealth (Zapata et al., 2015). These mhealth apps facilitate greater levels of patient empowerment by providing easy access to relevant health. However, augmented reality driven mhealth apps are under-researched. This study investigates the antecedents of AR-driven mhealth app continuance, drawing upon the TAM model (Davis, 1989) to highlight the relationship between perceived ease of use, perceived usefulness, continued use and how these ultimately impact user's subjective wellbeing (Pyke et al., 2016; Smith & Diekmann, 2017).
Stella Doukianou	University of Greenwich	**Using VR, eye tracking and EEG to transform the design of care homes for people with dementia** On account of continuously changing needs of elderly people, there is an emergent demand of a "new generation of buildings" which helps them to live independently. Architects and designers should embrace a human - centred care perspective in developing such care houses. There are various meters of quality of life such as proxy questionnaires, observations and interviews may be the most effective way of assessing elderly's people quality life in residential care settings (McKee et al. 1998). However, virtual reality is an ideal platform for human spatial navigation assessment since it allows participants with dementia to perceive as well as act upon an interactive environment that can be made very life-like (Cogne et al. 2017). Additionally, theta oscillations using EEG (electroencephalogram) during the spatial navigation in the virtual environment can investigate the sensorimotor integration (Kober and Neuper 2011), providing more information about spatial cues that direct indoor navigation. Therefore, this presentation will include the background research and the project methodology that is implemented to develop and evaluate a novel portable VR application for navigation in care houses for people with dementia. This VR application aims to provide insights for efficient design and development care houses for people with dementia.

Kieran Egan	University of Strathclyde	**Beginning with the end in mind: how can we accelerate innovative technology developments to make a real impact on health and wellbeing?**
		As the number of innovative technology solutions continues to grow, the question arises as to how to develop robust pathways to impact. Through using examples within the field of dementia from Dr Egan's previous own work (e.g. University of Edinburgh, World Health Organization) we will explore why developing effective interventions can be so challenging and explore why digital technologies such as eHealth and Virtual Reality may be able to offer scalable, cost-effective and effective global solutions. Thus, we will explore both qualitative and quantitative research methodologies and findings and discuss how they can be integrated to inform effective intervention design. This talk will emphasise how crucial it is that public willingness to trial health technologies is met sensitively with robust science that reflects real world implementation.
Maite Frutos-Pascual	Birmingham City University	**Mixed Reality Healthcare System using Freehand Natural Interaction**
		Presentation to this workshop will cover freehand natural interaction in MR/VR giving an insight into our most recent studies and their outcomes, specially focusing on the user perspective and their interaction while using most current MR/VR technology (i.e. Microsoft HoloLens, Meta Meta2, VR HMDs such as the Oculus or the HTC Vive and hand tracking sensors such as the Leap Motion).
		After the introduction to our fundamental research areas and outputs in the HCI field in MR and VR, I will present a novel system for mixed reality healthcare demonstration using freehand interaction in MR. The system integrates a practitioner in real time with multimodal patient data. The system provides natural interaction with virtual anatomical models, medical data and patient case information. A freehand Natural User Interface (NUI) is employed derived by empirical user interaction models.
		Previous versions of this system have been showcased in national and international events (regional West Midlands Health Informatics conference 2017 and Barcelona Mobile World Congress and Digital Health and Wellness Summit 2016).
Carlo Harvey	Birmingham City University	**Graphical Fidelity in Virtual Reality: What is Enough?**
		VEs and VR grant the ability to experience real-world scenarios, such as driving, in a virtual, safe, and reproducible context. However, to achieve their full potential, the fidelity of the VEs must provide confidence that it replicates the perception of the real-world experience. The computational cost of simulating real-world visuals accurately means that compromises to the fidelity of the visuals must be made. This talk will present a subjective evaluation of driving in a VE at

