

a) NAME

Tung, James Yungjen

Associate Professor, tenured
Member of Graduate Faculty

b) DEGREES

Ph.D., University of Toronto, Rehabilitation Science, 2010
M.Eng., McGill University, Biomedical Engineering, 2003
B.Eng., University of Guelph, Biological Engineering, 1999

c) EMPLOYMENT HISTORY

2020-present: Associate Professor, Mechanical & Mechatronics Engineering, University of Waterloo

2018: Technical advisor, Qoltom Inc.

2018: Scientific advisor, Stabilo Inc.

2014-2020: Assistant Professor, Mechanical & Mechatronics Engineering, University of Waterloo

2012-2013: Scientific consultant, Sensimat Systems, Inc.

2012-2013: Scientific technical advisor, Concussion Toolbox Inc.

2010-2012: Postdoctoral Fellow, Computer Science/Kinesiology, Math/Health, University of Waterloo

2007-2008: Teaching assistant, Physical Therapy, Medicine, University of Toronto

2003-2005: Research engineer, Centre for Studies in Aging, Research, Sunnybrook Research Institute

2003: Research assistant, Kinesiology, Health, Wilfrid Laurier University

2002: Research & Development Engineer, Baylis Medical Company

d) HONOURS

Outstanding Performance Award, University of Waterloo, 2020

e) SCHOLARLY AND PROFESSIONAL ACTIVITIES

Editorial/Conference organization

n/a

f) GRADUATE SUPERVISIONS

Completed: 1 P.D.F., 1Ph.D., 7 MA.Sc.

In progress: 0 P.D.F., 1 Ph.D., 3 M.A.Sc.

NAME OF STUDENTS supervised (past seven years):

Shovon Saha, M.A.Sc., TBD, 2022-present.

Andrew Paul Hart, M.A.Sc., Behavioural biomarkers of Levodopa effects on Parkinson's Disease, 2021-2023.

Aravind Ravi, Ph.D., Asynchronous Brain-Computer Interface (BCI) using Steady-State Motion Visual Evoked Potential for Motor Rehabilitation, 2020-present.

Christian Mele, M.A.Sc., Support surface design for bilateral lower-limb exoskeletons, 2020-2023.

Alyson Colpitts, M.A.Sc., Sensor-Mediated Assessment of physical Rehabilitation (SMART): Partial Knee Meniscectomy, 2020-2022.

Dalya Al-Mfarej, M.A.Sc., Development of a bimanual coordination assessment for concussion screening, 2019-2021.

Abdullah Rashid Yeaser, M.A.Sc., Mechatronic advancements in wheeled walker mobility, 2019-2020.

Jonathan Lin, P.D.F., Development and validation of analysis tools and interfaces for automated rehabilitation systems, 2018-2020.

Robin Murdock, M.A.Sc., Monitoring prosthetic socket fit in new transtibial amputees, 2018-2020.

Vladimir Joukov, Ph.D., Human motion estimation and learning optimal control on Lie groups, 2018-2019.

Mina Nouredanesh, Ph.D., TBD, 2017-present.

Kaela Shea, M.A.Sc., Wearable sensor systems for assessing behavioural biomarkers of cognitive decline, 2015-2017.

Andrew McCormick, M.A.Sc., Building Capacity for Design and Testing of Intelligent Mobility Aids, 2015-2017.

Mina Nouredanesh, M.A.Sc., Development of wearable system system to track near-falls in older adults, 2015-2017.

g) GRADUATE COURSES (past seven years)

n/a

h) RESEARCH FUNDING (past seven years as principal investigator/applicant)

External

2022-2027: Real-world Assessment of Assistive Robotics for Mobility Impairments and Injury Prevention, Canadian Foundation for Innovation (\$227,500) & ORF (\$227,500).

2022-2027: Wearable sensing for human motor control research and mobility assistive devices: Capturing environmental features, NSERC Discovery, \$135,000.

2021-2026: Design and development of Physiological REadiness for Therapy System (PRÊTS) for Motor Rehabilitation, Government of Ontario, Early Researcher Award, \$150,000.

