Wenkang (Winko) An *Curriculum Vitae*

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Education

01/2019 - 09/2021 **Carnegie Mellon University**
Ph.D. in Electrical and Computer Engineering
Thesis: Decoding attentional control from noninvasive measures in humans
Advisor: Dr. Barbara G. Shinn-Cunningham

09/2016 - 12/2018 **Boston University**
Ph.D. candidate in Biomedical Engineering (transferred to Carnegie Mellon University)

09/2014 - 08/2016 **The Chinese University of Hong Kong**
M.Sc. in Biomedical Engineering, *Dean's List (highest honor)*
Thesis: Applying exoskeleton ankle robot on healthy subjects: an EEG study
Advisor: Dr. Raymond K.Y. Tong

09/2013 - 08/2014 **The University of Hong Kong**
M.Sc. in Electrical and Electronic Engineering, *Distinction (highest honor)*
Thesis: A simultaneous EEG-fMRI study of laser-evoked pain
Advisor: Dr. Zhiguo Zhang

09/2008 - 08/2013 **The Hong Kong Polytechnic University**
B.Eng. in Electronic and Information Engineering, *Dean's List (2012/13)*
B.B.A. in Marketing, *First Class Honours (highest honor)*

Research Positions

Boston Children's Hospital, Harvard Medical School
02/26- Staff Scientist, Division of Developmental Medicine
10/21-01/26 Postdoctoral Research Fellow,
Mentors: Dr. Charles A. Nelson and Dr. Carol L. Wilkinson

09/16-09/21 **Boston University/Carnegie Mellon University**
Graduate Research Assistant
Advisor: Dr. Barbara G. Shinn-Cunningham

Summers 19, 20 **Microsoft Research, Redmond**
Research Intern (Brain-Computer Interface), Audio and Acoustics Research Group
Mentor: Dr. Hannes Gamper

02/14 - 06/16 **The Hong Kong Polytechnic University, Hong Kong**
Research Assistant, Department of Rehabilitation Sciences
Mentor: Dr. Roy T.H. Cheung (now with Western Sydney University)

Awards and Honors

2021 Rosamund Stone Zander Translational Neuroscience Fellowship, Boston Children's Hospital [F.2]
2018 ICMMB Best Paper Award [C.3]
2017 Hariri Graduate Fellowship, Hariri Institute for Computing, Boston University
2016 Distinguished Biomedical Engineering Fellowship, College of Engineering, Boston University
2016 Biomedical Engineering Scholarship, The Chinese University of Hong Kong
2015 Arthur and Louise May Memorial Scholarship, The Chinese University of Hong Kong
2012 Merit Award, Micro Fund for Innovation & Entrepreneurship, The Hong Kong Polytechnic University

Manuscripts under review

[R.6] **W. An**, A. Noyce, A. Pei, and B. Shinn-Cunningham. Neural representation of spatial and non-spatial auditory attention in EEG signals. Under review (preprint https://doi.org/10.1101/2023.07.13.548897)

[R.5] **W. An***, S. Sundar*, L. Yankowitz, D. Mehta, C. Wilkinson, Cross-modal characterization of infant cry: validation of a chest-surface accelerometer in extracting acoustic vocal function measures. Under review (preprint https://doi.org/10.48550/arXiv.2605.28687)

[R.4] H. Chung*, **W. An*** et al., Characterizing the longitudinal trajectory of functional brain network in children with and without autism. Under review (*co-first authors)

[R.3] R. Di Lorenzo, **W. An,** A. Kamenetskiy, M. Bisque, C. Nelson. Face-evoked event-related potential in infancy predicts helping behavior at 3 years old. Under review

[R.2] T. Chin, K. Yibeltal, F. Workneh, **W. An**, et al., Resting EEG activity in 24-month-old children in rural Ethiopia following antenatal enhanced nutrition and infection management interventions. Under review

[R.1] J. Kim, **W. An**, A. Noyce, B. Shinn-Cunningham, Representational similarity analysis of EEG reveals multiple spatiotemporal dynamics of auditory selective attention. Under review

Publications

Neuroscience and Neuroengineering

[N. 11] T. Chin, **W. An**, K. Yibeltal, F. Workneh, S. Pihl, S. K. G. Jensen, G. Asmamaw, N. Fasil, A. Teklehaimanot, K. North, S. V. Troller-Renfree, C. A. Nelson, Y. Berhane, and A. C. C. Lee. (2025). Implementation of mobile EEG for resting-state and visual evoked potentials in young children in rural Ethiopia. *Frontiers in Human Neuroscience*, 19, 1552410.

