

Dr. Ananda Sidarta

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EDUCATION

Doctor of Philosophy (Ph. D.) in Neuroscience McGill University, Canada. Thesis advisor: Prof. David J. Ostry	08/2012 - 10/2018
Master of Science (M. Sc.) in Biomedical Engineering Nanyang Technological University, Singapore	07/2007 - 05/2009
Bachelor of Engineering. (B. Eng., Hons) in Electronics Engineering Nanyang Technological University, Singapore	07/2000 - 05/2004

RESEARCH INTERESTS

Movement is a fundamental human need, regardless of age. Whether the movement involves reaching and grasping or ambulation, it relies on the sensorimotor system and cognitive ability. I am interested in quantifying and enhancing human performance in the context of neurorehabilitation using modern rehabilitation technology, with an interest in neural plasticity underlying skill learning.

PROJECT GRANTS

1. Early Career Research Fellowship Program (S\$ 237,500) <i>Act.Sens – active sensorimotor training for chronic stroke survivors</i> Role: Principal Investigator Funder: A*STAR/NHG/NTU – Rehabilitation Research Grant Call	10/2019 - 03/2023
2. Future Health Technologies, Module 3 (S\$ 1,59mil) <i>Deep phenotyping of upper limb sensorimotor recovery in Asian stroke survivors</i> Role: Scientific lead (Lead PI: Dr Nicole Wenderoth, Dr Karen Chua, Dr Ang Wei Tech) Funder: National Research Foundation, CREATE Programme	06/2023 - 02/2026

AWARDS & SCHOLARSHIPS

1. Meeting Support Award to NCM 2023, Canada Source: Society for the Neural Control of Movement	2023
2. Teaching Assistant Award Source: Department of Psychology, McGill University	2018
3. Returning Student Fellowship – C\$ 10,000 Source: Interdisciplinary Program in Neuroscience, McGill University	2016
4. Research Mobility Award to Seattle, USA Source: Department of Psychology, McGill University	2013
5. Graduate Excellence Scholarship in Neurology & Neurosurgery Source: Interdisciplinary Program in Neuroscience, McGill University	2012 - 2015
6. Molson & Hilton Hart Fellowship – C\$ 8,500 Source: Faculty of Science, McGill University	2012
7. Certificate of Excellence in Biomedical Engineering Source: Graduate School, Nanyang Technological University	2009

ACADEMIC SERVICES

1. Undergraduate mentorship 2020 – now
 - LKC School of Medicine: Russell A. Wong (2021), Wong Q.H.[^] (2022), Sng Q.W. (2022), Daniel J. (2023), G. Barath (2023), Isaac Kuah (2023), Jonathan Foo (2025), Kong Pek Yan (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)
2. Ad-hoc journal reviewer 2019 – now
 - *PLOS One* • *npj Science of Learning*
 - *Journal of NeuroEngineering and Rehabilitation* • *Brain Sciences*
 - *Pilot & Feasibility Studies* • *IEEE ICORR*
3. Teaching Assistantship (TA), Department of Psychology, McGill University 2012 – 2017
 - Introduction to Statistics • Statistics for Experimental Design
 - Sensorimotor Behavior • Intro. to Behavioral Neuroscience
 - Sensory Perception
4. Professional affiliations
 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
- Experience in operations management of a research institute

PUBLICATIONS

- Peer-reviewed journal (* denotes equal contribution)
1. Zhong, L., Jingyi, W. U., Jiaqi, L. I., **Sidarta, A.**, Zhang, J. J., & Kwong, P. W. H. (2025). Distinct Hip–Knee Coordination Patterns in Individuals with Hip Osteoarthritis as Measured by Cyclograms. *Gait & Posture*, 121, 217–224. [PMID:40482569. DOI:10.1016/j.gaitpost.2025.06.004]
 2. Tay, M. R. J., Kim, J. M., Ong, P. L., Khin, L. W., Wong, C. J., Kong, K. H., ... **Sidarta, A.**, Yee, E., Chua, K. S. G. (2025). 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*, 15(5), e094279. [DOI: 10.1136/bmjopen-2024-094279]
 3. **Sidarta, A.**, Soh, L. J., Lie, E., Kwong, W. H. P., Yeh, I. L., Liang, P., & Ang, W. T. (2025). Establishing normative pinch and grip strengths across adult age groups in Singapore. *BMC Sports science, Medicine & Rehabilitation*, 17(1), 84. [PMID: 40229663. DOI: 10.1186/s13102-025-01140-3]