		different quality settings. Participants (n = 44) were driven around in the real world and in a purposely built representative VE and the fidelity of the graphics and overall experience at low-, medium-, and high-visual settings were analysed. Results demonstrate that graphics quality affects the perceived fidelity of the visuals and the overall experience. This indicates that future VR simulations should improve the quality to a point, but once the equilibrium is reached, further computation may be wasted.
Leigh-Anne Hepburn	Glasgow School of Art	**Visualising Complexity in Health and Care for Meaningful and Sustainable Change** This paper presents the rationale for design within the context of health and care, framing the visualisation of complex contexts as the critical underpinning for meaningful and sustainable change. It is no longer the domain of the designer to respond individually to a challenge. Instead it is recognised that in order for innovation to be meaningful, it must instead be designed with and by instead of for. Acknowledgement of the ability of design to position itself as a participatory approach that explores the complex and often contradictory perspectives of the stakeholders involved, crossing disciplinary boundaries and generating rich insights that can inform, influence and affect change is growing exponentially. Presenting the ways in which complexity within health and care has been visualised across a number of DHI projects, the paper offers insights into the translation and interpretation of such visual data into a framework for meaningful and sustainable change.
Edmond S. L. Ho	Northumbria University	**Patient Assessment Assistant Using Augmented Reality** Facial symmetry and averageness are key components in quantifying the perception of beauty. In this study, a prototype Augmented Reality (AR) tool is developed on Android OS, to assist plastic surgeons and patients in objectively assessing facial symmetry when planning reconstructive surgical procedures. Specifically, the tool overlays 4 types of measurements and guidelines over a live video stream to provide the users with useful information interactively. The measurements are computed from the tracked facial landmarks at run-time.
Faraz Janan	University of Lincoln	**AR in Medical Image Analysis** My research area is breast cancer detection and risk assessment, recently moving towards to 3D reconstruction of breast parenchyma using Hololens – a Microsoft tool to create augmented reality. Previously I had worked as a Medical Imaging Scientist at Volpara Solutions Ltd., which is the world leading high-tech Company in breast density measurement and risk assessment in New Zealand – though I am based at Oxford.

		I represent the company in a project called Adopting Breast Screening Strategy Using Personalized Risk Estimation (ASSURE). For this post, I have secured a funding in a grant supported by the European Commission under the 7th Framework Programmed for Health Research. I am being directed in this project by Prof. Sir Michael Brady FRS at the University of Oxford, who was also my DPhil supervisor. It was a collaborative project headed by Prof. Nico Karssemeijer, which includes a number of partner companies and research groups in medical imaging. My current research theme in augmented reality takes inspiration from my previous industrial experience, where I have strong ambition to commercialize methods that can help clinicians to make breast cancer risk and diagnostic decisions based on non-traditional and novel ways: that combine the edge of game computing research to biomedical engineering, and further make it available at the point of care.
Yang Jiang	Robert Gordon University	**Mixed Reality Virtual Coach System on Gaits Analysis for Health Incentivisation** In real world, some wrong movements during daily exercises (jogging, swimming, yoga etc.) will cause injuries or damages to part of body such as angles, joints etc. These tiny injuries might not be easily spotted by human eyes, and some users (especially people with disabilities) might prefer to do exercises all by themselves rather than seeking for helps. We are exploring the possibilities to develop an innovative Virtual Coaching Framework by investigating a low latency Motion Capture system on Virtual Reality platforms. This framework will help the users to monitor & correct their gestures, getting feedbacks instantly and interact with the virtual objects to maximise their performance. An enhanced motion analysis application to support better human-computer interactions will be developed to help gym, local communities or physiotherapists to understand and observe the clients' postures and movements, so the customised physical exercise plans could be provided to benefit the end user dynamically.
Marwa Mahmoud	Cambridge University	**Automatic analysis of face and gesture in psychological distress** This talk will discuss how computer vision and machine learning can be used to build automatic systems that can sense, analyse and decode non-verbal signals from face and gesture. These nonverbal cues may indicate expression of emotions and mental states or even some medical conditions such as pain, depression and anxiety. Several theories address the relation between non-verbal cues and different levels of depression, anxiety or stress. Manual coding of non-verbal cues is the common practice for running such studies, which is time consuming and non-objective. Recent research has looked into automatic detection of cues associated with psychological disorders. My work proposes the use of