[N.10] **W. An**, Aprotim C. Bhowmik, Charles A. Nelson, Carol L. Wilkinson. EEG-based brain age prediction in infants–toddlers: Implications for early detection of neurodevelopmental disorders. *Developmental Cognitive Neuroscience*, Volume 71, 2025

[N.9] Firehiwot Workneh, Theresa I Chin, Kalkidan Yibeltal, Nebiyou Fasil, Krysten North, Sarah K G Jensen, Workagegnhu Tarekegn Kidane, Mulatu Melese, Sitota Tsegaye, Yoseph Yemane Berhane, Unmesha Roy Paladhi, Betelhem Haimanot Abate, Atsede Teklehaimanot, Tizita Lemma Melka, Stephen Pihl, **W. An**, Fred Van Dyk, Luke C Mullany, Lian V Folger, Sara Cherkerzian, Sonya V Troller-Renfree, Moriah E Thomason, Maria Andersson, Terrie Inder, Charles A Nelson, P Ellen Grant, Parul Christian, Alemayehu Worku, Yemane Berhane, Anne CC Lee. Impact of maternal antenatal nutrition and infection treatment interventions on Longitudinal Infant Development and Growth in rural Ethiopia: protocol of the LIDG child follow-up study. *BMJ Paediatrics Open*, 8:e002840, 2024

[N.8] A. Suhood, S. Summers, D. Opar, T. Astill, **W. An,** E. Rio, R. Cavaleri. Bilateral Corticomotor Reorganization and Symptom Development in Response to Acute Unilateral Hamstring Pain: A Randomized, Controlled Study. *The Journal of Pain*, 25(4):1000-1011, 2024

[N.7] **W. An,** C. Nelson, C. Wilkinson. Neural response to repeated auditory stimuli and its association with early language ability in male children with Fragile X syndrome. *Frontiers in Integrative Neuroscience*, 16, 2022

[N.6] **W. An**, A. Pei, A. Noyce, and B. Shinn-Cunningham. Decoding auditory attention from EEG using a convolutional neural network. In *Proceedings of the 43rd Annual International Conference of the IEEE Engineering in Medicine and Biology Society (***EMBC***)*, 2021

[N.5] **W. An**, B. Shinn-Cunningham, H. Gamper, D. Emmanouilidou, D. Johnston, M. Jalobeanu, E. Cutrell, A. Wilson, K. Chiang, I. Tashev. Decoding music attention from "EEG headphones": a user-friendly auditory brain-computer interface. In *Proceedings of the 2021 IEEE International Conference on Acoustics, Speech and Signal Processing (***ICASSP***)*, 2021

[N.4] K. Chiang, D. Emmanouilidou, H. Gamper, D. Johnston, M. Jalobeanu, E. Cutrell, A. Wilson, **W. An**, and I. Tashev. A closed-loop adaptive brain-computer interface framework: improving the classifier with the use of error-related potentials. In *Proceedings of the 10th International IEEE EMBS Conference on Neural Engineering (***NER***)*, 2021

[N.3] **W. An**, A. Pei, A. Noyce, and B. Shinn-Cunningham. Decoding auditory attention from single-trial EEG for a high-efficiency brain-computer interface. In *Proceedings of the 42nd Annual International Conference of the IEEE Engineering in Medicine and Biology Society (***EMBC***)*, 2020

[N.2] **W. An**, H. Si-Mohammed, N. Huang, H. Gamper, A. Lee, C. Holz, D. Johnston, M. Jalobeanu, D. Emmanouilidou, E. Cutrell, A. Wilson, and I. Tashev. Decoding auditory and tactile attention for use in an EEG-

based brain-computer interface. In *Proceedings of the 8th International Winter Conference on Brain-Computer Interface*, 2020

[N.1] **W. An**, K. Ting, I. Au, J. Zhang, Z. Chan, I. Davis, W. So, R. Chan, and R. Cheung. Neurophysiological correlates of gait retraining with real-time visual and auditory feedback. *IEEE Transactions on Neural Systems and Rehabilitation Engineering*, 27(6):1341-1349, 2019

Biomedical Signal Processing and Biomechanics

[B.20] J. Zhang, Z. Chan, F. Lau, M. Huang, A. Wang, S. Wang, I. Au, S. Wang, B. Lam, **W. An**, and R. Cheung. How do training experience and geographical origin of a runner affect running biomechanics? *Gait & Posture*, 84:209-214, 2021

