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.
**The International Conference of the IEEE EMBS, Seoul, South Korea, July 20-24, 2024**

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

**EW2: ISCAS 2024**

**Smart Technologies for Dementia Management: Circuitry Solutions**

**Abstract:** National Health and Morbidity Survey 2018: Elderly Health reported the overall prevalence of probable dementia was 8.8% 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 (GerontoCAS2023) 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 BE 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.

**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 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 (SPI) 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 International 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.
“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.