2023: Advancing Brain-Computer Interfaces (BCI) for wheelchair control: investigating cognitive fatigue effects in free-living conditions, NSERC Alliance, \$22,333.

2023: Foot-based sensor fusion for ambulatory gait analysis for occupational health & safety, NSERC Alliance, \$30,000.

2023: Garment-based Neuroprosthesis, a non-invasive closed-loop neural extension for facilitating the human nervous system function, MITACS Accelerate, \$30,000.

2021-2022: Insole-based sensor fusion for ambulatory gait analysis for occupational health & safety, MITACS Accelerate, \$60,000.

2021-2022: Garment-based Neuroprosthesis, a non-invasive closed-loop neural extension for facilitating the human nervous system function, MITACS Accelerate, \$15,000.

2020-2022: Technologies for low-cost mobile sensorimotor assessment following concussion, NSERC CRD, MITACS Accelerate, \$50,500.

2015-2021: Multimodal integration of wearable sensor signals for ambulatory gait and posture analysis, NSERC Discovery, \$132,000.

2019: Smart textile sensing for prosthetic fit monitoring, NSERC Engage, \$25,000.

2018-2019: Development of an Automatic Braking System for Rollator Walkers, AGE-WELL, SIP Accelerator, \$40,000.

2018-2019: Lower-limb wearable exoskeleton system to advance assisted mobility research, NSERC Research Tools and Instruments, \$104,944.

2016-2017: Automated assessment of independent activities of daily living, NSERC Engage, \$25,000.

Internal

2018-2019: Advancing Prosthetic Socket Fit: Biofeedback for New Trans-tibial Amputees, Centre of Bioengineering and Biotechnology, \$10,000.

i) PUBLICATIONS

1) Life-time summary:

Books and monographs: 0

Edited books and monographs: 0

Chapters in books and monographs: 3

Refereed journal articles: 20

Refereed conference proceedings: 22

Presentations at conferences: 0

Technical reports: 0

Invited/keynote addresses: 3

Others (workshops presented): 0

2) Details for past seven years

Chapters in books and monographs

1. Yunus Celik, Rodrigo Vitorio, Dylan Powell, Jason Moore, Fraser Young, Graham Coulby, James Tung, Mina Nouredanesh, Robert Ellis, Elena S Izmailova, Sam Stuart, Alan Godfrey. (2023). Sensor Integration for Gait Analysis. Roger Narayan. Encyclopedia of Sensors and Biosensors. 1(4): 263-283. Elsevier.
2. J. Tung, W. Gage, S. Gower, K. van Ooteghem, M. Nouredanesh. (2020). Wearable Point-of-Care-Technologies (POTC): Promises and Pitfalls. A. Godfrey, S. Stuart. Digital Health. : 73-84. Elsevier.
3. Nouredanesh, M; Tung, JY. (2018). Multimodal Ambulatory Fall Risk Assessment in the Era of Big Data. Sejdic, E; Falk, T. Biomedical Signal Processing in Big Data. : 1-42. CRC Press.

