Chua Sui Geok, Karen

Senior Consultant, Rehabilitation Medicine, Tan Tock Seng Hospital
Associate Professor, LKCMedicine, Nanyang Technological University

Research Interests:

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

Developing Interests:

- Tele rehabilitation
- Artificial Intelligence

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Biography

Dr Chua, (MBBS, MRCP, FRCPE, FAMS), has 30 years of clinical rehabilitation medicine practice at the TTSH Rehabilitation Centre and TTSH-CART (Centre of Advanced Rehabilitation Therapeutics, with sub-specialisation 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 Practioners Board, MOH since 2001. She is a core faculty member of the NHG rehabilitation medicine senior residency programme.

Dr Chua was appointed research track lead, Institute of Rehabilitation Excellence (IREx), Clinical Assoc Prof, LKCMedicine and Co-Director, Rehabilitation Research Institute of Singapore (RRIS) in 2021, 2022 and 2024 respectively, and mentor role at LKC Medicine Academy of Clinician Scientists and Inventors. Dr Chua currently holds research grants in telerehabilitation using robotics, brain computer interface, sarcopaenia and gait motion capture. She has co-authored >80 publications including 2 review articles, 4 book chapters and holds 3 joint-patents. She is guest associate editor for Frontiers Rehabilitation Sciences and LIFE Physical Medicine and Rehabilitation. She has been on the grant review boards for the Ng Teng Fong Healthcare Innovation Programme (NTF-HIP) and Strategic Research Programme.

Selected Publications

- Pan, J. W., Sidarta, A., Wu, T.-L., Kwong, W. H., Ong, P. L., Tay, M. R., Phua, M. W., Chong, W. B., Ang, W. T., & Chua, K. S. (2024). Unravelling stroke gait deviations with movement analytics, more than meets the eye: A case control study. Frontiers in Neuroscience, 18. https://doi.org/10.3389/fnins.2024.1425183

- Lo YT, Lim MJR, Kok CY, Wang S, Blok SZ, Ang TY, Ng VYP, Rao JP, Chua KSG. Neural interface-based motor neuroprosthesis in post-stroke upper limb neurorehabilitation: An individual patient data meta-analysis. Arch Phys Med Rehabil. 2024 Apr 3:S0003-9993(24)00910-9. doi: 10.1016/j.apmr.2024.04.001. Epub ahead of print. PMID: 38579958.

- Aarthy Nagarajan, Neethu Robinson, Kai Keng Ang, **Karen Sui Geok Chua**, Effie Chew and Cuntai Guan, "Transferring a deep learning model from healthy subjects to stroke patients in a motor imagery brain-computer interface", Journal of Neural Engineering (JNE), December 2023, DOI: 10.1088/1741-2552/ad152f. (IF: 4.0)

- **Chua, K.S.G**.; Kwan, H.X.; Teo, W.S.; Cao, R.X.; Heng, C.P.; Ratha Krishnan, R. Changing Epidemiology and Functional Outcomes of Inpatient Rehabilitation in Asian Traumatic Brain Injury Cases before and during the COVID-19 Pandemic: A Retrospective Cohort Study. Life 2023, 13, 1475. https://doi.org/ 10.3390/life13071475.(IF 3.2)

- Ong, P.L.; Rosiana, A.; **Chua, K.S.G**. Characteristics and Functional Impact of Unplanned Acute Care Unit Readmissions during Inpatient Traumatic Brain Injury Rehabilitation: A Retrospective Cohort Study. Life 2023, 13, 1720. https://doi.org/10.3390/life13081720.(IF 3.2)

- Ong, P.L.; Seah, J.D.; **Chua, K.S.G**. Inpatient Rehabilitation Outcomes after Primary Severe Haemorrhagic Stroke: A Retrospective Study Comparing Surgical versus Non-Surgical Management. Life 2023, 13, 1766. https://doi.org/10.3390/life13081766 (IF 3.20)

- Ratha Krishnan, R.; Ting, S.W.X.; Teo, W.S.; Lim, C.J.; **Chua, K.S.G.** Rehabilitation of Older Asian Traumatic Brain Injury Inpatients: A Retrospective Study Comparing Functional Independence between Age Groups. Life 2023, 13, 2047. https://doi.org/10.3390/life13102047 (IF 3.2)

- Alhossary A, Ang WT, **Chua KSG**, Tay MRJ, Ong PL, Murakami T, Quake T, Binedell T, Wee SK, Phua MW, Wei YJ, Donnelly CJ. Identification of Secondary Biomechanical Abnormalities in the Lower Limb Joints after Chronic Transtibial Amputation: A Proof-of-Concept Study Using SPM1D Analysis. Bioengineering (Basel). 2022 Jun 30;9(7):293. doi: 10.3390/bioengineering9070293. PMID: 35877344.

