Inaugural University of Sydney Human Centred Technology Research Symposium

Improving Health and Wellness through Digital Technologies

Organised by the Human Centred Technology Research Cluster and the Faculty of Engineering and Information Technologies at the University of Sydney

Tuesday 16 February 2016

THE UNIVERSITY OF
SYDNEY

Schedule

TIME	SESSION	TITLE, SPEAKER
8.30am	Registration and Posters	
9.00am	Welcome to University	Prof Kim Rasmussen, Associate Dean Research, Faculty of Engineering and Information Technologies, University of Sydney
9.10am	Introduction	"Health Technology - The Human-Centred Vision" Prof Judy Kay, University of Sydney
9.30am	Keynote Presentation	"Current state and future challenges in Clinical Decision Support" Adjunct Associate Prof Anne Miller, Vanderbilt University Medical Center, and NSW Health
10.00am	Research Presentation	"eHealth and Using data for change" Prof Tim Shaw, University of Sydney
10.15am	Research Presentation	"Minimally invasive sensing of sleep apnea" Prof Philip de Chazal, University of Sydney
10.30am	Break	
11.00am	Research Presentation	"Improving the health and wellbeing of young adults with digital technology" Prof Margaret Allman-Farinelli, University of Sydney
11.15am	Research Presentation	"The use of motion sensors in physical activity and sleep epidemiological and interventional research" Assoc Prof Emmanuel Stamatakis, University of Sydney
11.30am	Research Presentation	"Telehealth- convergence of ICT supporting healthcare" Assoc Prof Jinman Kim, University of Sydney
11.45am	Research Presentation	Dr Olivier Galy, University of New Caledonia Assoc Prof Corinne Caillaud. University of Sydney Assoc Prof Kalina Yacef, University of Sydney
12.00pm	Industry Presentation	"Personalised Medicine, Big Data and other buzz words in Health Technology" Dr George Margelis, Intel
12.20pm	Industry Presentation	"Playfulness, Health Buddies and mHealth" Dr Coralie Wales, Western Sydney Local Health District
12.40pm	Panel Session	"I own my health data. Right?" Dr John Lambert, NSW Health Prof Rafael Calvo, University of Sydney Prof Hugh Durrant-Whyte, University of Sydney Prof David Cook, University of Sydney Prof Tim Shaw, University of Sydney
1.00pm	Lunch and Posters	
1.45pm	Research Presentation	"Computing, Mental Health and Wellbeing" Prof Rafael Calvo, University of Sydney
2.00pm	Industry Presentation	"From Wearables to Thinkables - Deep Learning, Biosensors and the Next Generation of Mobile Devices " Dr Stefan Harrer, IBM Health Research
2.20pm	Industry Presentation	"A new approach - Engaging and Empowering Citizen's in their own Health and Wellness" Mr Robert Lippiatt, Self Care Alliance
2.40pm	Panel Session	"The vision for devices that transform our health" Dr George Margelis, Intel Prof Anthony Maeder, WSU Dr Alistair McEwan, University of Sydney Assoc Prof Corinne Caillaud. University of Sydney
3.00pm	Break	
3.20pm	Research Presentation	"Bioelectronics" Dr Alistair McEwan, University of Sydney
3.35pm	Research Presentation	"Wearable machine learning for cognitive aid" Assoc Prof Fabio Ramos, University of Sydney
3.50pm	Concluding Remarks	Prof Judy Kay, University of Sydney
4.00pm	Close and Networking	

Speakers

Professor Margaret Allman-Farinelli

Margaret Allman-Farinelli is Professor of Dietetics at the University of Sydney and leads the Wireless Wellbeing research node in the Charles Perkins Centre. She leads the transdisciplinary research node in the Charles Perkins Centre called Wireless Wellbeing – the aim of which is to investigate the use of new technologies in the delivery of preventive healthcare in nutrition and physical activity for weight management and chronic disease. Margaret's research is especially focused on improving healthy eating and preventing weight gain in young adulthood.