Papers in refereed Journals

1. Jason Moore, Sam Stuart, Peter McMeekin, Richard Walker, Mina Nouredanesh, James Tung, Richard Reilly, Alan Godfrey. (2023). Toward enhanced free-living fall risk assessment: Data mining and deep learning for environment and terrain classification. Intelligence-Based Medicine.
2. Adam J. Yu, Run Ze Gao, Peter S. Lee, Christian Mele, Doug Dittmer, Andreas Schirm, Carolyn L. Ren, James Y. Tung. (2023). Soft robotics–inspired sensing system for detecting downward movement and pistoning in prosthetic sockets: A proof-of-concept study. Prosthetics and Orthotics International. In Press.
3. Peter S Lee, Run Ze Gao, Alyson Colpitts, Robin W Murdock, Doug Dittmer, Andreas Schirm, James Y Tung, Carolyn L Ren. (2022). Air microfluidics-enabled soft robotic transtibial prosthesis socket liner toward dynamic management of residual limb contact pressure and volume fluctuation. Biomicrofluidics. 16(3):034107.
4. Leia C Shum, Reza Faieghi, Terry Borsook, Tamim Faruk, Souraiya Kassam, Hoda Nabavi, Sofija Spasojevic, James Tung, Shehroz S Khan, Andrea Iaboni. (2022). Indoor location data for tracking human behaviours: A Scoping Review. Sensors. 22(3): 1220.
5. Mina Nouredanesh, Lauro Ojeda, Neil Alexander, Alan Godfrey, Michael Schwenk, William Melek, James Tung. (2022). Automated Detection of Older Adults' Naturally-Occurring Compensatory Balance Reactions: Translation from Laboratory to Free-living Conditions. IEEE Translational Engineering in Health and Medicine. 10: 2700113.
6. Kelly, K; Norouzi, DM; Nouredanesh, M; Jost, R; Cheng-Patel, C; Beauchamp, C; Dao, L; Luu, B; Stager, D; Tung, J; Niechwiej-Szwedo, E. (2022). Temporal eye-hand coordination during visually-guided reaching in 7 to 12 year old children with strabismus. Investigative Ophthalmology & Visual Science.63: 10.1167/iops.63.12.1.
7. Mina Nouredanesh; Alan Godfrey; Dylan Powell; James Tung. (2022). Egocentric vision-based detection of surfaces: Towards context-aware free-living digital biomarkers for gait and fall risk assessment. Journal of NeuroEngineering and Rehabilitation. 19(1): 1-16.
8. Yiwen Liao, Abdullah Rashid Yeaser, James Tung, Bin Yang, Ehsan Hashemi. (2021). Unsupervised Fault Detection and Recovery for Intelligent Robotic Rollators. Robotics and Autonomous Systems. 146: 103876.

9. Ewa Niechwiej-Szwedo, Susana Wu, Mina Nouredanesh, James Tung, Lisa W. Christian. (2021). Development of eye-hand coordination in typically developing children and adolescents assessed using a reach-to-grasp sequencing task . *Human Movement Science*. 80: 102868.
10. E. Niechwiej-Szwedo, M. Nouredanesh, J. Tung. (2020). Test-retest repeatability reveals a temporal kinematic signature for an upper limb precision grasping task in adults. *Human Movement Science*. 75:102721.
11. E. Lam, S. Aratia, J. Wang, J. Tung. (2020). Measuring Heart Rate Variability in Free-Living Conditions using Consumer-Grade Photoplethysmography: Validation Study. *JMIR Biomedical Engineering*. 5(1):e17355.
12. Ewa Niechwiej-Szwedo, Kimberly Meier, Lisa Christian, Mina Nouredanesh, James Tung, Pamela Bryden, Deborah Giaschi. (2020). Concurrent maturation of visuomotor skills and motion perception in typically developing children and adolescents. *Developmental psychobiology*. 62(3): 353-367.
13. Mina Nouredanesh, Alan Godfrey, Jennifer Howcroft, Edward Lemaire, James Tung. (2020). Fall risk assessment in the wild: A critical examination of wearable sensors use in free-living conditions. *Gait & Posture*. 85: 178-190.
14. Nouredanesh, M; Gordt, K; Schwenk, M; Tung, JY. (2019). Automated detection of multidirectional compensatory balance reactions: a step towards tracking naturally-occurring near-falls. *IEEE Transactions on Neural Systems & Rehabilitation Engineering*. 28(2): 478-487.
15. Mina Nouredanesh, James Tung. (2019). IMU, sEMG, or their cross-correlation and temporal similarities: Which signal features detect lateral compensatory balance reactions more accurately?. *Computer methods and programs in biomedicine*. 182: 105003.
16. Niechwiej-Szwedo, E; Meier, K; Christian, L; Nouredanesh, M; Tung, JY; Bryden, P; Giaschi, D. (2019). Concurrent maturation of visuomotor skills and motion perception in typically-developing children and adolescents. *Developmental Psychobiology*. 62(3): 353-367.
17. Mina Nouredanesh, Alan Godfrey, James Tung. (2019). First-person Vision-based Assessment of Fall Risks in The Wild, Towards Fall Prevention in Older Adults. *Journal of Computational Vision and Imaging Systems*. 5(1): 1.
18. Arjun Puri; Ben Kim; Olivier Nguyen; Paul Stolee; James Tung; Joon Lee. (2017). User acceptance of wristworn activity trackers among community dwelling older adults: A mixed methods study. *Journal of Medical Internet Research*. 5(11): e173.
19. Zeibart, C; Tung, JY; Levine, I.; Gibbs, J; Giangregorio, L; Laing, A. (2017). Measurement of peak impact loads differ between accelerometers - effects of system operating range and sampling rate. *Journal of Biomechanics*. 58: 222-226.
20. Ewa Niechwiej-Szwedo, David Gonzalez, Mina Nouredanesh*, James Tung. (2017). Evaluation of the Leap Motion Controller during the performance of visually-guided upper limb movements. *PLOS ONE*. 13(3):e0193639.

