Dr. Ananda Sidarta

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EDUCATION

Doctor of Philosophy (Ph. D.) in Neuroscience 2012 - 2018
McGill University, Canada. Thesis advisor: Prof. David J. Ostry

Master of Science (M. Sc.) in Biomedical Engineering 2007 - 2009
Nanyang Technological University, Singapore

Bachelor of Engineering. (B. Eng., Hons) in Electronics Engineering 2000 - 2004
Nanyang Technological University, Singapore

RESEARCH INTERESTS

Movement is a fundamental human need, regardless of age. Whether the movement involves reaching and grasping or ambulation, the central nervous system must make precise plans and controls. I am interested in quantifying and enhancing human performance in relation to the sensorimotor system and brain health using modern technology, with a special interest in neurorehabilitation and skill learning.

RESEARCH GRANTS

1. *Act.Sens - active sensorimotor training for chronic stroke survivors* 2019 - 2023
   Early Career Research Fellowship Program, RFP (S$ 237,500)
   Funder: A*STAR/NHG/NTU, Rehabilitation Research Grant Call
   Role: PI
2. *Deep phenotyping of upper limb sensorimotor recovery in Asian stroke survivors* 2023 - 2026
   Future Health Technologies, Module 3 (S$ 1.59 mil)
   Funder: CREATE Programme, National Research Foundation
   Role: Scientific lead (PI: Dr Nicole Wenderoth, Dr Ang Wei Tech, Dr Karen Chua)
3. *H-Stride: a robotics-assisted solution for rehabilitation of the lower extremities* 2026 - 2027
   NRP 2.0 Funding Initiative, MTC (S$ 974,900)
   Funder: National Robotics Programme, NRP
   Role: Co-I (PI: Dr Domenico Campolo)

AWARDS & SCHOLARSHIPS

1. Best Poster Award – Basic Science/Translational 2025
   Source: Singapore Biomedical & Health Congress (SHBC) 2025, Singapore
2. Meeting Support Award to NCM 2023, Canada 2023
   Source: Society for the Neural Control of Movement
3. Teaching Assistant Award 2018
   Source: Department of Psychology, McGill University
4. Returning Student Fellowship, CAD 10,000 2016
   Source: Interdisciplinary Program in Neuroscience, McGill University
5. Research Mobility Award, CAD 1,500 2013
   Source: Department of Psychology, McGill University

6. Graduate Excellence Scholarship in Neurology & Neurosurgery 2012 - 2015
   Source: Interdisciplinary Program in Neuroscience, McGill University
7. Molson & Hilton Hart Fellowship, CAD 8,500 2012
   Source: Faculty of Science, McGill University
8. Certificate of Excellence in Biomedical Engineering 2009
   Source: Graduate School, Nanyang Technological University

ACADEMIC SERVICES

1. **Undergraduate mentorship** 2020 - now
   - LKC Medicine: Russell Wong (2021), Wong Q.H.^ (2022), Sng Q.W. (2022), Daniel J. (2023), G. Barath (2023), Isaac Kuah (2023), Jonathan Foo (2025), Kong P. Y. (2025).
     ^ : commended for outstanding work in 'EEG profiling for balance perturbation'
   - NTU Mech Engineering: Enoch L. (2020), Tan C.Y. (2021), Wong Z.W. (2022), Sim J.L. (2022), Liew E.J. (2025)
2. **Ad-hoc journal reviewer** 2019 - now
   - *PLOS One*
   - *Journal of NeuroEngineering and Rehabilitation*
   - *Pilot & Feasibility Studies*
   - *Experimental Brain Research*
   - *npj Science of Learning*
   - *IEEE ICORR*
   - *Brain Sciences*
3. **Teaching experience:**
   Teaching assistantship (TA), Department of Psychology, McGill University 2012 - 2017
   - Introduction to Statistics
   - Sensorimotor Behavior
   - Sensory Perception
   - Statistics for Experimental Design
   - Intro. to Behavioral Neuroscience