4. **Sidarta, A.**, Lim, Y. C., Kuah, C. W. K., Chua, K. S. G., & Ang, W. T. (2025). “Relearning Upper Limb Proprioception After Stroke Through Robotic Therapy: A Feasibility Analysis”. *Journal of Clinical Medicine*, 14(7), 2189. [PMID: 40217638. DOI: 10.3390/jcm14072189]
5. Zhang, L., **Sidarta, A.**, Wu, T. L., Jatesiktat, P., ..., Ang, W.T. (2025). “Towards Clinical Application of Enhanced Timed Up and Go with Markerless Motion Capture and Machine Learning for Balance and Gait Assessment”. *IEEE Journal of Biomedical & Health Informatics*. [DOI: 10.1109/JBHI.2025.3543095]
6. Li, J., Kwong, P. W., Lin, W., Fong, K. N., Wu, W., & **Sidarta, A.** (2025). “Assessment of ambulation functions through kinematic analysis in individuals with stroke: a systematic review”. *Eur J. Physical and Rehab Med*, 61(1), 28–40. [PMID: 40008910. DOI: 10.23736/S1973-9087.25.08767-2]
7. Premchand, B., Zhang, Z., Ang, K. K., Yu, J., Tan, I. O., ... **Sidarta, A.**, Kwong, P.W.H. & Chung, L. H. C. (2025). “A Personalized Multimodal BCI-Soft Robotics System for Rehabilitating Upper Limb Function in Chronic Stroke Patients”. *Biomimetics*, 10(2), 94. [PMID: 39997117. DOI: doi.org/10.3390/biomimetics10020094]
8. Soh, L.J., Lim, L.S., Law, W.C., Lau, J.L., Lie, E., Yeh, I.L., Gonzalez, P.C., **Sidarta, A.**, Ang, W.T. (2024). “Technical Properties of a Sensor-Aided Key Rig for Hand Function Measurement: A Proof of Concept Study”. *IEEE Sensors Journal*, vol. 25, no. 1, pp. 260-265 [DOI: 10.1109/JSEN.2024.3494814.]
9. Kwong, W.H., Li, J.Q., Lui, C.H., Luk, H.T., Lau, K.F., Seaby, R., **Sidarta, A.** (2024). “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.*, 9, 161. [PMID: 39311269. DOI: 10.3390/jfmk9030161]
10. Pan, J.W., **Sidarta, A.**, Wu, T-L, Kwong, W.H.P., Ong, P.L., Tay, M.R.J., Phua, M.W., Chong, W.B., Ang, W.T., and Chua, K.S.G. (2024). “Unraveling stroke gait deviations with movement analytics, more than meets the eye: a case control study”. *Frontiers in Neuroscience*, 18:1425183. [PMID: 39104608. DOI: 10.3389/fnins.2024.1425183]
11. Cheng, H.J., Chin, L.F., Kanzler, C.M., Lehner, R., Kuah, C.W., Kager, S., Josse, E., Samkharadze, T., **Sidarta, A.**, ... et al. (2023). “Upper limb sensorimotor recovery in Asian stroke survivors: a study protocol for the development and implementation of a Technology-Assisted dIgitAl biOmaRker (TAILOR) platform.” *Frontiers in Neurology*, 14, 1246888. [PMID: 38107648. DOI: 10.3389/fneur.2023.1246888]
12. Li, J.Q., Sun, Y.W., So, W.S., **Sidarta, A.**, Kwong, P.W.H. (2022). “A Comprehensive Appraisal of Meta-Analyses of Exercise-Based Stroke Rehabilitation with Trial Sequential Analysis”. *Healthcare*, 10(10):1984. [PMID: 36292431. DOI: 10.3390/healthcare10101984]
13. Kumar, N.*, **Sidarta, A.***, Smith, C., & Ostry, D. J. (2022). “Ventrolateral Prefrontal Cortex Contributes to Human Motor Learning”. *eNeuro* 9(5), ENEURO.0269-22.2022. [PMID: 36114001. DOI: 10.1523/ENEURO.0269-22.2022]
14. **Sidarta, A.**, Lim, Y.C., Wong, R.A., Tan, I.O., Kuah C.W.K., Ang, W.T. (2022). “Current clinical practice in managing somatosensory impairments and the use of technology in stroke rehabilitation”. *PLOS One* 17(8): e0270693. [PMID: 35951544. DOI: 10.1371/journal.pone.0270693]
15. Lei, Z., Tan, B.Y., Garg, N.P., Li, L., **Sidarta, A.**, & Ang, W.T. (2022). “An Intention Prediction Based Shared Control System for Point-to-Point Navigation of a Robotic Wheelchair”. *IEEE Robotics and Automation Letters*, 7(4), pp. 8893–8900. [DOI: 10.1109/LRA.2022.3189151]
16. **Sidarta, A.**, Komar, J., & Ostry, D.J. (2022). “Clustering analysis of movement kinematics in reinforcement learning”. *Journal of Neurophysiology*, 127(2), 341–353. [PMID: 34936514. DOI: 10.1152/jn.00229.2021]
17. **Sidarta, A.**, Lim, Y.C., Kuah, C.W.K., Loh, Y.J., & Ang, W.T. (2021). “Robotic-based ACTIVE somatoSENSory (Act. Sens) retraining on upper limb functions with chronic stroke survivors: study protocol for a pilot randomised controlled trial”. *Pilot and Feasibility Studies*, 7(1), 1-11. [PMID: 34782024. DOI: 10.1186/s40814-021-00948-3]
18. Liang, P., Kwong, W.H., **Sidarta, A.**, Yap, C.K., Tan, W.K., et al. (2020). “An Asian-centric human movement database capturing activities of daily living”. *Scientific Data*, 7(1), 290. [PMID: 32901007. DOI: 10.1038/s41597-020-00627-7]

