

# EW2: ISCAS 2024

## EMBEDDED WORKSHOPS ON TECHNOLOGY FOR THE ELDERLY (GERONCAS)

WEDNESDAY  
22 MAY 2024

LEO 1, RESORTS WORLD  
CONVENTION CENTRE

The Embedded workshop on technology for the elderly, GeronCAS, at ISCAS 2024 has the overarching goal of sustaining and fostering interest in the continuous development of technology designed to empower systems for managing the care of the elderly. Through this workshop, we aim to cultivate a heightened focus on technology development specifically tailored to address the needs of seniors within the Circuits and Systems (CAS) society.

### Distiguished Speaker



**Prof Ir Dr Siti Anom Ahmad**  
Universiti Putra Malaysia



**Dr Mohammad Al-Amri**  
Cardiff University,UK



**Dr Yuanyuan (Helen) Zhao**  
Zhejiang Dongfang Polytechnic,  
China



**Prof Dr Vasily Moshnyaga**  
Fukuoka University, Japan

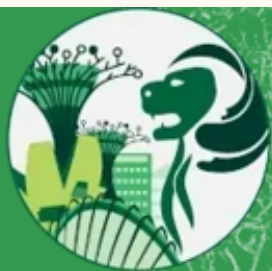


**Prof Dr Tomohiro Umeda & Rio  
Nara Medical University (MBT),  
Japan**



**Dr Mohd Nazim Mohtar**  
Universiti Putra Malaysia  
(Chair)

TIME		SPEAKER	REMARKS
1330	1400	Ts Dr Mohd Nazim	Gerontechnology
1400	1430	Prof Dr Vasily Moshnyaga	Dementia caregivers need help. How CAS engineers can assist them?
1430	1500	Prof Ir Dr Siti Anom	Smart Technologies for Dementia Management: Circuitry Solutions
1500	1530	Coffee Break	
1530	1600	Dr Mohammad Al-Amri	Can Virtual Reality Feedback Improve Motor Performance in Individuals with Knee Osteoarthritis?
1600	1630	Dr Yuanyuan (Helen) Zhao	The expectations and acceptability of a smart nursing home model among Chinese older adults
1630	1700	Prof Dr Umeda & Rio Ohmori	Medicine Based Town Initiatives in Japan



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### “Dementia caregivers need help. How CAS engineers can assist them?”

**Abstract:** More than 55 million people now have dementia worldwide, and nearly 10 million new cases appear every year. Dementia is a syndrome that imposes a significant burden on families, caregivers, and society, making caregiving the most demanding job in the world. This talk overviews how circuit and system engineers can ease the caregiving of people with dementia.

**Speaker Bio:** Vasily Moshnyaga received his Ph.D. in computer engineering from Moscow Aviation Institute in 1986. He is a Full Professor in the Department of Electronics Engineering and Computer Science, Fukuoka University, Japan. Dr. Moshnyaga served as Vice-Chairman of the IEEE CAS Society, Fukuoka Chapter, a General Chair of the IEEE Midwest Symposium of Circuits and Systems, and a member of Steering and Technical Program Committees of many international conferences and symposia including ACM/IEEE ISPLED, IEEE SMC, IEEE ISCAS, IEEE MWSCAS, ASP-DAC, etc. His current research interests are in the areas of video processing, low-power design, embedded systems, and cognitive systems with a particular emphasis on information technologies for assisting dementia caregivers. He has authored or co-authored over 200 referred journal and conference publications, one book and holds six patents. He is a senior member of IEEE, a member of the Institute of Electronics, and a member of Information, and Communication Engineers of Japan.