		multimodal features from the face and body to infer psychological distress. Moreover, I will present how computer vision techniques used for human facial expressions analysis can be extended to detect pain in facial expressions of sheep. Applications of this work will enhance the well-being of both humans and animals.
Rafaela Neiva Ganga	Institute of Cultural Capital	**House of Memories: The Impacts of a Digital Museum-led Dementia Awareness Programmes on Informal Caregivers' Subjective Wellbeing**
		This presentation draws on the results of the impact of House of Memories Family Caregivers' Awareness Day across four museums in England on the subjective well-being of 66 participating dementia caregivers. House of Memories is an award-winning dementia awareness programme led by National Museums Liverpool (NML) in the UK that uses museums' collections to support caregivers to develop reminiscence activities with people with dementia. My House of Memories app was launch in 2012 and since then has register more than 12 000 downloads worldwide. Crossing Boundaries: The value of museums in dementia care developed a mixed-method pre-post approach, combining quantitative profiling of participants' care responsibilities and museum engagement; standardized measures of subjective well-being and care burden (adaptations of the Warwick-Edinburgh Mental Wellbeing Scale and Zarit Burden Interview); and delegates' comments on the session collected by National Museums Liverpool Marketing Department. Parametric statistic and thematic exploration were used for data analysis.
Arlinda Cerga Pashoja	Imperial College	**VR as treatment for Behavioural and Psychological Symptoms of Dementia**
		Behavioural and Psychological Symptoms of Dementia (BPSD) such as agitation and aggression affect almost everyone with dementia and are core symptoms of the condition. These symptoms cause distress to the person with dementia and their caregivers and predict early institutionalisation and death. Historically, BPSD has been managed with medication, typically anti-psychotic drugs. Recent data show that anti-psychotic medications increase mortality and the risk of stroke in people with dementia. Consequently, there is a need to evaluate the impact that non-pharmacological interventions have on BPSD.
		Reminiscence therapy (RT) uses old newspapers, photographs, household items and music to stimulate memories and enable people to relive past experiences that are highly significant to them. Simulated presence therapy entails use of videos or audio recordings of family members sharing conversations and memories with the person with dementia. We believe that VR has the unique potential to combine both the above interventions into a much powerful approach as an effective treatment for BPSD.

Ran Song	University of Brighton	**Visual Saliency: from 2D to 3D** Seeing comes before words. By "visual saliency", we mean enabling a machine system to automatically reason about which pixels, vertices or regions of a 2D image or 3D polygonal mesh are perceptually important, so the artificial intelligence can observe and potentially understand like humans. The presentation will give an introduction to the topic of visual saliency, particularly 3D saliency, including motivation, cognitive background, a light touch on one or two (depending on the time I have for the presentation) state-of-the-art methods that we developed, results, and applications in VR, 3D printing, medical image processing, etc.
Lili Tao	University of West England	**Computer Vision for Active and Assisted Living** Intelligent visual monitoring has received a great deal of attention in the past decade, due to increased interest in smart healthcare systems in the home environments. Although a wide variety of sensing technologies can be used in in-home assistive systems, visual sensors have the potential to address several limitations of current systems: they do not require the user to wear them and they are able to simultaneously detect multiple events. Supporting an active and independent life style at home has become a prominent concern in modern society. Active and Assisted Living systems (AAL) support an independent and healthy lifestyle for individuals, particularly beneficial for the elderly and disabled. In this talk, I will present the problems and recent solutions associated with the development of AAL systems for real life settings.
Neil Vaughan	University of Chester	**Simulators for medical procedure training with haptic feedback and virtual reality** I am currently developing a simulator for invasive surgery procedures. This is making use of the newer range of head mounted displays including HoloLens and Oculus. Also I have recently developed a stroke rehabilitation system using VR combined with other sensory and actuation mechanisms and technology to provide wellbeing and recovery to stroke patients. Also I have developed simulators for needle insertion, using haptic devices combined with 3D stereo graphics head mounted displays. I will be presenting the challenges and solutions for these developments.
He Wang	University of Leeds	**Virtual Reality for Cost-effective Human Perception Evaluation of Urban Green Space** Green (parks, trees) and blue (lakes, rivers) features in urban landscapes can provide considerable services to the well-being of local communities: greenhouse gas sequestration, psychological restoration, and opportunities for exercise. However, such space interventions must have acceptable installations to local people, which incurs dwindling budgets and thus calls for a cost effective tool for the aesthetic