[B.19] Z. Chan, I. Au, J. Zhang, R. Ferber, G. Shum, **W. An**, and R. Cheung. Effects of deceptive footwear condition on subjective comfort and running biomechanics. *Translational Sports Medicine*, 3(3): 256-262, 2020

[B.18] J. Zhang, Z. Chan, I. Au, **W. An**, P. Shull, R. Cheung. Transfer learning effects of biofeedback running retraining in untrained conditions. *Medicine and science in sports and exercise*, 51(9):1904-1908, 2019

[B.17] R. Cheung, J. Zhang, Z. Chan, **W. An**, I. Au, A. MacPhail, and I. Davis. Shoe-mounted accelerometers should be used with caution in gait retraining. *Scandinavian Journal of Medicine & Science in Sports*, 29(6):835-842, 2019

[B.16] J. Zhang, Z. Chan, I. Au, **W. An**, and R. Cheung. Can runners maintain a newly learned gait pattern outside a laboratory environment following gait retraining? *Gait & Posture*, 69:8-12, 2019

[B.15] D. Mak, I. Au, M. Chan, Z. Chan, **W. An**, J. Zhang, D. Draper, and R. Cheung. Physiotherapy Theory and Practice, 35(2):157-162, 2019

[B.14] E. Ching, **W. An**, I. Au, J. Zhang, Z. Chan, G. Shum, and R. Cheung. Impact loading during distracted running before and after auditory gait retraining. International Journal of Sports Medicine, 36(13):1497-1501, 2018

[B.13] R. Cheung, K. Ho, I. Au, **W. An**, J. Zhang, Z. Chan, K. Deluzio, and M. Rainbow. Immediate and short-term effects of gait retraining on the knee join moments and symptoms in patients with early tibiofemoral joint osteoarthritis: a randomized controlled trial. Osteoarthritis and Cartilage, 26(11):1479-1486, 2018

[B.12] R. Cheung, **W. An**, I. Au, J. Zhang, Z. Chan, A. MacPhail. Control of impact loading during distracted running before and after gait retraining in runners. Journal of Sports Sciences, 36(13):1497-1501, 2018

[B.11] A. MacPhail, I. Au, M. Chan, D. Mak, **W. An**, Z. Chan, J. Zhang, K. Wong, A. So, N. Chan, C. Kwok, P. Lau, D. Draper, and R. Cheung. Type effect of inhibitory KT tape on measured vs. perceived maximal grip strength. Journal of Bodywork and Movement Therapies, 22(3):639-642, 2018

[B.10] I. Au, F. Lau, **W. An**, J. Zhang, T. Chen, R. Cheung. Immediate and short-term biomechanical adaptation of habitual barefoot runners who start shod running. Journal of Sports Sciences, 36(4):451-455, 2018

[B.9] Z. Chan, J. Zhang, I. Au, **W. An**, G. Shum, G. Ng, and R. Cheung. Gait retraining for the reduction of injury occurrence in novice distance runners: 1-year follow-up of a randomized controlled trial. The American Journal of Sports Medicine, 46(2):388-395, 2018

[B.8] R. Cheung, **W. An**, I. Au, J. Zhang, Z. Chan, A. Man, F. Lau, M. Lam, K. Lau, C. Leung, N. Tsang, L. Sze, and G. Lam. Measurement agreement between a newly developed sensing insole and traditional laboratory-based method for footstrike pattern detection in runners. *PLoS ONE*, 12(6):1-7, 2017

[B.7] I. Au, P. Fan, W. Lee, M. Leong, O. Tang, **W. An**, R. Cheung. Effects of Kinesio tape in individuals with lateral epicondylitis: a deceptive crossover trial. Physiotherapy Theory and Practice, 33(12):914-919, 2017

[B.6] J. Zhang, A. MacPhail, **W. An**, W. Naqvi, D. Chan, I. Au, A. Luk, T. Chen, and R. Cheung. A new footwear technology to promote non-heelstrike landing and enhance running performance: fact or fad? Journal of Sports Sciences, 35(15):1533-1537, 2017

[B.5] J. Zhang, **W. An**, I. Au, T. Chen, and R. Cheung. Comparison of the correlations between impact loading rates and peak accelerations measured at two different body sites: intra- and inter-subject analysis. Gait & Posture, 46:53-56, 2016

[B.4] T. Chen, **W. An**, Z. Chan, I. Au, Z. Zhang, and R. Cheung. Immediate effects of modified landing pattern on a probabilistic tibial stress fracture model in runners. Clinical Biomechanics, 33:49-54, 2016