Abstract Improving the health and wellbeing of young adults with digital technology

Technology is often implicated in the rising prevalence of overweight in children and young adults but it has many applications in prevention and treatment of obesity. It is not commonly recognized that young adulthood is the period of most rapid weight gain. Our analyses show the prevalence of overweight and obesity has increased from 29% of males and 19% of females being overweight or obese in 1995 to 43% of males and 41% of females in 2012. SMART technology can be used for monitoring lifestyle behaviours such as dietary intakes and in the delivery of health promotion and individualized nutrition counselling. We have demonstrated the efficacy and acceptance of a multicomponent mHealth program in 18 to 35 year olds with improvements in dietary intakes and weight loss. Text messaging, emails, apps and website resources as well as brief telephone coaching are all useful communication channels for delivery. A major problem in young adults' diets is eating food of poorer nutritional quality prepared outside the home. We are using digital technologies to assess the impact and extent of the problem across NSW to formulate individual behavior change and population level policy. These two research projects demonstrate the value of digital technology to solve the most wicked health problems in our western society.

Associate Professor Corinne Caillaud

Associate Professor Corinne Caillaud is a member of the Faculty of Health Sciences and the Charles Perkins Centre. Her area of expertise lies in the field of aerobic fitness and exercise physiology with a special interest in energy metabolism and stress responses in relation to health outcomes.

More recently, A/Prof Caillaud introduced in her research the use of human centred technologies such as portable sensors with the aim to better characterise physical activity, metabolic adaptations and environmental stressors in humans "on the go". She is currently developing a number of research projects investigating the role of social interactions on physical activity in children in a school context, the impact of physical fitness and physical activity on wellbeing and performance following long-haul flights, or the health impact of active commute to work in urban environment.

A/Prof Caillaud also has a keen interest into the role technology can play to promote health literacy and skills and help people engage more in healthy behaviours.

Abstract Joint presentation – see Associate Professor Kalina Yacef's abstract.

Professor Rafael Calvo

Rafael Calvo is Professor at the University of Sydney, and ARC Future Fellow. He has taught at several Universities, high schools and professional training institutions. He worked at the Language Technology Institute in Carnegie Mellon University, Universidad Nacional de Rosario (Argentina) and on sabbaticals at the University of Cambridge and the University of Memphis. Rafael also has worked as an Internet consultant for projects in the US, Australia, Brazil, and Argentina. He is the recipient of 5 teaching awards for his work on learning technologies, and the author of two books and many publications in the fields of learning technologies, affective computing and computational intelligence. Rafael is Associate Editor of the IEEE Transactions on Learning Technologies, the IEEE Transactions on Affective Computing and the Journal of Medical Internet Research (JMIR-HF) Rafael is Editor of the Oxford Handbook of Affective Computing and co-author of "Positive Computing" (MIT Press) with Dorian Peters.

Abstract Computing, Mental Health and Wellbeing

There is increased awareness amongst computing professionals that the tools we build have an impact on people's psychological wellbeing and mental health. AI has generally focused on improving productivity and therefore wealth, but more recently, more humanistic variables are beginning to be taken into account. Can AI be used to understand what drives human emotion? [1,2] Can we integrate it into systems that promote empathy and compassion? [3] These and other determinants of psychological wellbeing are being used to promote flourishing as part of what we call Positive Computing [4]. But when it comes to psychological wellness, AI is having an impact beyond promotion. For example, it has already been shown to be valuable for risk detection and even treatment of mental illness. Take, for example, new systems that leverage Natural Language Processing and AI to detect depression and anxiety from social media data.

In this seminar I will discuss projects underway in our research lab and across the field that cover the spectrum of AI innovation for psychological wellbeing.

Professor Philip de Chazal

Philip de Chazal is the ResMed Chair of Biomedical Engineering at the School of Electrical and Information Engineering. Previously, he was an ARC Future Fellow at the University of Western Sydney. Prior to this he worked for 9 years in industry as a founder, director and chief technical officer for BiancaMed in Dublin, Ireland.

His specialisation is biomedical digital signal processing with a focus on monitoring of sleep and the cardiorespiratory system. He also has extensive experience in commercialising university research.