   Guest lecturer for "Introduction to Statistics" in the same department (Summer, 2018)
4. **International membership**
   Society for Neuroscience, Society for the Neural Control of Movement, American Congress of Rehabilitation Medicine

RESEARCH APPOINTMENTS

Senior Research Scientist (Rehabilitation Research Institute of Singapore)	08/2024 - now
Senior Research Fellow (Rehabilitation Research Institute of Singapore)	06/2023 - 07/2024
Research Fellow (Rehabilitation Research Institute of Singapore)	12/2018 - 05/2023
Project Officer (BioRobotics Lab, Nanyang Technological University)	05/2008 - 12/2009

CORE SKILLS

Human behavioural experiments: healthy adults, stroke survivors, and ageing cohorts
R and Python (statistical analyses & applied machine learning), MATLAB (signal processing)
Analysis of neuroimaging datasets from functional MRI and EEG
Experience in conducting standardized assessments and analysis of motion capture datasets

PUBLICATIONS

- Peer-reviewed articles (* denotes equal contribution)

1. Cruz Gonzalez P, Zhang JJ, **Sidarta A,** Chua KSG. To Treat or Not to Treat? A Point of View on the Clinical Translation of Non-Invasive Neuromodulation Therapy for Post-Stroke Upper Limb Recovery. *Neurorehabilitation and Neural Repair*. 2026;0(0). [DOI: 10.1177/15459683251399155]
2. Kaliya-Perumal AK, **Sidarta A**. Healthcare reimagined: Carebots from hospital to home. *Public Health*. 2025; 248:105920. [PMID: 40834625 DOI: 10.1016/j.puhe.2025.105920]
3. Zhong L, Wu J, Li J, **Sidarta A**, Zhang JJ, Kwong PWH. Distinct hip–knee coordination patterns in individuals with hip osteoarthritis as measured by cyclograms. *Gait & Posture*. 2025; 121:217–24. [PMID:40482569. DOI:10.1016/j.gaitpost.2025.06.004]
4. Tay MRJ, Kim JM, Ong PL, Khin LW, Wong CJ, Kong KH, …, **Sidarta A**, et al. Targeting osteosarcopenia and multimorbidity for frailty prevention through identification and deep phenotyping methods in healthy ageing and high-burden disease cohorts (OPTIMA-C): a longitudinal observational cohort study protocol for neuromusculoskeletal muscle health. *BMJ Open*. 2025;15(5):e094279. [DOI: 10.1136/bmjopen-2024-094279]
5. **Sidarta A**, Soh LJ, Lie E, Kwong PWH, Yeh IL, Liang P, Ang WT. Establishing normative pinch and grip strengths across adult age groups in Singapore. *BMC Sports Sci Med Rehabil*. 2025;17(1):84. [PMID: 40229663. DOI: 10.1186/s13102-025-01140-3]
6. **Sidarta A**, Lim YC, Kuah CWK, Chua KSG, Ang WT. Relearning upper limb proprioception after stroke through robotic therapy: a feasibility analysis. *J Clin Med*. 2025;14(7):2189. [PMID: 40217638. DOI: 10.3390/jcm14072189]
7. Zhang L, **Sidarta A**, Wu TL, Jatesiktat P, Ang WT. Towards clinical application of enhanced Timed Up and Go with markerless motion capture and machine learning for balance and gait assessment. *IEEE J Biomed Health Inform*. [DOI: 10.1109/JBHI. 2025.3543095]
8. Li J, Kwong PW, Lin W, Fong KN, Wu W, **Sidarta A**. Assessment of ambulation functions through kinematic analysis in individuals with stroke: a systematic review. *Eur J Phys Rehabil Med*. 2025;61(1):28–40. [PMID: 40008910. DOI: 10.23736/S1973-9087.25.08767-2]
9. Premchand B, Zhang Z, Ang KK, Yu J, Tan IO, **Sidarta A**, et al. A personalized multimodal BCI–soft robotics system for rehabilitating upper limb function in chronic stroke patients. *Biomimetics (Basel)*. 2025;10(2):94. [PMID: 39997117. DOI: doi.org/10.3390/biomimetics 10020094]
10. Soh LJ, Lim LS, Law WC, Lau JL, Lie E, Yeh IL, … **Sidarta A**, et al. Technical properties of a sensor-aided key rig for hand function measurement: a proof-of-concept study. *IEEE Sensor J.* 2024;25(1):260–5 [DOI: 10.1109/ JSEN.2024.3494814.]
11. Kwong WH, Li JQ, Lui CH, Luk HT, Lau KF, Seaby R, **Sidarta A.** Reliability and convergent validity of endurance indices derived from near-infrared spectroscopy and electromyography during a bilateral hanging task in amateur rock climbers. *J Funct Morphol Kinesiol*. 2024;9:161. [PMID: 39311269. DOI: 10.3390/jfmk9030161]
12. Pan JW, **Sidarta A,** Wu TL, Kwong WPH, Ong PL, Tay MRJ, et al. Unraveling stroke gait deviations with movement analytics, more than meets the eye: a case–control study. *Front Neurosci.* 2024;18:1425183. [PMID: 39104608. DOI: 10.3389/fnins.2024.1425183]
13. Cheng HJ, Chin LF, Kanzler CM, Lehner R, Kuah CW, Kager S, … , **Sidarta A**, et al. Upper limb sensorimotor recovery in Asian stroke survivors: a study protocol for the development and implementation of a Technology-Assisted dIgitaL biOmaRker (TAILOR) platform. *Front Neurol*. 2023; 14:1246888. [PMID: 38107648. DOI: 10.3389/fneur.2023.1246888]