Prof Dr Vasily Moshnyaga

### “Smart Technologies for Dementia Management: Circuitry Solutions”

**Abstract:** National Health and Morbidity Survey 2018: Elderly Health reported the overall prevalence of probable dementia was 8.5% among the older adults in Malaysia. This finding was closer and only slightly higher than the World Health Organization (WHO) estimate of global dementia of 5%–8%. According to Alzheimer’s Disease International, the estimated number of persons living with dementia in Malaysia was 123,000 in 2015, 261,000 by 2030 and 590,000 by 2050. Dementia is a complex condition that requires comprehensive care. People with dementia experiencing memory loss, cognitive decline, and changes in behaviors. Emerging smart technologies offer innovative solutions to support dementia patients and their caregivers, including monitoring and tracking, smart home technologies, wearable devices, medication management, and cognitive simulation and engagement tools. Thus, MyAgeing™ has organized Workshop on Utilizing Circuits and Systems in Managing Dementia (GeronCAS2023) in Kuala Lumpur on November 2023 to provide a platform for researchers, practitioners, and professionals in the field of gerontology, ageing and technology to exchange knowledge, share research findings, and discuss innovative approaches and solutions related to dementia. A total of 50 participants from different fields of expertise and countries from participated in this workshop. They discussed on the current practice of the management and treatment of dementia, issues and barriers among stakeholders, as well as how to utilize CAS in the management of dementia. Smart technologies are revolutionizing dementia care, offering innovative solutions to enhance patient safety, independence, and quality of life. As research and development continue, we can expect to see even more advanced and personalized dementia management tools in the years to come.

**Speaker Bio:** Siti Anom Ahmad is a Professor at the Faculty of Engineering, Universiti Putra Malaysia. Siti Anom received her PhD in Electronics in 2009 and MSc in Microelectronics System Design in 2004 from the University of Southampton, UK. She received her BEng in Electronic/ Computer from UPM in 1999. She is a Professional Engineer of Board of Engineers. Malaysia, Chartered Engineer of Institute of Engineering and Technology (IET), Senior Member of Institute of Electrical & Electronic Engineering. (IEEE) and a member of the Institute of Engineers Malaysia (IEM). Her research interests are biomedical engineering, artificial intelligence, gerontechnology, and intelligent control systems. She was the Director of Malaysian Research Institute on Aging (MyAgeingTM) from April, 2020 to March, 2023. She still actively doing research on Gerontechnology.



Prof Ir Dr Siti Anom Ahmad

### “Can Virtual Reality Feedback Improve Motor Performance in Individuals with Knee Osteoarthritis?”

**Abstract:** Impaired self-awareness (ISA) is common following traumatic brain injury (TBI) and can significantly impact safe road-crossing. Road-crossing interventions are variable and involve high-risk real-world situations. Virtual reality (VR)-based road-crossing can elicit changes in real-world functioning but has not been trialled in the TBI population. The primary objective of this research was to explore whether VR-based self-paced treadmill technology offers a safe road-crossing assessment mechanism for people with TBI. Three participants with TBI completed two road-crossing pilot-trials using a VR-based self-paced treadmill. Avatar feedback and verbal feedback were provided between trials. Participants were provided with a safe road-crossing strategy for the second pilot-trial. The Researcher and Participant evaluated road-crossing following each trial using the Mayo-Portland Adaptability Inventory and the number of safe road-crossings to assess changes in self-evaluation and performance between trials. One of the participants perceived improvements in self-evaluation and performance in the second pilot-trial. All participants attempted to apply the safe road-crossing strategy advised. No safety issues were identified using the VR-based self-paced treadmill within this study’s protocol thereby supporting the primary objective of the work. Future research is warranted to strengthen the evidence-base for using VR to elicit improvements in ISA in road-crossing and in generalising findings to the wider TBI population.

**Speaker Bio:** Dr Mohammad Al-Amri is a Senior Research Fellow and Postgraduate Research Programme Manager at the Cardiff University of School of Healthcare Sciences. He holds a PhD in Rehabilitation Engineering from University of Surrey and a B.Sc in Electronic Engineering from Yarmouk University. Dr Al-Amri directs the Sensor Physiotherapy Intervention (SPIN) Research Group, where his research span both virtual reality and wearable technology to help in understanding human movement and gait applied to musculoskeletal and neurodegenerative conditions. Much of his research programme has been on establishing the feasibility of using latest movement analysis affordable technologies combined with purposely developed real-time biofeedback to advance healthcare by providing new approaches for quantifying clinical functional outcomes. This involves development of a novel application based on using combined motor-cognitive tasks to detect subtle impairments in patients following brain injury and to develop physical-biomarkers of cognitive decline. He has collaborated actively with researchers in several other disciplines, particularly physiotherapy and software. Dr Al-Amri is a member of the Editorial Board of BMC Musculoskeletal Disorders and Research Notes Journals and has served on the Scientific Boards of a number of international conferences committees and served as the Chair for internal conference. He currently serves on the Institute of Physics and Engineering in Medicine (IPEM)’s board of trustees. He is the Director of the Science, Technology and Engineering Research and Innovation Council of the IPEM.