Abstract **Minimally invasive sensing of sleep apnea**

It is a challenging problem to quantitatively measure human sleep without interfering with it. I will present an overview of my 15 years of experience developing ways of measuring sleep non-invasively. During this time I have worked in commercial and academic institutions, and have used a variety of sensors including ECG, oximetry and radio frequency based sensors.

Dr Olivier Galy

Since 2000, Dr Olivier Galy has been developing his research in the field of exercise physiology, with a particular interest in sports performance in endurance triathletes. At the University of New Caledonia he currently leads the research unit on lifestyle in Oceanian adolescents, and is developing an interdisciplinary approach with a special focus on exercise including physical fitness, physical activity and food behaviours in both urban and rural environments.

Abstract Joint presentation – see Associate Professor Kalina Yacef's abstract.

Dr Stefan Harrer

In 2015 Stefan co-founded the Brain-Inspired Computing Research program of IBM Research – Australia and now leads it as an IBM Research Staff Member and Honorary Associate Professor at the Centre for Neural Engineering at the University of Melbourne. His team spearheads an effort to employ IBM's recently introduced cognitive TrueNorth chip to develop deep-learning enabled biomedical and healthcare solutions at the intersection of neuroscience and neuromorphic computing.

Since joining IBM Research in 2008, Stefan has worked on biotechnology and nanotechnology research projects at IBM AlbanyNanotech, the IBM T.J. Watson Research Center and IBM Research - Australia. He has held positions as Lead of the Lab Innovation Development Team and Science Technical Assistant to the Lab Director and now is a member of the Senior Lab Leadership Team at IBM Research – Australia. Stefan has authored and co-authored over 30 technical publications, is an inventor on 20 issued patents and has more than 20 patents pending. He is a Senior Member of the IEEE, a member of the New York Academy of Sciences and the American Chemical Society, and an Associate Editor of the IEEE Transactions on Nanobioscience. Stefan has received a Research Scholarship from UC Berkeley, a Karl Chang Innovation Fund Grant from MIT and Research Grants from the NIH and the Australian Research Council. He holds a PhD in EECS from the Technical University Munich and an Honorary Masters Certificate in Technology Management from the Center for Digital Technology and Management.

Abstract **From Wearables to Thinkables - Deep Learning, Biosensors and the Next Generation of Mobile Devices**

Wearables will be transformed into Thinkables offering cognitive real-time analytics of biometric and biological data at the point of sensing. Thereby

neuromorphic platforms will play a key role in connecting on-body sensors directly with deep-learning technology for instant analytics, prediction and interfacing with artificial intelligence systems. The architecture of such autonomously operating, always-on cognitive sensors will be minimum-footprint biosensors feeding into low-power deep-learning pipelines with a closed-loop interface back to the wearer. By providing the analytics power of the most advanced supercomputers on an ultra-low power system the size of a stamp, IBM's recently introduced neuromorphic TrueNorth chip constitutes the means to transform a Wearable into a Thinkable. By linking TrueNorth technology to advances in biosensing and deep-learning we aim to create a first generation of Thinkables in the field of applied neuroscience. The focus of our current exploratory feasibility studies lies on monitoring and interpreting brain activity in form of EEG and ECoG data for diagnostics and predictive prevention in epilepsy as well as for brain-machine interfacing applications in bionics. Further topics of interest are deep-brain-stimulation and parallel analysis of multiple orthogonal sensory signals. This talk will give an overview of TrueNorth technology with special focus on transformative healthcare applications and present some of our early results of EEG data analysis using neural networks.