Papers in refereed conference proceedings

1. Krista Kelly, Jeffrey Hunter Jr, Reed Jost, Eileen Birch, Serena Wang, Mina Nouredanesh*, James Tung, Ewa Niechwiej-Szwedo. (2022). Visually-guided reaching in children with deprivation amblyopia. Association for Research in Vision and Ophthalmology, Abstract.
2. Krista R Kelly, Ashley J White, Jeffrey Hunter, Dorsa Mir Norouzi, Reed M Jost, Christina Cheng-Patel, Cynthia L Beauchamp, Lori M Dao, Becky A Luu, David Stager, James Y Tung, Ewa Niechwiej-Szwedo. (2022). Impaired hand kinematics during visually guided reaching in children age 4-6 years with impaired binocularity. American Association for Pediatric Ophthalmology and Strabismus, Abstract.
3. Mele, C; Mombaur, K; Tung J. (2022). Initial development and evaluation of a predictive geometry based pressure map for interface surface evaluation in lower limb rehabilitation exoskeletons. 2022 North American Congress on Biomechanics, Ottawa, Canada. Paper.
4. Colpitts, A; Ibey, R; Lin, JL; Tung. J. (2022). Kinematics-Based Lower Limb Rehabilitation Monitoring Following Partial Knee Meniscectomy: Case Study. 2022 44th Annual International Conference of the IEEE Engineering in Medicine & Biology Society (EMBC), Glasgow, United Kingdom. Paper.
5. Tung, J; Hart, AP; Al-Mfarej, D; O'Connell, M; Mazumdar, V; Poursartip, B; Alizadeh-Meghrazi. (2022). Advancing free-living gait bout segmentation using smart garments. International Society of Posture and Gait Research World Congress, Montreal, Canada, Abstract.
6. Colpitts, A; Lin, JL; Ibey, R; Tung, J. (2022). Clinical Validation of Inertial Measurement Units to Track Recovery: A Case Study Following Partial Knee Meniscectomy. International Society of Posture and Gait Research World Congress, Montreal, Canada, Abstract.
7. Mele, C; Mombaur, K; Tung, J. (2022). Preliminary Kinematic Evaluation of Custom versus Generic Human-Robot Coupling Interfaces on Lower-Limb Rehabilitation Exoskeletons. International Society of Posture and Gait Research World Congress, Montreal, Canada, Abstract.
8. Mele, C; Inkol, K; Gao, R; Tung, JY; Mombaur, K. (2022). Preliminary Modelling, Development and Validation of a Dynamic Exoskeleton-Human Test Bench for the Evaluation of Two Strapping Interaction Models. 2022 World Congress of Biomechanics, Taipei, Taiwan, Paper.
9. Tung, J; Hart, AP; Koo, C; Ehgoetz-Martens, K; Van Ooteghem, K. (2022). A Comparison of Armswing Measurement using Inertial Measurement Units versus Kinematic Motion Capture across Daily Walking Tasks. International Society of Posture and Gait Research World Congress, Montreal, Canada, Abstract.
10. Nouredanesh, M; Godfrey, A; Howcroft, J; Lemaire, E; Tung, J. (2022). Free-living digital biomarkers and domains with high predictive values for falls. International Society of Posture and Gait Research World Congress, Montreal, Canada, Abstract.
11. Al-Mfarej, D; Gonzalez, D; Tung, J. (2021). Sensor-based 9-week Serial Balance Data Show Need for Individualized Baseline Profiles: Implications on Concussion Diagnosis. Canadian Medical and Biological Engineering Conference, Paper.
12. Lee, Peter S; Gao, Run Ze, Tung, James Y; Ren, Carolyn. (2021). Research and Development of an Active Prosthetic Socket via Air-Microfluidic Enabled Soft Robotics. 42nd Annual International Conference of the IEEE Engineering in Medicine & Biology Society (EMBC), Poster.