		evaluation. Virtual reality can be used to explore human attitudes and perceptions of those spaces. In a pilot study, we vary the tree cover in three parks in Bradford and explore aspects of psychological restoration. The effects of tree cover generally enhanced restorative benefits, but the size of the effect was park-specific. We demonstrate that VR, although with technical challenges to be addressed, may have a key role to play in socio-ecological studies of urban ecosystem services, and is a promising method to provide accessible, scalable and economic tools.
Pauline Whelan	University of Manchester	**Virtual Reality to Improve Health and Wellbeing of Children and Young People: Digital Research @ CAMHS.Digital** The preventive mental health needs of children and young people are a priority for UK and international public health organisations. The CAMHS.Digital research unit aims to develop digital tools that improve the mental health and wellbeing of vulnerable children and young people. Currently, we are exploring how Virtual Reality (VR) might assist with management of self-harm. Evidence-based VR interventions, co-designed with young people, offer the possibility for self-harm management strategies that are safe, accessible, scalable, cost-effective, and acceptable to those who use them. However, VR has little track record of use within mental health. So research is needed to develop and evaluate VR interventions co-designed with, and usable by young people at whom they are targeted.
Cao Mingliang	Foshan University	**Toward Cloud Avatars that Dress You Well and Impact Your Health** This talk discusses what would be needed to realize cloud avatars that could dress us well and potentially impact our health by suggesting clothes appropriate for our activities. Comparison between traditional simulation-based methods and cloud avatars, and intended key features of cloud avatars are discussed. In addition, how to capture the data and how to embed avatars into smart environments in the future are also explored in this talk.
Tong Jing	Hehai University	**Low-Cost 3D Modelling Technology and its application in Virtual Try-on and Other Areas** With the popularization of virtual reality, augmented reality and 3D printing, construction of 3D models are highly required. This report will introduce the main concepts of 3D modelling and our main work in methods of low-cost 3D modelling, such as 3D human body scanning, 3D hair restoration, 3D face reconstruction, etc. For the application of virtual try-on, large-scale construction of 3D geometric models, texture mapping, skeleton binding, animation, and dynamic simulation are required. The corresponding optimization algorithms and engineering skills are introduced. Finally, the application of low-cost 3D modelling in virtual reality, augmented reality, 3D printing, mechanical

		simulation, digital medicine, educational games and other areas is also introduced.
Wei Wei	Xian University of Technology	**Gradient-Driven Parking Navigation Using a Continuous Information Potential Field Based on Wireless Sensor Network** This paper present a method that supports information query and navigation systems through construction of the virtual potential field. Under the premise of diffusion equation and Poisson-based formula, a novel method is proposed which can accomplish the navigation more conveniently and efficiently. In order to guarantee the accuracy of navigation, we first utilize relative knowledge of information transmission and the partial differential process (diffusion equation) in electric potential field, meanwhile gradient descent method is applied in the process of application by the use of a complete mathematical derivation. Tiny-OS simulations show that the method can efficiently overcome the original WSNs' weakness, i.e. the network configuration abilities of information navigation are not good enough. Simultaneously, during the process of exploring the navigation computation, structures of diffusion equation are more flexible and adaptable.
Yan Fengting	Shanghai University of Engineering	WebVR Large-scale Building Crowd Fire Evacuation Based on Speech Recognition
Ding Dandan	Hangzhou Normal University	Convolutional neural network based video coding methodology
Hu Guosheng	China Academy of Art	Color Computing and Interactive Design
Sun Minghui	Jilin University	Enhancing Naturalness of Pen-and-Tablet Drawing through Context Sensing
Shen Yang	Lishui University	An Active Learning Framework for Alpha Matting
Shi Yan	Hangzhou Dianzi University	Learning as Adventure: An AR based App Designed with Gamification Elements to Facilitate Geographic information Learning
Wang Liying	Nanjing Normal University	Multi-Mode Behavior Detection for Online Learning
Li Yi	Wenzhou University	Haptic rendering method using penetration depth in high degrees of freedom
Xu Guangtao	Hangzhou Normal University	Research on Chinese Middle School Students' Scientific Practices with the Affordance of Virtual World
Xu Li	Ningbo University of Technology	Smart Home Control System
Yan Hong	Hainan University	Fishery Visualization in China South Sea
Yang Yang	Jiangsu University	Simulating Bokeh Effect with Kinect

Ying Wenhao	Changshu Institute of Technology	A New Clustering Method Based on Layered Hierarchical Fusion TSK Fuzzy Mapping