



Karen Chua Sui Geok

Senior Consultant, Rehabilitation Medicine, TTSH
Adjunct Associate Professor, LKCMedicine, NTU

Research Interests:

- Neurorehabilitation
- Brain Injury Rehabilitation
- Rehabilitation Robotics and Technology
- Brain Computer Interfaces

Developing Interests:

- Tele Rehabilitation
- Artificial Intelligence

Email: Karen_Chua@ttsh.com.sg

Biography

Dr Chua, (MBBS, MRCP, FRCPE, FAMS), has 28 years of clinical rehabilitation medicine practice at the TTSH Rehabilitation Centre and TTSH-CART (Centre of Advanced Rehabilitation Therapeutics, with sub-specialisation expertise in brain injury rehabilitation and neurorehabilitation. She obtained her clinical fellowship in Brain Injury Rehabilitation from Baylor College of Medicine, Houston, Texas, USA under a year-long MOH HMDP programme in 1997. She also has a practicing license in medical acupuncture with the TCM Practitioners Board, MOH since 2001. She is a core faculty member of the NHG rehabilitation medicine senior residency programme.

Dr Chua was appointed Adj Assoc Prof, LKCMedicine and programme principal PI, Rehabilitation Research Institute of Singapore (RRIS) in 2018 and 2019 respectively. She has been a member of the National Healthcare Group (NHG), Research Committee since 2011, Agency for Integrated Care (AIC) research and innovation committee and MOH complaints committee. Dr Chua currently holds research grants actively collaborates with clinicians and scientists from various institutes of higher learning, in rehabilitation technology, assistive robotics and functional outcome prognostication. She has co-authored ~ 60 publications including 2 review articles, 3 book chapters and holds 3 joint-patents. She is a reviewer for Ng Teng Fong Healthcare Innovation Programme (NTF-HIP) and Singapore Medical Journal (SMJ). She was past chair of the Chapter of Rehabilitation Physicians, Academy of Medicine, Singapore and ex-board member of the Asian Oceanian Society of Rehabilitation Medicine (AOSPRM), ex-vice president of the Society of Rehabilitation Medicine, Singapore and ex-Board of Governors, International Brain Injury Association (IBIA).

Selected Publications

- Ang KK, Guan C, Chua KS, Ang BT, Kuah CW, Wang C, Phua KS, Chin ZY, Zhang H. A large clinical study on the ability of stroke patients to use an EEG-based motor imagery brain-computer interface. *Clin EEG Neurosci*. 2011; 42(4):253-8.
- Ang KK, Chua KS, Guan C, Phua KS, Wang C, Chin ZY, Kuah CW, Low W. A Randomized Controlled Trial on EEG-based motor imagery Brain-Computer Interface robotic rehabilitation for stroke. *Clin EEG & Neuroscience*. 2014: 522229.

- Ang KK, Guan C, Phua KS, Wang C, Zhou L, Tang KY, Ephraim Joseph GJ, Kuah CW, Chua KS. Brain-computer interface-based robotic end effector system for wrist and hand rehabilitation: results of a three-armed randomized controlled trial for chronic stroke. *Front Neuroeng*. 2014; 7:30. doi: 10.3389/fneng.2014.00030.
- Chua KS, Chee J, Wong CJ, Lim PH, Lim WS, Hoo CM, Ong WS, Shen ML, Yu WS. A pilot clinical trial on a Variable Automated Speed and Sensing Treadmill (VASST) for hemiparetic gait rehabilitation in stroke patients. *Front Neurosci*. 2015; 9:231. doi: 10.3389/fnins.2015.00231. PMID: 26217170. PubMed Central PMCID: PMC4498099.
- Hussain A, Budhota A, Hughes CM, Dailey WD, Vishwanath DA, Kuah CW, Yam LH, Loh YJ, Xiang L, Chua KS, Burdet E, Campolo D. Self-paced reaching after stroke: a quantitative assessment of longitudinal and directional sensitivity using the h-man planar robot for upper limb neurorehabilitation. *Front Neurosci*. 2016; 10:477. eCollection 2016.
- Chua KSG, Kuah CWK. Innovating With Rehabilitation Technology in the Real World: Promises, Potentials, and Perspectives. *Am J Phys Med Rehabil*. 2017. doi: 10.1097/PHM.0000000000000799 [Epub].
- Contu S, Hussain A, Kager S, Budhota A, Deshmukh VA, Kuah CW, Yam LHL, Xiang LM, Chua KS, Masia L, Campolo D. Proprioceptive assessment in clinical settings: Evaluation of joint position sense in upper limb post-stroke using a robotic manipulator. *PLoS ONE*. 2017; 12(11): e0183257. <https://doi.org/10.1371/journal.pone.0183257>.
- van Hedel HJA, Severini G, Scarton A, O'Brien A, Reed T, Gaebler-Spira D, Egan T, Meyer-Heim A, Graser J, Chua K, Zutter D, Schweinfurther R, Möller JC, Paredes LP, Esquenazi A, Berweck S, Schroeder S, Warken B, Chan, Devers A, Petioky J, Paik NJ, Kim WS, Bonato P, Boninger M; ARTIC network. Advanced Robotic Therapy Integrated Centers (ARTIC): an international collaboration facilitating the application of rehabilitation technologies. *J Neuroeng Rehabil*. 2018; 15(1):30. doi: 10.1186/s12984-018-0366-y.
- Kager S, Hussain A, Budhota A, et al. Work with me, not for me: Relationship between robotic assistance and performance in subacute and chronic stroke patients. *J Rehabil Assist Technol Eng*. 2020; 6:2055668319881583. doi: 10.1177/2055668319881583.
- Chua K, Lim WS, Lim PH, et al. An Exploratory Clinical Study on an Automated, Speed-Sensing Treadmill Prototype with Partial Body Weight Support for Hemiparetic Gait Rehabilitation in Subacute and Chronic Stroke Patients. *Front Neurol*. 2020; 11:747. doi:10.3389/fneur.2020.00747.

Notable Research Awards & Grants From Past 5 Years

Name of Awards & Grants	Year Obtained
Singapore Healthcare and Assistive Robotics Programme (SHARP) for “Development and Proof of Concept Study of Care Assistant and Rehabilitation Enabling (CARE) Robots: A multi-centre study to establish safety and feasibility through the rehabilitation care continuum”	2019
RIE 2020 AME (A*STAR) Programmatic Fund award for “Next-Generation Brain-computer Brain Platform - A holistic solution for the restoration & enhancement of brain functions”	2020

Translating Research Into Healthcare

- Robot helps stroke patients with their rehabilitation at home. *The Straits Times*. Published 28 October 2020. <https://www.straitstimes.com/singapore/health/robot-helps-stroke-patients-with-their-rehabilitation-at-home>