Professor Judy Kay

Judy Kay is Professor of Computer Science. She leads the Human Centred Technology Research Cluster, one of three priority clusters in the Faculty of Engineering and IT at the University of Sydney. Her own lab, CHAI, Computer Human Adapted Interaction Research Group aims to create new technologies for human computer interaction (HCI). Her personalisation research has created the Personis user modeling framework. Personis models are distinctive in that they were designed to be scrutable, because interfaces enable the user to scrutinise their user model and personalisation processes based on it. Her interface research has created the Cruiser Natural User Interaction (NIU) software framework. This provides new ways for people to make use of large interactive tabletops and wall displays. By mining the digital footprints of such interaction, this research is creating new ways for people to learn to collaborate, and to learn and work more collaboratively. Her research has been commercialised and deployed and she has extensive publications, in venues such as the conferences Pervasive, Computer Human Interaction (CHI), User Modeling (UM, AH, UMAP) and journals, such as IEEE Transactions on Knowledge and Data Engineering, International Journal of Artificial Intelligence in Education, User Modeling and User-Adapted Interaction, Personal and Ubiquitous Computing, Communications of the ACM, Computer Science Education.

Abstract Health Technology - The Human-Centred Vision

This talk has three parts. First, it presents the broad vision of the Human Centred Technology Cluster (HCT). While HCT is based in the Faculty of Engineering and Information technologies, it is deeply multi-disciplinary. But it is far more than that. It tackles the problems that we must address if we are to create technologies that truly address people's problems, meet their needs and help them fulfill their aspirations. Second, the talk overviews the breadth of our projects in health and wellness technology. This is to complement the speakers who will present during the day. Finally, it illustrates the HCT vision with some examples of my work that aims

to enable people to harness, control and manage their big personal data. This is challenging because people are generating vast, and growing, collections of personal data. That data is captured by rich personal digital ecosystems of devices, including our digital footprints, ranging from simple clicks and touches, to images, audio and video. Because it is personal, it should be handled in accord with people's wishes. To do this, we bring together researchers in Human-Computer Interaction, Databases, Machine Learning and Data Mining, Security and health disciples.
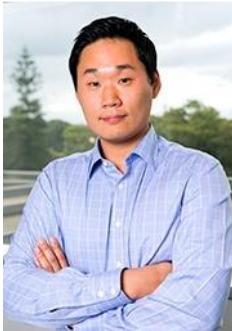
Associate Professor Jinman Kim

Jinman Kim is an Associate Professor, School of Information Technologies, Faculty of Engineering and IT, the University of Sydney and the Director of the Nepean Telehealth Technology Centre. He is also the Theme Leader (imaging, visualisation and IT) of the institute of BMET and USYD-SJTU Joint Research Alliance.

Prior to this, Associate Professor Kim was an ARC postdoctoral research fellow, working closely with RPA on medical imaging and visualization. In 2009, he joined MIRALab research group, Switzerland, as a Marie Curie Senior Research Fellow. Associate Professor Kim has been CI for several ARC linkage grants and AI for several other major external competitive grants. He is active in his research community e.g., CGI'14 program chair and as a Guest editor for a special issue on Telehealth, by in the IEEE Journal of Biomedical and Health Informatics. He is a reviewer for numerous leading journals and the ARC.

Abstract Telehealth: convergence of information and communication technologies supporting healthcare

From patients sending health status updates and video consulting with doctors on their tablets, to specialists accessing patient medical records, including medical image exams with sophisticated automated image analysis, in any location, a wave of change is coming to the health care environment. Due to the fast growing of technology and the ageing population, healthcare delivery will soon become very different from today's practice. The convergence of information and communication technologies supporting telehealth is fostering diverse efficient and cost-effective healthcare solutions. These solutions are becoming embedded in all aspects of health care, many fuelled by the expansion of affordable and accessible Internet-enabled health sensors and mobile computing devices. In this talk, Dr Jinman Kim will present several new Telehealth initiatives underway at the Nepean Telehealth Technology Centre. NTTC is a unique multi-disciplinary partnership between the Nepean Hospital and the institute of Biomedical Engineering and Technology (BMET), Faculty of Engineering and IT, to innovate and translate new Telehealth technologies.

Mr Robert Lippiatt

Robert Lippiatt is a Strategic Business Advisor with over twenty five years experience in positioning and restructuring organisations in the Public, Private and Not for Profit Sectors across a number of Industry Sectors. For the past thirteen years he has been working on a mix of projects concerned with the development of new service and delivery models in the Health, Aged and Community Care Sectors. Robert works primarily with Boards and Executive Leadership Teams. He is a Member of the Australasian College of Health Service Management, an Associate Fellow of the Australian Human Resources Institute and a Member of the Australian Institute of Company Directors.