Dr Mohammad Al-Amri



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### “Medicine Based Town Initiatives in Japan”

**Abstract:** MBT Link Co., Ltd is a first startup spun out of Nara Medical University in Japan. MBT stands for Medicine-Based Town, which is town development based on medical knowledge. The MBT project, which began in 2012, focuses on enhancing health orientation and advancing healthcare services in anticipation of the 100-year lifespan era. It aims to create towns where people can live comfortably in a society with declining birthrates and an aging population. By injecting medical insights and expertise into all industries, the project seeks to foster industrial creation and contribute to regional revitalization.

MBT Link Co., Ltd. aims to embody this philosophy by offering innovative medical and health services, products, and systems that have never been seen before. Currently, the company focuses on so called Life Style Scoring in order to extend healthy life expectancy of elderly in Japan. As you may know, Japan is low birthrate and aging society, and containing medical cost is urgent priorit. The Life Style Score evaluates and scores the regularity of daily life based on electricity consumption patterns using a proprietary algorithm. By improving individual scores, it aims to extend healthy life expectancy and reduce medical costs. In the session, we would like to introduce our initiatives in Japan.

**Founder Bio:** Tomohiro Umeda is a Professor at Nara Medical University as well as a Research Professor at the MBT Institute, since 2015. He is also a Visiting Professor at the University of Tokyo and a Visiting Lecturer at Waseda University and Doshisha University. He held various academic positions, including a Master's degree from Tokyo University of Science, Toho University, Tokyo University of Science, Management of Technology, and completed all PhD coursework and requirement at Integrated Design Engineering at Keio University, and Toho University. His professional experience includes roles at Mitsubishi Materials and Olympus.

**Speaker Bio:** Rio Ohmori is a business professional specialized in sales and business development. He has extensive experience across various industries, including manufacturing, IT startups, public works, and biotech startups. He holds a Master's degree in Business from National Taiwan University, Taiwan and also in Public Administration from Tsinghua University, China. He joined MBT Link Co., Ltd. in 2024 in order to accelerate to achieve the company's goal



Prof Dr Tomohiro Umeda



Rio Ohmori

### “The expectations and acceptability of a smart nursing home model among Chinese older adults”

**Abstract:** Smart technology in nursing home settings has the potential to enhance the operations managing a larger number of elderly residents. A comprehensive scoping review was conducted to define a smart nursing home model and assess the feasibility of the specific technologies applied in nursing home settings, utilizing the Technology Readiness Levels. Feasible and innovative smart nursing homes encompass the Internet of Things, digital health, big data, artificial intelligence, cloud computing technologies, and information management systems that enable the monitoring of abnormal events, the provision of remote clinical services, the establishment of health information databases, the enhancement of decision-making processes, the analysis of clinical data, and the facilitation of activities of daily living for older adults. They may integrate medical services from remote hospitals or healthcare experts, using telemedicine, mHealth, and other electronic clinical information, to manage complex health conditions among their residents, ensuring their overall well-being within a safe and cost-effective environment. Subsequently, an exploratory sequential mixed methods study integrated qualitative and quantitative data sources, offering strength to confirmatory results on the expectations and acceptability of the smart nursing home model among Chinese older adults, both in general and in particular. A feasible smart nursing home model presents a promising solution for addressing the challenges posed by the rapidly aging society in China and it was accepted by Chinese older adults. The study outcomes are relevant to a wide range of stakeholders and audiences with an interest in smart nursing homes, including older adults, their family members, healthcare providers, nursing home personnel, policy makers, and entrepreneurs in the smart device industry.

**Speaker Bio:** Dr. Yuanyuan Zhao, was born in Dalian, China. As a lecturer at the School of Smart Health and Wellness, Health Medical College, Zhejiang Dongfang Polytechnic, Wenzhou, China, she is also responsible for research planning, internship training, and providing consultancy services to government and enterprises. Her research interests include healthy aging, chronic disease management, telemedicine, and wearable device application. Helen received her PhD in Gerontechnology in 2023 from Universiti Putra Malaysia, Malaysia. In 2016 she received her MSc in Global Public Health and Policy from Queen Marry University of London, UK and in 2015 received her MBA from Cardiff Metropolitan University, UK.



Dr Yuanyuan (Helen) Zhao



75 YEARS



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