14. Li JQ, Sun YW, So WS, **Sidarta A**, Kwong PWH. A comprehensive appraisal of meta-analyses of exercise-based stroke rehabilitation with trial sequential analysis. *Healthcare (Basel)*. 2022;10(10):1984. [PMID: 36292431. DOI: 10.3390/healthcare10101984]
15. Kumar N*, **Sidarta A***, Smith C, Ostry DJ. Ventrolateral prefrontal cortex contributes to human motor learning. *eNeuro*. 2022;9(5):ENEURO.0269-22.2022. [PMID: 36114001. DOI: 10.1523/ ENEURO.0269-22.2022]
16. **Sidarta A**, Lim YC, Wong RA, Tan IO, Kuah CWK, Ang WT. Current clinical practice in managing somatosensory impairments and the use of technology in stroke rehabilitation. *PLoS One*. 2022;17(8):e0270693. [PMID: 35951544. DOI: 10.1371/journal.pone.0270693]
17. Lei Z, Tan BY, Garg NP, Li L, **Sidarta A,** Ang WT. An intention-prediction-based shared control system for point-to-point navigation of a robotic wheelchair. *IEEE Robot Autom Lett*. 2022;7(4):8893–900. [DOI: 10.1109/LRA.2022.3189151]
18. **Sidarta A**, Komar J, Ostry DJ. Clustering analysis of movement kinematics in reinforcement learning. *J Neurophysiol*. 2022;127(2):341–53. [PMID: 34936514. DOI: 10.1152/jn.00229.2021]
19. **Sidarta A,** Lim YC, Kuah CWK, Loh YJ, Ang WT. Robotic-based ACTive somatoSENSory (Act.Sens) retraining on upper limb functions with chronic stroke survivors: study protocol for a pilot randomized controlled trial. *Pilot Feasibility Stud*. 2021;7(1):1–11. [PMID: 34782024. DOI: 10.1186/s40814-021-00948-3]
20. Liang P, Kwong WH, **Sidarta A**, Yap CK, Tan WK, et al. An Asian-centric human movement database capturing activities of daily living. *Sci Data*. 2020;7(1):290. [PMID: 32901007. DOI: 10.1038/s41597-020-00627-7]
21. **Sidarta A**, VanVugt FT, Ostry DJ. Somatosensory working memory in reinforcement-based motor learning. *J Neurophysiol*. 2018;120(6):3275–86. [PMID: 30354856. DOI: 10.1152/jn.00442.2018]
22. **Sidarta A**, Vahdat S, Bernardi NF, Ostry DJ. Somatic and reinforcement-based plasticity in the initial stages of human motor learning. *J Neurosci*. 2016;36(46):11682–92. [PMID: 27852776. DOI: 10.1523/JNEUROSCI.1767-16.2016]
23. Latt WT, Tan UX, Georgiou A, **Sidarta AE,** Riviere CN, Ang WT. A micro-motion sensing system for micromanipulation tasks. *Sens Actuators A Phys*. 2012;173(1):254–66. [PMID: 22423177. DOI: 10.1016/j.sna.2011.09.009]