Abstract **A new approach - Engaging and Empowering Citizen's in their own Health and Wellness**

Sustainability is on the lips and minds of those involved in health policy and funding both public and private. Current models and approaches in the Health and Care Sector are built around a provider centric model. This model does not recognise the key role and responsibility of citizen's as the owners and primary managers of their own health and wellbeing. If we truly want to see change and innovation that leads to a healthier population and a more sustainable Health and Care Sector then a new approach that moves to a citizen centric model is required. This requires new approaches such as engaging and listening to citizen's, providing them with access to information that supports informed decision making and the tools and technology that put them at the centre of their own health and wellness.

The quiet revolution of Self Care and Self Management is underway. So, what might a citizen centred Health and Care Sector mean for those engaged in research, education and the development and deployment of new technologies and clinical and business models.

Dr George Margelis

Dr George Margelis is a medical practitioner who has been deeply involved in technology for the last 30 years. Originally trained as an optometrist, he started tinkering with computers in 1981 when he bought his first PC, a Sinclair ZX80 before going back to medical school to complete his training at the University of Sydney. During that time he also started a software distribution company that grew to one of the largest direct software sales companies in Australia. He was CIO of a private hospital group as well as managing an innovative software development team that produced a personal health record for Australians 10 years before the PCEHR. He joined Intel in 2005, and then Intel-GE Care Innovations as they tried to radically transform healthcare, and has some amusing stories he can share about that time. In 2014 he returned to Intel as Health & Life Sciences Lead for Australia & New Zealand.

In 2013 he was appointed an Adjunct Associate Professor at the University of Western Sydney with the TeleHealth Research & Innovation Laboratory (THRIL), and is also currently a member of Ignition Labs a start up incubator in the health

space as well as a number of advisory roles. He was appointed senior adviser to the Health Information Management Systems Society (HIMSS), the peak international body in health information technology in February 2014. In July 2014 he was admitted into the IT in Aged Care (ITAC) Hall of Fame for his service to technology in aged care. He is a regular on the healthcare social media beat regularly blogging, tweeting, and commenting on healthcare trends. Over the last 3 decades he has been deeply involved in both the healthcare world and the technology world, and sees a natural fit between the two. However there also exists a natural tension between good care and good technology that needs to be addressed.

Abstract Personalised Medicine, Big Data and other buzz words in Health Technology

Hype is very common in the world of health technology, and often hidden behind it are some very useful solutions to modern health problems. In this presentation we explore some of those areas and try to separate the hype from the reality and find solutions that clinicians can use today.

Dr Alistair McEwan

Alistair's research investigates medical instrumentation, biomedical devices and integrated circuit design. He leads bioelectronics research and teaching at The University of Sydney. His research aims to develop hardware and algorithms to measure and classify biological signals. He is one of the founding members of Biomedical Engineering and IT Research Institute and leader of the Biomedical devices and instrumentation theme. With clinical colleagues at Royal Prince Alfred Hospital, Sydney and The School of Public Health Alistair leads a project to develop low cost body composition measurement in newborns. This project has received continued support from the Bill and Melinda Gates Foundation. He has developed a portable imaging device based on Electrical Impedance Tomography Spectroscopy (EITS). The resulting system is currently being used in clinical trials of stroke and epilepsy monitoring in London hospitals and attracted commercial attention of Philips Research Laboratories (Germany) and GE Research (USA).

Abstract Bioelectronics

The field of bioelectronics is very human centred with a focus on measuring the physiological properties of tissue to enable new technologies. There is growing interest from companies within and outside traditional health care. I will introduce some of the projects and devices we are working on where we are increasingly taking into account the importance of human interaction.

