Beom-Chan Lee, Ph.D.

Department of Health and Human Performance, University of Houston

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Academic Appointments

09/2020-present	Associate Professor (tenured), Department of Health and Human Performance, University of Houston, Houston, TX
12/2022-12/2023 (sabbatical)	Senior Researcher, Institute of Sport Science, Seoul National University, Seoul, South Korea
05/2015-06/2021	Researcher (without compensation), Michael E. DeBakey Veterans Affairs Medical Center, Houston, TX
09/2014-08/2020	Assistant Professor (tenure track), Department of Health and Human Performance, University of Houston, Houston, TX
06/2013-08/2014	Visiting Assistant Professor (non-tenure track), Department of Health and Human Performance, University of Houston, Houston, TX
01/2013-05/2013	Research Investigator, Department of Mechanical Engineering, University of Michigan, Ann Arbor, MI
02/2012-12/2012	Postdoctoral Research Fellow, Department of Mechanical Engineering, University of Michigan, Ann Arbor, MI

Education

09/2008-04/2012	Ph.D., Mechanical Engineering, University of Michigan, Ann Arbor, MI Dissertation: "Design and Assessment of Vibrotactile Biofeedback and Instructional Systems for Balance Rehabilitation Applications"
03/2006-06/2008	Ph.D. (all but dissertation), Mechatronics, Gwangju Institute of Science and Technology, Gwangju, Korea
03/2004-02/2006	M.S., Mechatronics, Gwangju Institute of Science and Technology, Gwangju, Korea Thesis: "Development of K-Touch™ Haptic API (Application Programming Interface)"
03/1998-02/2004	B.S., Electrical and Computer Engineering, Kangwon National University, Chuncheon, Korea Thesis: "Implementation of 3D Haptic Interface for Virtual Reality"

Other Academic Experience

09/2011-01/2012	Graduate Student Instructor, Department of Mechanical Engineering, University of Michigan, Ann Arbor, MI
09/2008-08/2011	Research Assistant, Sensory Substitution and Augmentation Laboratory, Department of Mechanical Engineering, University of Michigan, Ann Arbor, MI
03/2004-06/2008	Research Assistant, Human Robotics Laboratory, Department of Mechatronics, Gwangju Institute of Science and Technology, Gwangju, Korea
03/2004-06/2008	Teaching Assistant, Department of Mechatronics, Gwangju Institute of Science and Technology, Gwangju, Korea
03/2002-02/2004	Research Assistant, Human Interface Laboratory, Department of Electrical and Computer Engineering, Kangwon National University, Chuncheon, Korea

RESEARCH and SCHOLARSHIP

Research Interests

Biomechanics; Neuromechanics; Rehabilitation engineering and science; Robotics; Mechatronics; Digital health technologies; Telerehabilitation; Telehealth; Machine learning; Neuroscience; Biofeedback; Pathological neuromuscular behavior; Fall-inducing technology platform; Fall prevention training; Motor behavior; Big data and data mining

Research Impact as of December 3, 2025

h-Index per Web of Science: 18

h-Index per Google Scholar: 23

i10-Index per Google Scholar: 44

Total citations per Web of Science: 819

Total citations per Google Scholar: 1,610

Peer-reviewed Journal Articles

* = Beom-Chan Lee as the corresponding/senior author

§ = UH graduate student/post-doc author supervised by Beom-Chan Lee

‡ = UH graduate student/post-doc author co-supervised by Beom-Chan Lee

¥ = Non-UH graduate student/post-doc author mentored by Beom-Chan Lee

IF = Impact Factor based on 2024 Journal Citation Reports by Thomson Reuters

N/A = Not Available

Published Journal Articles

1-36: After University of Houston appointment

37-45: Before University of Houston appointment

1. Catherine Park and ***Beom-Chan Lee**, "Identifying minimal risk factors for adolescent suicidal ideation and suicide attempts: A machine learning-optimized approach", *PLOS ONE*, Vol. 21, No. 4, pp. e0346050, 2026 (IF: 2.6)