[B.3] C. Cai, I. Au, **W. An**, and R. Cheung. Facilitatory and inhibitory effects of Kinesio tape: fact or fad? Journal of Science and Medicine in Sport, 19(2):109-112, 2016

[B.2] **W. An**, V. Wong, and R. Cheung. Lower limb reaction force asymmetry in rowers with and without a history of back injury. Sports Biomechanics, 14(4):375-383, 2015

[B.1] **W. An**, M. Rainbow, and R. Cheung. Effects of surface inclination on the vertical loading rates and landing pattern during the first attempt of barefoot running in habitual shod runners. BioMed Research International, 2015

Manuscripts in preparation

[M.4] **W. An***, B. Keough* et al., Elevated trial-to-trial variability in children with autism: a visual-evoked potential study. In preparation (*co-first authors)
[M.3] **W. An** *et al.* Alterations in resting EEG power in children with Phelan-McDermid syndrome. In preparation
[M.2] **W. An** *et al.*, Delayed maturation of auditory system in children with fragile X syndrome. In preparation
[M.1] **W. An**, W. Guo, A. Pei, B. Shinn-Cunningham, and A. Noyce. Representation of human selective attention in function MRI. In preparation

Selected Conference Posters

[C.8] **W. An** *et al.* Estimating chronological age from resting-state EEG power in the first three years of life. Society of Neuroscience, Washington D.C., 2023
[C.7] **W. An**, M. Hartney, C. Wilkinson. Neural response to repeated auditory stimuli is associated with early language development in Fragile X syndrome. In preparation. Poster accepted to *Cognitive Neuroscience Society Annual Meeting (***CNS***)*, 2022
[C.6] **W. An**, A. Noyce, A. Pei, B. Shinn-Cunningham. Extract neural representation of auditory attention from fMRI using multivariate pattern analysis. Poster presented at *Association in Otolaryngology Midwinter Meeting 2020 (***ARO***)*, 2020
[C.5] **W. An**, A. Noyce, A. Pei, and B. Shinn-Cunningham. Comparison of spatial and talker-specific attention in a multi-talker scenario. Poster presented at *Advances and Perspectives in Auditory Neuroscience (***APAN***)*, 2019
[C.4] **W. An**, A. Pei, and B. Shinn-Cunningham. Quadratic discriminant analysis reveals representational dissimilarities between different types of auditory selective attention. Poster presented at *Neuroscience 2018 (***SfN***)*, 2018
[C.3] R. Cheung, J. Zhang, Z. Chan, I. Au, **W. An**, and I. Davis. Running retraining using shoe-mounted sensor may provide false impact loading reduction. In *Proceedings of the 21st International Conference on Mechanics in Medicine & Biology (***ICMMB***)*, 2018 **[Best Paper Award]**
[C.2] **W. An**, K. Ting, I. Au, J. Zhang, Z. Chan, I. Davis, and R. Cheung. Alpha band event-related spectral perturbation is coupled with visual feedback in gait training. Poster presented at *Organization for Human Brain Mapping (***OHBM***)*, 2016
[C.1] **W. An**, K. Ting, I. Au, J. Zhang, Z. Chan, I. Davis, and R. Cheung. Error monitoring during gait training modulates theta band oscillation. Poster presented at *Organization for Human Brain Mapping (***OHBM***)*, 2016

Presentations

[T.5] Language ability and EEG phenotypes in children with Fragile X syndrome
Brain, Mind and Behavior Center Seminar Series, Boston Children's Hospital (10/2022)
[T.4] Neuroinformatics: Making sense of neuroimaging with computational methods
Translational Neuroscience Center Seminar Series, Boston Children's Hospital (02/2022)
[T.3] Decoding attentional control from noninvasive measures in humans
Labs of Cognitive Neuroscience, Boston Children's Hospital (06/2021)
[T.2] Decoding music attention from "EEG headphones": a user-friendly auditory brain-computer interface
Microsoft Research (08/2020)
[T.1] Decoding multisensory attention from EEG for use in a brain-computer interface
Microsoft Research (08/2019)

Open-source Software

[S.1] AVOCODO (Audio/VideO CODing Optimization) for EEG Coding
https://github.com/winkoan/AVOCODO?tab=readme-ov-file#readme