Adjunct Associate Professor Anne Miller

Dr Anne Miller is a Human Factors specialist working with E-Health NSW. She has recently returned from the United States where she was Associate Professor and Associated Director of the Human Factors & Information Design Group within the Center for Research and Innovation in Systems Safety at Vanderbilt University Medical Center, Nashville Tennessee. She remains an Adjunct Associate Professor position at Vanderbilt. Dr Miller was awarded her PhD in the field of psychology (human factors) from The University of Queensland, Australia in 2004. Prior to that, she worked as a critical care nurse at the Alfred and other hospitals in Melbourne before retraining as in the field of Applied Psychology. She has consulted to multidisciplinary software development teams in industries as diverse as telecommunications, finance, manufacturing and mining, and has led user interface design efforts aimed at improving the design of computer-screens, multi-media technology and applications using human factors approaches. Dr Miller's recent research involves the role and design of technology to support distributed communication and the continuity and coordination of care within and across community, acute and critical care settings; clinical decision-making and clinical decision support. She has published papers addressing handovers, health care team coordination, and information design for clinical decision- making.

Abstract **Current state and future challenges in Clinical Decision Support**

Clinical Decision Support technology can improve patient safety, the implementation of evidence-based practices, while also reducing clinician memory demands and information overload. However, despite growing sophistication, CDS applications are often poorly accepted and adopted by clinicians. A common complaint is that CDS applications poorly integrate into clinical work. Computer screens provide the interface between computer and clinician decisions. Thus the design of human-computer interactions (user interfaces) is pivotal to the successful integration of computerized and clinician decision making. This talk revisits clinical decision making, presents three challenges and some directions in addressing these in user interfaces. The three challenges include 1) supporting situation and action awareness, 2) dealing with uncertainty and 3) supporting care continuity over time and across locations. Ultimately a joint cognitive system is one that draws on and integrates computational and human cognitive capabilities.
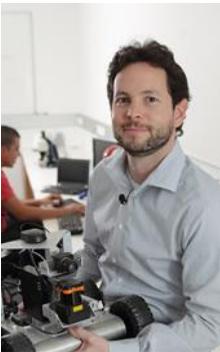
Associate Professor Fabio Ramos

Fabio Ramos is an Associate Professor in machine learning and robotics at the School of Information Technologies, University of Sydney. He received the B.Sc. and the M.Sc. degrees in Mechatronics Engineering at University of Sao Paulo, Brazil, in 2001 and 2003 respectively, and the Ph.D. degree at University of Sydney, Australia, in 2007. From 2007 to 2010 he was an ARC postdoctoral fellow and from 2012 to 2014 an ARC DECRA fellow. He has over 100 peer-reviewed publications and received numerous awards. His research focuses on statistical machine learning techniques for large-scale data fusion with applications in robotics, mining, environmental monitoring and healthcare.

Abstract **Wearable machine learning for cognitive aid**
The challenges associated with an ageing population and pressures on carers and nursing services, are opening unprecedented opportunities for pervasive computing. Such systems can improve the quality of life of the aged particularly by making daily activities of living safer and easier to complete. In this talk I describe a novel pervasive system to recognise human daily activities from a wearable device. The system is designed in a form of reading glasses, named 'Smart Glasses', integrating a 3-axis accelerometer and a first-person view camera. Our aim is to classify subject's activities of daily living (ADLs) based on their vision and head motion data. This ego-activity recognition system not only allows caretakers to track on a specific person (such as disabled patient or elderly people), but also has the potential to remind/warn people with cognitive impairments of hazardous situations. Experimental results on two large datasets: 20 h of elder ADLs datasets and 40 h of patient ADLs datasets, containing 12 and 14 different activities show that our method efficiently improves the system performance (F-Measure) over conventional classification approaches by an average of 20%–40% up to 84.45%, with an overall accuracy of 90.04% for elders. More challenging tests on 30 patients with serious disabilities achieved an overall accuracy up to 77.07%.

Professor Tim Shaw

Tim is the inaugural Professor of eHealth and Director of the Research in Implementation Science and eHealth Group (RISe) in the Faculty of Health Sciences at the University of Sydney. Tim leads implementation science across Sydney Catalyst and Sydney West Translational Cancer Research Centres and has an active research and development program both in Australia and Internationally. Tim's research interests lie at the intersection of implementation science and quality improvement and how ICT and health data is impacting on practice, professional development and system improvement.