2. [‡]Hyunje Park, ***Beom-Chan Lee**, Dimitry Sayenko, Sheng Li, and Seoung Hoon Park, "Transcutaneous spinal stimulation paired with visual feedback facilitates retention of improved weight transfer toward the affected side in people post-stroke", *Journal of NeuroEngineering and Rehabilitation*, Vol. 22, No. 1, Article number: 188, 2025 (IF: 5.2)

3. Seung-Su Ha, Hye-Eun Park, Catherine Park, and **Beom-Chan Lee**, "Towards system design for the prevention of compensatory movements in upper limb stroke rehabilitation", *Journal of the Korea Society for Wellness*, Vol. 20, No. 3, pp. 59-67, 2025 (KCI IF: 1.5)

4. Catherine Park, Namhee Kim, Miji Kim, Chang Won Won, and ***Beom-Chan Lee**, "Advancing fall risk prediction in older adults with cognitive frailty: a machine learning approach using 2-year clinical data", *PLOS ONE*, Vol. 20, No. 8, pp. e0330672, 2025 (IF: 2.6)

5. Seoung Hoon Park, [‡]Hyunje Park, Jooeun Ahn, and ***Beom-Chan Lee**, "A novel Adaptive Propulsion Enhancement eXperience (APEX) system: Development and preliminary validation for enhancing gait propulsion in stroke survivors", *IEEE Transactions on Neural Systems and Rehabilitation Engineering*, Vol. 33, pp. 1486-1496, 2025 (IF: 5.2)

6. [¥]Chihyeong Lee, Jooeun Ahn, and ***Beom-Chan Lee**, "The effects of six perturbation intensities on backward falls induced by an instrumented split-belt treadmill", *Scientific Reports*, Vol. 15, No. 1, pp. 5108, 2025 (IF: 3.9)

7. Catherine Park and ***Beom-Chan Lee**, "A systematic review of the effects of interactive telerehabilitation with remote monitoring and guidance on balance and gait performance in older adults and individuals with neurological conditions", *Bioengineering*, Vol. 11, No. 5, pp. 460, 2024 (IF: 3.7)

8. [¥]Chihyeong Lee, Jooeun Ahn, and ***Beom-Chan Lee**, "A systematic review of the long-term effects of using smartphone- and tablet-based rehabilitation technology for balance and gait training and exercise programs", *Bioengineering*, Vol. 10, No. 10, pp. 1142, 2023 (IF: 3.7)

9. ***Beom-Chan Lee**, Jongkwan Choi, Jooeun Ahn, and Bernard J. Martin, "The different contributions of the eight prefrontal cortex subregions to reactive responses after unpredictable slip perturbations and vibrotactile cueing", *Frontiers in Human Neuroscience*, Vol. 17, pp. 1-15, 2023 (IF: 2.7)

10. ***Beom-Chan Lee**, Junmo An, Jiyeon Kim, and Eugene C. Lai, "Performing dynamic weight-shifting balance exercises with a smartphone-based wearable telerehabilitation system for home use by individuals with Parkinson's disease: A proof-of-concept study", *IEEE Transactions on Neural Systems and Rehabilitation Engineering*, Vol. 31, pp. 456-463, 2023 (IF: 5.2)

11. [§]Dongyual Yoo, Junmo An, Kap-Ho Seo, and ***Beom-Chan Lee**, "Aging affects lower limb joint moments and muscle responses to a split-belt treadmill perturbation", *Frontiers in Sports and Active Living*, Vol. 3, pp. 683039, 2021 (IF: 2.6)

12. Charles S. Layne, David R. Young, **Beom-Chan Lee**, Daniel G. Glaze, Aloysia Schwabe, and Bernhard Suter, "Kinematics associated with treadmill walking in Rett Syndrome", *Disability and Rehabilitation*, Vol. 43, No. 11, pp. 1585-1593, 2019 (IF: 2.0)