- Preprint/submitted

1. Wu J, Kwong PW, **Sidarta A**, Zhang JJ, Zhuang J, Li Y, Fong KN. Understanding Bilateral Motor Coordination in Stroke Using the Towel Folding Task: An Exploratory Biomechanical Study. *medRxiv*. 2024 Sep 4:2024-09. [https://doi.org/10.1101/2024.09.03.24313027]

- Conference proceedings

1. Zhang L, **Sidarta A**, Lim YC, Er C, Yan X, Wu TL, Ang WT. Muscle activation and postural sway in response to task complexity: a study of balance control in older adults. In: *Proc IEEE Int Conf Rehabil Robot (ICORR)*. 2025. p. 82–7. Chicago, IL, USA.. [DOI: 10.1109/ICORR66766.2025.11063123]
2. Jatesiktat P, Anopas D, Kwong WH, **Sidarta A**, Liang P, Ang WT. Muscle activation analysis from gait kinematics and reinforcement learning. In: *Proc 19th Int Conf Electr Eng/Electronics, Comput, Telecommun Inf Technol (ECTI-CON)*. [DOI: 10.1109/ECTI-CON54298.2022.9795606]
3. Kwong WH, Sidarta A, Chua SGK, Ang WT, Liang P, Pataky T, Donnelly CJ. Recommendations for minimum trial numbers during walking gait. *ISBS Proc Arch*. 2020;38(1):41.

4. **Ananda ES,** Latt WT, Shee CY, Su EL, Burdet E, et al. Influence of visual feedback and speed on micromanipulation accuracy. In: *Proc 31st Annu Int Conf IEEE Eng Med Biol Soc (EMBC)*. 2009. p. 1188–91. Minneapolis, USA. doi: 10.1109/IEMBS.2009.5333996. [DOI: 10.1109/IEMBS.2009.5333996]
5. Latt WT, **Ananda ES**, Ong SCL, Veluvolu KC, Shee CY, Ang WT. Design and implementation of a two degree-of-freedom micromanipulation assessment system. In: *Proc 30th Annu Int Conf IEEE Eng Med Biol Soc (EMBC)*. 2008. p. 5640–3. Vancouver, Canada.