Abstract **eHealth and Using data for change**
Tim's talk will cover the framework developed at University to guide research and teaching in eHealth. He will present his current research on effective downstream use of routinely collected patient data to impact on clinician behaviour and patient outcomes.

Associate Professor Emmanuel Stamatakis

Emmanuel is an NHMRC Senior Research Fellow at Charles Perkins Centre and the Sydney School of Public Health. He completed a PhD on the use of physical activity-measuring motion sensors in clinically obese children and adolescents at the University of Bristol in 2003. In 2002 he joined University College London where for 5 years he led the development and implementation of physical activity measurements in several large-scale epidemiological studies (e.g. Health Survey for England, National Diet and Nutrition Survey, Scottish Health Survey). In 2006-7 he led the development of the very first national population

survey in Europe that used objective measures to quantify physical activity and sedentary behaviour (Health Survey for England 2008). He was a National Institute for Health Research Fellow between 2007-'10 (Physical Activity Epidemiogy) and 2011-'14 (Sedentary Behaviour and Cardiometabolic Disease). He has been an advisor to the English Department of Health, the Office for National Statistics UK and Sport England. His current research program examines the role of sedentary behaviour, physical activity/exercise, and sleep on chronic disease prevention, mental health, and wellbeing. He has received research funding from UK, Australia, Kuwait, and Finland and has authored over 155 papers in many high impact journals, including several publications in the British Medical Journal, The Proceedings of the National Academy of Sciences, JAMA Internal Medicine, JAMA Psychiatry, Plos Medicine, Journal of the American College of Cardiology, Diabetes Care, and International Journal of Epidemiology. His research has received broad media coverage by UK, International and Australian media.

Abstract The use of motion sensors in physical activity and sleep epidemiological research: past, present, and future

Physical activity, sedentary behaviour, and sleep are complex multidimensional behaviours that are still poorly understood. This poor understanding is due to the inability to measure accurately the most important dimensions of these behaviours at the population level. As technology is advancing fast and becomes more compact and more inexpensive, the use of motion sensors in large-scale epidemiological research gained popularity in the last decade. Due to their objective nature, motion sensors overcome many limitations of the questionnaires, such as recall bias and biases related to people's tendency to over-report doing "the right thing". However, motion sensors are far from perfect in quantifying physical activity and sleep and there many challenges relating to their feasibility, the completeness of information they provide, their inability to record context, and the interpretation of their output. Consumer "lifestyle monitoring" devices (e.g. Fitbit products) have gained a lot of popularity in the last few years but their potential for health surveillance research is very limited due to their ability to influence behaviour and the lack of transparency in how the devices operate and data are processed by the manufacturers. Although the "perfect" motion sensor for large-scale research has yet to be developed, it is becoming increasingly promising that it may be just around the corner.

Dr Coralie Wales

Dr Coralie Wales is the founder and current President of Chronic Pain Australia. She is well known for innovation in educational programs for health professionals to support their work with people in pain. She has developed consumer-centred pain management services for over a decade consulting to employers, insurers, rehabilitation providers and treatment providers to improve outcomes for all parties.

Coralie's research interests include the challenge of pain within Australian vocational rehabilitation systems, pain leading to suicide, and the use of high speed technology in rural Australia to provide health care for people in pain and the use of social media by people in pain. She has taught chronic pain related subjects at the University of Sydney and is a regular provider of continuing education about chronic pain management for health professionals. She has a deep understanding of the challenges for all stakeholders in the provision of healthcare

services for people in pain within Australian health settings, particularly within statutory compensation systems.

Coralie is working in Western Sydney engaging communities in health reform.

Abstract Playfulness, health buddies and mHealth improves mental and physical wellbeing in a rural Australian context

In Australia, an ageing population and the increasing incidence of cancer are challenges for health service consumers and clinicians. This is especially so for people living away from major cities where availability and choice in services is an issue. Telehealth hopes to level the playing field for this group of health consumers. The psychosocial needs of people surviving cancer are noted in the literature as a major unmet need and this research aimed to address those needs using mHealth technologies.