13. **Beom-Chan Lee**, Jongkwan Choi, and Bernard J. Martin, "Roles of the prefrontal cortex in learning to time the onset of pre-existing motor programs", *PLoS One*, Vol. 15, No. 11, pp. e0241562, 2020 (IF: 2.6)

14. Stacey L. Gorniak, Haley Ray, **Beom-Chan Lee**, and Jing Wang, "Cognitive-motor impairment in manual tasks in adults with type 2 diabetes", *Occupation, Participation and Health*, Vol. 40, No. 2, pp. 113-121, 2020 (IF: 1.6 in 2022)

15. §Dongyual Yoo, Dae-Hee Kim, Kap-Ho Seo, and ***Beom-Chan Lee**, "The effects of technology-assisted ankle rehabilitation on balance control in stroke survivors", *IEEE Transactions on Neural Systems and Rehabilitation Engineering*, Vol. 27, No. 9, pp. 1817-1823, 2019 (IF: 5.2)

16. ***Beom-Chan Lee**, Chul-Soo Kim, and Kap-Ho Seo, "The body's compensatory responses to unpredictable trip and slip perturbations induced by a programmable split-belt treadmill", *IEEE Transactions on Neural Systems and Rehabilitation Engineering*, Vol. 27, No. 7, pp. 1389-1396, 2019 (IF: 5.2)

17. §Dongyual Yoo, Kap-Ho Seo, and ***Beom-Chan Lee**, "The effect of the most common gait perturbations on the compensatory limb's ankle, knee, and hip moments during the first stepping response", *Gait and Posture*, Vol. 71, pp. 98-104, 2019 (IF: 2.4)

18. Stacey L. Gorniak, Fangmei Yoshimi Lu, **Beom-Chan Lee**, Paul J. Massman, and Jing Wang, "Cognitive impairment and postural control deficits in adults with Type 2 Diabetes", *Diabetes-Metabolism Research and Reviews*, Vol. 35, No. 2, pp. e3089, 2019 (IF: 6.0)

19. §Dongyual Yoo, Younsun Son, Dae-Hee Kim, Kap-Ho Seo, and ***Beom-Chan Lee**, "Technology-assisted ankle rehabilitation improves balance and gait performance in stroke survivors: A randomized controlled study with 1-month follow-up", *IEEE Transactions on Neural Systems and Rehabilitation Engineering*, Vol. 26, No. 12, pp. 1-9, 2018 (IF: 5.2)

20. David R. Young, **Beom-Chan Lee**, and Charles S. Layne, "Comparison of martial artists and healthy individuals using treadmill-induced gait perturbation", *Neurology and Neuroscience Reports*, Vol. 1, No. 2, pp. 1-4, 2018 (IF: N/A)

21. Charles S. Layne, **Beom-Chan Lee**, David R. Young, Daniel G. Glaze, and Bernhard Suter, "Temporal gait measures associated with overground and treadmill walking in Rett syndrome", *Journal of Child Neurology*, Vol. 33, No. 10, pp. 667-674, 2018 (IF: 1.6)

22. §Alberto Fung, Eugene C. Lai, and ***Beom-Chan Lee**, "Usability and validation of the Smarter Balance System: An unsupervised dynamic balance exercises system for individuals with Parkinson's disease", *IEEE Transactions on Neural Systems and Rehabilitation Engineering*, Vol. 26, No. 4, pp. 798-806, 2018 (IF: 5.2)

23. ***Beom-Chan Lee**, Alberto Fung, and Timothy A. Thrasher, "The effects of coding schemes on vibrotactile biofeedback for dynamic balance training in Parkinson's disease and healthy elderly individuals", *IEEE Transactions on Neural Systems and Rehabilitation Engineering*, Vol. 26, No. 1, pp. 153-160, 2018 (IF: 5.2)