13. Enrique, P; Yang, D; Rose, M; Ding, S; Tung, J; Kennings, A. (2021). Mechatronics Application for a Smart Inhaler. IEEE International IOT, Electronics and Mechatronics Conference (IEMTRONICS), Paper.
14. Krista R Kelly, Reed M Jost, Jeffrey Hunter, Cynthia L Beauchamp, Serena Wang, James Y Tung, Ewa Niechwiej-Szwedo. (2020). Discordant binocular experience disrupts hand kinematics during visually guided reaching in children. The Association for Research in Vision and Ophthalmology, Abstract.
15. A. Yeaser, J. Tung, J. Huissoon, E. Hashemi. (2020). Learning-Aided User Intent Estimation for Smart Rollators. 2020 42nd Annual International Conference of the IEEE Engineering in Medicine & Biology Society (EMBC), Montreal, Canada, Paper.
16. Murdock, R; Dittmer; D; Tung. JY. (2019). Biofidelic 3D printed trans-tibial residual limbs to facilitate bench testing of new socket technologies. International Society for Prosthetics and Orthotics (ISPO), Toronto, Canada, Paper.
17. Nouredanesh, M; Tung., JY. (2019). Going Deeper into Fall Risk Assessment in the Wild Using Egocentric Cameras and Wearable IMUs. International Neurorehabilitation Symposium, Toronto, Canada, Paper.
18. Nouredanesh, M; Frazier, M; Tung, JY; Jeon, S; Arami, A. (2019). Effect of Visual Information on Dominant and Non-dominant Hands During a Bi-manual Drawing in a Robotic Platform. IEEE-RAS-EMBS International Conference on Rehabilitation Robotics (ICORR), Toronto, Canada, Paper.
19. Tung, JY; Murdock, RW; Lam, E; Plater, E; Bent, L; Schirm, A; Cooper, S; Dittmer, D. (2019). Emerging Smart Socket Technologies: New approaches and Applications. Ontario Association for Amputee Care (OAAC), Toronto, Canada, Abstract.
20. Mina Nouredanesh, Aaron Li, Alan Godfrey, James Tung. (2018). Chasing feet in the wild: An egocentric motion-aware gait assessment tool. British Machine Vision Conference (BMVC), Newcastle, United Kingdom, Paper.
21. Priyank Jaini, Zhitang Chen, Pablo Carbajal, Edith Law, Laura Middleton, Kayla Regan, Mike Schaekermann, George Trimponias, James Tung, Pascal Poupart. (2017). Online Bayesian Transfer Learning for Sequential Data Modeling. International Conference on Learning Representations, Paper.
22. Shea, K; Tung, JY. (2017). System Identification of Motion Artifact Noise in EEG Headsets from
23. Locomotion. H-Workload 2017: The first international symposium on human mental workload, Dublin, Ireland, Paper.

Invited/keynote addresses

1. Should we worry about Automation and Artificial Intelligence in Rehabilitation? Lessons from research conducted at the UW Neural and Rehabilitation Engineering (NRE) Lab. Grand River Hospital, Pizza with a Professor Series, Kitchener, Canada, 2019.
2. Advancing contextual awareness for mobility assistive technology. Centre for Bioengineering and Biotechnology Event in Biomechanics and Assistive Technology, Waterloo, Canada, 2019.

3. Multimodal wearable sensor systems for mobility assistive technology. Technology in Rehabilitation Lecture Series, Toronto, Canada, 2019.

DATE: January 2024