A mixed method approach was used. A participatory evaluation framework was adopted to ensure that all stakeholders' experiences informed service development. Surveys were administered pre and post intervention to determine changes in quality of life, impact of pain, distress, anxiety and depression. Checking in with participants occurred regularly. Consequently, surveys were developed to capture the experiences of participants along the way. While 100 people were recruited into the project, 57 were eligible for inclusion in the dataset. Carers were also included as participants in this study.

There were significant improvements in mental and physical wellbeing (SF36) and significant reductions in depression and anxiety (K10) and distress (DT). There were significantly positive experiences with working with a health buddy, using the technology and the achievement of health goals. Qualitative analysis yielded themes about the usefulness, enjoyability and playfulness of mHealth.

Associate Professor Kalina Yacef

Kalina Yacef (BSc. Maths, PhD Computer Science) is Associate Professor at the School of Information Technologies, University of Sydney, Australia. Her research is primarily in artificial intelligence in education and educational data mining, creating techniques and tools to allow both teachers and learners to access and benefit from the unprecedented amount of empirical data generated whenever people learn with or through technology. She is a founding member of the International Educational Data Mining Society (IEDMS) and serves on its Board of Directors, as well as on the Executive Committee of the International Artificial Intelligence in Education Society (IAIED). She is Associate Editor (and founding past Editor-in-Chief) of the Journal of Educational Data Mining, and past conference program chair of Artificial Intelligence in Education (2013) and Educational Data Mining (2012).

Abstract Novel technologies for promoting healthier behavior in oceanian youth
About 80% of children and adolescents in the Pacific region are at risk of developing a non-communicable disease, such as obesity and type 2 diabetes, due to insufficient physical activity and poor eating habits, especially soft drink consumption. Using an approach based on novel technologies such as wearable devices and game-based teaching modules, we aim at supporting a tailored health education program that will change children's behavior long-term, by increasing their physical activity and reducing their soft drink intake.

Panelists

Professor Hugh Durrant-Whyte

Hugh Durrant-Whyte is a Professor and ARC Federation Fellow at the University of Sydney. From 2010-2014, he was CEO of National ICT Australia (NICTA), and from 1995-2010 Director of the ARC Centre of Excellence for Autonomous Systems and of the Australian Centre for Field Robotics (ACFR). He has published over 350 research papers and founded four successful start-up companies. He has won numerous awards and prizes for his work, including being named the 2010 NSW Scientist of the Year. He is a Fellow of the of the Australian Academy of Science (FAA), and a Fellow of the Royal Society of London (FRS).

Dr John Lambert
Chief Clinical Information Officer, eHealth NSW
As a practicing clinician with broad experience in Information and Communication Technology development, Dr John Lambert was the standout choice when appointed as eHealth NSW's Chief Clinical Information Officer in August 2014. Prior to his appointment to this inaugural position, he was working as the Medical Director of Intensive Care at Orange Health Service. With a passion for designing technology and related systems to help clinicians deliver better patient care, John has a long history of contributing to major health projects including hospital redevelopments and clinical Information Technology (IT), technology and communication systems, including the Critical Care Advisory Service in Western NSW Local Health District. At eHealth NSW, John is focused on ensuring clinical programs are aligned and integrated while also enabling future innovation across NSW Health.

Professor Anthony Maeder

Anthony Maeder is Professor in Health Informatics at the University of Western Sydney, where he leads the Telehealth Research and Innovation Laboratory. He was previously the inaugural Research Director of the CSIRO eHealth Research Centre in Brisbane from 2004-2008. He is a Fellow of the Institution of Engineers Australia and a Fellow of the Australian Computer Society. Since 2006 he has served on the IT-14 Health Informatics Committee of Standards Australia, and contributed to ISO TC-215 international standards development. He was a Board Member of the Health Informatics Society of Australia and their representative on IMIA WG1 (Education) until 2011. In 2015 he was appointed as the Fulbright Distinguished Chair in Agricultural and Life Sciences, visiting Kansas State University.

For more information
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