Patents

[P.2] G. Lam, R. Cheung, **W. An**, I. Au, J. Shi, R. Ma, Y. Qu, and R. Ding. Sole landing way detection equipment and method as well as insole and shoes comprising equipment (Publication No. CN105662423A/B). China National Intellectual Property Administration, 2016

[P.1] G. Lam, R. Cheung, **W. An**, I. Au, J. Shi, R. Ma, Y. Qu, and R. Ding. Sole implementation mode check out test set and including shoe pad and shoes of this equipment (Publication No. CN205658914U). China National Intellectual Property Administration, 2016

Fundings

[F.2] **Rosamund Stone Zander Fellowship, Boston Children's Hospital, USA**
PI, $200,000, 10/2021 – 09/2023

[F.1] **Innovation and Technology Fund, Hong Kong**
Development of a sensing insole for real time landing pattern detection in runners
Co-I (PI: Dr. Roy T.H. Cheung), HK$239,882 (ITP/085/15TI), 02/2016 – 10/2017

Teaching

2024 **Postdoc Mentor – MBB 102 S Becoming a Brain Scientist**
Summer School, Harvard University

Fall 2018 **Teaching Assistant – BE403 Biomedical Signals and Controls**
College of Engineering, Boston University

Fall 2017 **Teaching Assistant – BE401 Biomedical Signals and Systems**
Substitute Lecturer for the lecture *Discrete-time Fourier Transform*
College of Engineering, Boston University
TA evaluation rating: 4.6/5.0

Fall 2015 **Teaching Assistant – RS2630/RS5630 Movement Science**
Department of Rehabilitation Sciences, The Hong Kong Polytechnic University

Advising and Mentoring

25 **Autumn Johnson,** Ph.D. student at Harvard University
25 **Trishul Chowdhury**, Master's student at Northeastern University
25 **Shefali Verma**, undergraduate student at Northeastern University
24 – 26 **Saketh Sundar,** undergraduate student at Harvard University
24 **Jinling Wang,** student at Harvard University Summer School
23 - 24 **Yuhang Li,** Master's student at Carnegie Mellon University
23 - 24 **Noah Crane,** Research Assistant, Boston Children's Hospital
23 - 24 **Virginia Rosenberger,** Project Coordinator, Boston Children's Hospital
23 - 24 **Brooke Keough,** Research Assistant, Boston Children's Hospital
23 - 26 **Michael Khela,** Undergraduate student, Tufts University
23 **Krisha Patel**, Undergraduate student at Harvard University
23 - 24 **Ava Bandel,** Undergraduate student at Harvard University
22 - 24 **Weizhe Guo,** Master's student at Carnegie Mellon University
21 - 24 **Christopher J. Winnard**, Ph.D. student at Queen Mary University of London
22 **Linxi Wang**, Master's student at Massachusetts Institute of Technology
18 - 21 **Alexander Pei**, Ph.D. student at Carnegie Mellon University
20 **Wusheng Liang**, Ph.D. student at Carnegie Mellon University

Services

2017 - present **Ad-hoc Reviewer (Journals and Conferences)**
Developmental Sciences, Translational Psychiatry, Journal of Neurodevelopmental Disorders, IEEE Transactions on Neural Systems and Rehabilitation Engineering, Computer Methods in Biomechanics and

Biomedical Engineering, Sensors, Brain Sciences, International Journal of Sports Medicine, IEEE EMBS Conference on Neural Engineering, International Conference on Biomedical Engineering and Biotechnology

2025 **Grant Reviewer**
Austrian Science Fund (FWF)

2022 **Guest Editor for Special Issue**
Sensors (Advances on EEG-based Sensing and Imaging)

2022 - present **External Research Mentor for PhD Program**
School of Electronic Engineering and Computer Science, Queen Mary University of London

2021 - 2022 **Newton Special Education Parent Advisory Council**
Liaison at Lincoln-Eliot Elementary School

References

Charles A. Nelson, PhD
Richard David Scott Chair in Pediatric Developmental Medicine Research
Professor of Pediatrics and Neuroscience
Boston Children's Hospital, Harvard Medical School
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Carol L. Wilkinson, MD PhD
Attending Physician, Division of Developmental Medicine
Assistant Professor of Pediatrics
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Levinger Family Professor of Pediatrics
Founding Director, Global Alliance for Infant and Maternal Health Research
Warren Alpert Medical School of Brown University
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Barbara Shinn-Cunningham, PhD
George A. and Helen Dunham Cowan Professor of Auditory Neuroscience
Director, Neuroscience Institute
Department of Psychology, Carnegie Mellon University
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