



## Chua Sui Geok, Karen

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### Research Interests:

- Neurorehabilitation
- Brain injury rehabilitation
- Rehabilitation robotics and technology
- Brain computer interfaces

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## 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**

- A large clinical study on the ability of stroke patients to use an EEG-based motor imagery brain-computer interface. Ang KK, Guan C, Chua KS, Ang BT, Kuah CW, Wang C, Phua KS, Chin ZY, Zhang H. *Clin EEG Neurosci*. 2011 Oct;42(4):253-8.
- A Randomized Controlled Trial on EEG-based motor imagery Brain-Computer Interface robotic rehabilitation for stroke" Kai Keng Ang, Karen Sui Geok Chua, Cuntai Guan, Kok Soon Phua, Chuanchu Wang, Zheng Yang Chin, Christopher Wee Keong Kuah, and Wilson Low. *Clin EEG & Neuroscience*. EEG 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 Jul 29;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 Jul 10;9:231. doi: 10.3389/fnins.2015.00231. eCollection 2015. PubMed PMID: 26217170. PubMed Central PMCID: PMC4498099.
- Self-paced reaching after stroke: a quantitative assessment of longitudinal and directional sensitivity using the h-man planar robot for upper limb neurorehabilitation. Hussain A, Budhota A, Hughes CM, Dailey WD, Vishwanath DA, Kuah CW, Yam LH, Loh YJ, Xiang L, Chua KS, Burdet E, Campolo D. *Front Neurosci*. 2016 Oct 25;10:477. eCollection 2016.
- Innovating With Rehabilitation Technology in the Real World: Promises, Potentials, and Perspectives. Chua KSG, Kuah CWK. *Am J Phys Med Rehabil*. 2017 Jul 13. doi: 10.1097/PHM.0000000000000799.[Epub]
- Proprioceptive assessment in clinical settings: Evaluation of joint position sense in upper limb post-stroke using a robotic manipulator. Sara Contu, Asif Hussain, Simone Kager, Aamani Budhota, Vishwanath A. Deshmukh, Christopher W. K. Kuah, Lester H. L. Yam, Liming Xiang, Karen S. G. Chua, Lorenzo Masia, Domenico Campolo. *PLoS ONE* 12(11): e0183257. <https://doi.org/10.1371/journal.pone.0183257>
- Advanced Robotic Therapy Integrated Centers (ARTIC): an international collaboration facilitating the application of rehabilitation technologies. 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. J Neuroeng Rehabil. 2018 Apr 6;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. Published 2020 Jan 9. 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. Published 2020 Jul 24. doi:10.3389/fneur.2020.00747

### Notable Research Awards & Grants from Past 5 Years

Name of Awards & Grants	Year Obtained
RIE 2020 AME (ASTAR) Programmatic Fund award for Next-Generation Braincomputer Brain Platform - A holistic solution for the restoration & enhancement of brain functions	2020
ETH Singapore SEC Ltd. (SEC) for “Future Health Technologies”	2020
National Healthcare Group Research Innovation Award - HMAN for robot aided rehabilitation	2021
Smart robot therapy for stroke upper limb rehabilitation: A proof-of-value trial of clinic to home robotics-assisted telerehabilitation. Temasek Fund, Singapore	2021
NHIC_I2I (2104007): Robotics Assisted Telerehabilitation at Home: a Solution for Clinical Adoption	2022
NHG Research Mentor of the Year Award	2023