19. **Sidarta, A.**, VanVugt, F.T., Ostry, D.J. (2018) “Somatosensory working memory in reinforcement-based motor learning”. *Journal of Neurophysiology*. 120(6): 3275-3286. [PMID: 30354856. DOI: 10.1152/jn.00442.2018]
20. **Sidarta, A.**, Vahdat, S., Bernardi, N.F., Ostry, D.J. (2016). “Somatic and reinforcement-based plasticity in the initial stages of human motor learning”. *Journal of Neuroscience*. 36 (46): 11682-11692. [PMID: 27852776. DOI: 10.1523/JNEUROSCI.1767-16.2016]
21. Latt, W.T., Tan, U.X., Georgiou, A., **Sidarta, AE.**, Riviere, C.N., & Ang, W.T. (2012). “A micro-motion sensing system for micromanipulation tasks”. *Sensors and Actuators A: Physical*, 173(1), 254-266. [PMID: 22423177. DOI: 10.1016/j.sna.2011.09.009]

- Submitted manuscript

1. Wu, J. Y., Li J. Q., Kwong, P.W.H., Zhang J. J., **Sidarta, A.** “Neural Mechanisms underlying Bimanual Coordination in Healthy and Stroke Individuals and Application of Non-Invasive Brain Stimulation: A Scoping Review”. Under review in *Systematic Review*.
2. Wu, J., Kwong, P. W. H., **Sidarta, A.**, Zhang, J. J., Zhuang, J., Li, Y., & Fong, K. N. (2024). Understanding Bilateral Motor Coordination in Stroke Using the Towel Folding Task: An Exploratory Biomechanical Study. Under review in *Human Movement Science*.

- Published proceeding

1. Zhang, L., **Sidarta, A.**, Lim, Y. C., Er, C., Yan, X., Wu, T.-L., & Ang, W. T. (2025). Muscle activation and postural sway in response to task complexity: A study of balance control in older adults. In *Proc. of the IEEE International Conference on Rehabilitation Robotics* (pp. 82-87), Chicago, IL, USA. [DOI: 10.1109/ICORR66766.2025.11063123]
2. Jatesiktat, P., Anopas, D., Kwong, W. H., **Sidarta, A.**, Liang, P., & Ang, W. T. (2022, May). Muscle Activation Analysis from Gait Kinematics and Reinforcement Learning. In *2022 19th International Conference on Electrical Engineering/Electronics, Computer, Telecommunications and Information Technology (ECTI-CON)* (pp. 1-4). IEEE. [DOI: 10.1109/ECTI-CON54298.2022.9795606]
3. Kwong, W.H, **Sidarta, A.**, Chua, S.G. Karen, Ang, W.T., Liang, P., Pataky, T., and Donnelly, C.J. (2020). “Recommendations for Minimum Trial Numbers During Walking Gait”, *ISBS Proceedings Archive*: Vol. 38: Iss. 1, Article 41.
4. **Ananda, E.S.**, Latt, W.T., Shee, C.Y., Su, E.L., Burdet, E., ... (2009). “Influence of visual feedback and speed on micromanipulation accuracy”. In *Proc. 31st Intl. Conf. IEEE Engineering in Medicine and Biology Society* (pp. 1188 - 1191), Minneapolis, USA. [DOI: 10.1109/IEMBS.2009.5333996]
5. Latt, W.T., **Ananda, E.S.**, Ong, S.C.L., Veluvolu, K.C., Shee, C.Y., & Ang, W.T. (2008). “Design and implementation of a two degree-of-freedom micromanipulation assessment system”. In *Proc. 30th Intl. Conf. IEEE Engineering in Medicine and Biology Society* (pp. 5640-5643), Vancouver, Canada.