- Select conference abstracts

1. Chan LG, Lin J, Mohapatra L, **Sidarta A**. Neuroimaging correlates of outcomes of poor sleep after acquired brain injury. In: *World Sleep Congress 2025*; 2025; Singapore.
2. **Sidarta A**, Lim YC, Gonzalez PC, Zhang JQJ, Kwong PWH. Thinking while falling forward: an EEG study on reactive postural control in older adults. In: *RehabWeek 2025, ACRM Fast Forward Presentation*; 2025; Chicago, IL, USA.
3. Choo AXY, Kwong PWH, Li JQ, **Sidarta A**, Dai BT. Sub-phases detection in gait cycles using deep learning and marker coordinate data. In: *Int Conf Movement Sci Technol (ICMST)*; 2024; Taipei, Taiwan.
4. Gonzalez PC, **Sidarta A**, Er C, et al. Comprehensive phenotyping and innovative granular assessment tools for advancing stroke rehabilitation. In: *8th Singapore Rehabilitation Conference (SRC)*; 2024; Singapore.
5. **Sidarta A**, Lim YC, Gonzalez PC, Omar NB, Er JK, Kwong WHP, Ang WT. Evidence of brain-evoked potentials from a forward trip on a sloped terrain in old adults. In: *18th Int Soc Phys Rehabil Med (ISPRM)*; 2024; Sydney, NSW, Australia.
6. **Sidarta A**, Lim YC, Kuah CWK, Loh YJ, Ang WT. Robot-assisted active somatosensory retraining of upper limb stroke – a preliminary finding. In: *RehabWeek 2023, ACRM Fast Forward Presentation*; 2023; Singapore.
7. **Sidarta A**, Lim YC, Er JK, Er C, Lim LS, Kwong PWH, Ang WT. Neuromuscular signals of postural imbalance in older adults. In: *Neural Control of Movement (NCM) Annual Meeting*; 2023; Victoria, BC, Canada.
8. Kumar N, **Sidarta A**, Ostry DJ, Thiel A. Early robot-assisted proprioceptive training for arm reaching in acute stroke. In: *9th European Stroke Organization Conference (ESOC)*; 2023; Munich, Germany.
9. Lim YC, Wong RA, Tan IO, Kuah CWK, **Sidarta A**. Managing somatosensory impairments in stroke: current clinical practice and the use of technology. In: *American Congress of Rehabilitation Medicine (ACRM) Annual Conference*; 2022; Chicago, IL, USA.
10. **Sidarta A,** Kumar N, Manning TF, Ostry DJ. Suppression of lateral prefrontal cortex impairs somatosensory working memory. In: *Society for Neuroscience (SfN) Annual Meeting*; 2018; San Diego, CA, USA.
11. Thiel A, Vahdat S, Darainy M, Ostry DJ, **Sidarta A.** Robot-assisted proprioceptive training for improving motor function after stroke. In: *Cerebrovasc Dis*. 2018;45:41.

- Talks and presentations

1. Sidarta A, "The non-movement side of precision rehabilitation". Invited talk for the Future Healthcare track, 3rd Annual Biomechanics Day, SGH-Academia, Singapore, October 2025.
2. Sidarta A, "Smartwatch for smarter health". Sharing session at Sembawang Central Zone-1 Residents' Network, Singapore, July 2025.
3. Sidarta A, "Fall Prevention and Ageing". Sharing session at Sembawang Central Zone-1 Residents' Network, Singapore, May 2024.

4. Sidarta A, "Ability Data: Large movement database in the context of rehabilitation". Special workshop session for the *i*-CREATe 2023, Bangkok, Thailand, August 2023.
5. Sidarta A, "Functional networks associated with the initial stages of motor learning", CRBLM Data Blitz, Montreal, Canada, April 2016.

INTELLECTUAL PROPERTIES

Study name	Region	Application #	Registration date
1. Motion motor test system	US	US 18553149	2022-04-19
2. Methods and systems for shared control of goal directed wheelchair navigation	WIPO (PCT)	WO 2022216232A1	2022-04-06
3. Motion motor test system	WIPO (PCT)	WO 2022225454A1	2022-04-19
4. Table motion motor test system	WIPO (PCT)	WO 2022225452A1	2022-04-19

CORPORATE PORTFOLIO

Before pursuing my doctoral study, I spent six years as an engineer in the corporate sector, a great opportunity to hone management and leadership skills. From 2011 to 2012, I was with *Life Technologies* (now *Thermo Fisher Scientific*) and was responsible for designing and developing a new software package to test PCR machines using National Instruments' LabVIEW. Other work history includes a short stint as a co-founder and Assistant Director of an engineering startup (*SISTECH Pte. Ltd.*) in 2010, focusing on developing automated electronic test solutions, involving hardware & software integration using LabVIEW.