- Tay MRJ, Lim CJ, **Chua KSG.** Functional and ambulatory benefits of robotic-assisted gait training during early subacute inpatient rehabilitation following severe stroke. Singapore Med J. 2021 Nov 26. doi: 10.11622/smedj.2021219. Epub ahead of print. PMID: 34823332.(IF 3.331)

- **Chua KSG**, Krishnan RR, Yen JM, Plunkett TK, Soh YM, Lim CJ, Chia CM, Looi JC, Ng SG, Rao J. 3D-printed external cranial protection following decompressive craniectomy after brain injury: A pilot feasibility cohort study. PLoS One. 2021 Oct 28;16(10):e0258296. doi: 10.1371/journal.pone.0258296. PMID: 34710123.(IF 3.4)

- **Chua KSG**, Loke JJY, Lim CJ, Thio JML, Krishnan RR. Rehabilitation outcome after acute subarachnoid haemorrhage: the role of early functional predictors and complications. Singapore Med J. 2021 Nov 19. doi: 10.11622/smedj.2021198. Epub ahead of print. PMID: 34808738.(IF 3.331)

- **Chua KSG**, Loke JJY, Lim CJ, Thio JML, Krishnan RR. Rehabilitation outcome after acute subarachnoid haemorrhage: the role of early functional predictors and complications. Singapore Med J. 2021 Nov 19. doi: 10.11622/smedj.2021198. Epub ahead of print. PMID: 34808738.(IF 3.331)

- Budhota A, **Chua KSG**, Hussain A, Kager S, Cherpin A, Contu S, Vishwanath D, Kuah CWK, Ng CY, Yam LHL, Loh YJ, Rajeswaran DK, Xiang L, Burdet E, Campolo D. Robotic Assisted Upper Limb Training Post Stroke: A Randomized Control Trial Using Combinatory Approach Toward Reducing Workforce Demands. Front Neurol. 2021 Jun 2;12:622014. doi: 10.3389/fneur.2021.622014. PMID: 34149587; PMCID: PMC8206540

- Lambercy O, Lehner R, **Chua K**, Wee SK, Rajeswaran DK, Kuah CWK, Ang WT, Liang P, Campolo D, Hussain A, Aguirre-Ollinger G, Guan C, Kanzler CM, Wenderoth N and Gassert R (2021) Neurorehabilitation From a Distance: Can Intelligent Technology Support Decentralized Access to Quality Therapy? Front. Robot. AI 8:612415.doi: 10.3389/frobt.2021.612415. PMID:34026855

- **Chua, K. S**., Earnest, A., Chiong, Y., & Kong, K. H. (2010). Characteristics and correlates of rehabilitation charges during inpatient traumatic brain injury rehabilitation in Singapore. Journal of rehabilitation medicine, 42(1), 27–34. https://doi.org/10.2340/16501977-0476) IF 3.959)

Notable Research Awards & Grants from Past 5 Years

Name of Awards & Grants	Year Obtained
ETH Singapore SEC Ltd. (SEC) for "Future Health Technologies"	2020
RIE 2020 AME (ASTAR) Programmatic Fund award for Next-Generation Brain computer Brain Platform - A holistic solution for the restoration & enhancement of brain functions.	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
Mobility Frailty Falls – the OPTIMA-C programme: Targeting osteosarcopenia and multimorbidity for frailty prevention through identification and deep phenotyping methods in healthy aging and high-burden disease cohorts	2023
NHIC_I2Adopt (2305004) Telerehabilitation Robotics for Upper Limb Rehabilitation after Stroke (TRUST): a study of multi-cluster adoption	2024

Translating Research/Innovation Into Healthcare

- https://www.straitstimes.com/singapore/health/modernising-rehabilitation-medicine-as-the-sector-in-singapore-marks-golden-jubilee

- https://www.straitstimes.com/singapore/engineering-student-gets-3d-printed-finger-after-bike-accident

- https://www.straitstimes.com/singapore/wearable-robot-detects-and-prevents-falls-especially-in-the-elderly-reducing-reliance-on-caregivers#:~:text=Called%20the%20Mobile%20Robotic%20Balance,can%20counter%20falls%20and%20imbalances.

- https://www.washingtonpost.com/technology/2022/09/10/fall-prevention-robot/

- https://www3.ntu.edu.sg/CorpComms2/documents/2022/09_sep/businessinsider_220911_mrba.pdf

- https://www.straitstimes.com/singapore/health/robot-helps-stroke-patients-with-their-rehabilitation-at-home?xtor=CS3-18&utm_source=STiPhone&utm_medium=share&utm_term=2020-10-29%2020%3A10%3A41

Patents pending

- Head Protection Prototype Device (HPPD) and method of manufacturing for Post-Decompression Craniectomy Patients, filed in 2021, PCT/SG2021/050161

- Transfer Assistive Cobot (TAC), provisional patent application 0202250455 R (Singapore), filed 2022