- Select conference abstract

1. **Sidarta, A.**, Lim, Y. C., Gonzalez, P. C., Zhang, J.Q.J, Kwong, P.W.H. (2025). “Thinking while falling forward: an EEG study on reactive postural control in older adults”. Presented at the *RehabWeek 2025 – ACRM Fast Forward Presentation*, Chicago, IL, US.
2. Gonzalez, P.C, **Sidarta, A.**, Er, C., et al. (2024). “Comprehensive phenotyping and innovative granular assessment tools for advancing stroke rehabilitation”. Presented at the *8th Singapore Rehabilitation Conference (SRC)*, Singapore.
3. **Sidarta, A.**, Lim, Y.C., Gonzalez, P.C., Omar, N.B., Er, J.K., Kwong, W.H.P., Ang, W.T. (2024), “Evidence of brain-evoked potentials from a forward trip on a sloped terrain in old adults”. Presented at *18th International Society of Physical and Rehabilitation Medicine (ISPRM)*, Sydney, NSW, Australia.
4. **Sidarta, A.**, Lim, Y.C., Kuah, C.W.K., Loh, Y.J., Ang, W.T. (2023). “Robot-assisted Active Somatosensory Retraining of Upper Limb Stroke - a Preliminary Finding”. Presented at the *RehabWeek 2023 – ACRM Fast Forward Presentation*, Singapore.

5. **Sidarta, A.**, Lim, Y.C., Er, J. K., Er, C., Lim, L.S., Kwong, P.W.H., Ang, W.T. (2023). “Neuromuscular signals of postural imbalance in older adults”. Presented at the *Neural Control of Movement* annual meeting, Victoria, BC, Canada.
 6. Kumar, N., **Sidarta, A.**, Ostry, D.J., Thiel, A. (2023). "Early robot-assisted proprioceptive training for arm reaching in acute stroke". Presented at the *9th European Stroke Organization Conference – ESOC 2023*, Munich, Germany.
 7. Lim, Y.C., Wong, R.A., Tan, I.O., Kuah, C.W.K., **Sidarta, A.** (2022). “Managing somatosensory impairments in stroke: Current clinical practice and the use of technology”. Presented at the *American Congress of Rehabilitation Medicine (ACRM)* annual conference, Chicago, IL, USA.
 8. **Sidarta, A.**, Kumar, N., Manning, T.F., Ostry, D.J. (2018). “Suppression of lateral prefrontal cortex impairs somatosensory working memory”. Presented at the *Society for Neuroscience* annual meeting, San Diego, CA, USA.
 9. Kumar, N., Manning, T.F., **Sidarta, A.**, Ostry, D.J. (2018). “Somatosensory but not Primary Motor Cortex is involved in the consolidation of Motor Memory”. Presented at the *Society for Neuroscience* annual meeting, San Diego, CA, USA.
 10. Thiel, A., Vahdat, S., Darainy, M., Ostry, D.J., **Sidarta, A.** (2018). "Robot assisted proprioceptive training for improving motor function after stroke". Abstract compiled in the *Cerebrovascular Diseases*, 45, 41-41.
 11. **Sidarta, A.**, Bergeron, K., VanVugt, F.T., Ostry, D.J. (2018). “The relationship between somatosensory working memory and human motor learning”. Presented at the *Neural Control of Movement* annual meeting, Sante Fe, NM, USA.
 12. **Sidarta, A.**, Vahdat, S., Bernardi, N.F., Ostry, D.J. (2016). “The incentive of success: Plasticity in the initial stages of motor learning”. Presented at the *1st NeuroSymposium Quebec 2016*, Montreal, QC, Canada.
- Talks and presentations
 1. “Smartwatch for smarter health”. Sharing session at Sembawang Central Zone-1 Residents’ Network, Singapore, July 2025.
 2. “Fall Prevention and Ageing”. Sharing session at Sembawang Central Zone-1 Residents’ Network, Singapore, May 2024.
 3. “Ability Data: Large movement database in the context of rehabilitation”. Special workshop session for the *i-CREATE 2023*, Bangkok, Thailand, August 2023.
 4. “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 202225454A1	2022-04-19
4. Table motion motor test system	WIPO (PCT)	WO 202225452A1	2022-04-19

CORPORATE PORTFOLIO

Before pursuing my PhD, I spent six years as an engineer in the corporate sector, where I honed my management and leadership skills. From 2011 to 2012, I joined *Life Technologies* (now *Thermo Fisher Scientific*) and was responsible for the design & development of 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.