24. Charles S. Layne, **Beom-Chan Lee**, David R. Young, Aryn Knight, Daniel G. Glaze, and Bernhard Suter, "Methodologies to objectively assess gait and postural control features in Rett syndrome-With a comment on specific challenges and how to address them", *Rare Diseases and Orphan Drugs*, Vol. 4, No. 1, pp. 1-7, 2017 (IF: N/A)

25. ***Beom-Chan Lee**, Bernard J. Martin, Timothy A. Thrasher, and Charles S. Layne, "The effect of vibrotactile cuing on recovery strategies from a treadmill-induced trip", *IEEE Transactions on Neural Systems and Rehabilitation Engineering*, Vol. 25, No. 3, pp. 235-243, 2017 (IF: 5.2)

26. Hao Meng, Daniel P. O'Connor, **Beom-Chan Lee**, Charles S. Layne, and Stacey L. Gorniak, "Alterations in over-ground walking patterns in obese and overweight adults", *Gait and Posture*, Vol. 53, pp. 145-150, 2017 (IF: 2.4)

27. Rakshatha Kabbaligere, **Beom-Chan Lee**, and Charles S. Layne, "Balancing sensory inputs: Sensory reweighting of ankle proprioception and vision during a bipedal posture task", *Gait and Posture*, Vol. 52, pp. 244-250, 2017 (IF: 2.4)

28. **Beom-Chan Lee**, Timothy A. Thrasher, Charles S. Layne, and Bernard J. Martin, "Vibrotactile cuing revisited to reveal a possible challenge to sensorimotor adaptation", *Experimental Brain Research*, Vol. 234, No. 12, pp. 3523-3530, 2016 (IF: 1.6)

29. Recep Ali Ozdemir, Jose L. Contreras-Vidal, **Beom-Chan Lee**, and William H. Paloski, "Cortical activity modulations underlying age related performance differences during posture-cognition dual tasking conditions", *Experimental Brain Research*, Vol. 234, No. 11, pp. 3321-3334, 2016 (IF: 1.6)

30. David R. Temple, **Beom-Chan Lee**, and Charles S. Layne, "Effects of tibialis anterior vibration on postural control when exposed to support surface translations", *Somatosensory and Motor Research*, Vol. 33, No. 1, pp. 42-48, 2016 (IF: 1.1)

31. Marius Dettmer, Amir Pourmoghaddam, **Beom-Chan Lee**, and Charles S. Layne, "Do aging and tactile noise stimulation affect responses to support surface translations in healthy adults?", *Current Gerontology and Geriatrics Research*, Vol. 2016, No. 2941964, 9 pages, 2016 (IF: N/A)

32. Marius Dettmer, Amir Pourmoghaddam, **Beom-Chan Lee**, and Charles S. Layne, "Associations between tactile sensory threshold and postural performance and effects of healthy aging and subthreshold vibrotactile stimulation on postural outcomes in a simple dual task", *Current Gerontology and Geriatrics Research*, Vol. 2016, No. 9797369, 11 pages, 2016 (IF: N/A)

33. Hao Meng, Daniel P. O'Connor, **Beom-Chan Lee**, Charles S. Layne, and Stacey L. Gorniak, "Effects of adiposity on postural control and cognition", *Gait and Posture*, Vol. 43, pp. 31-37, 2016 (IF: 2.4)

34. ***Beom-Chan Lee**, Timothy A. Thrasher, Stanley P. Fisher, and Charles S. Layne, "The effects of different sensory augmentation on weight-shifting balance exercises in Parkinson's disease and healthy elderly people: A proof-of-concept study", *Journal of NeuroEngineering and Rehabilitation*, Vol. 12, No. 75, 2015 (IF: 5.2)

35. Marius Dettmer, Amir Pourmoghaddam, **Beom-Chan Lee**, and Charles S. Layne, "Effects of aging and tactile stochastic resonance stimulation on postural performance and postural control of younger and older adults in a sensory conflict task", *Somatosensory and Motor Research*, Vol. 32, No. 2, pp. 128-135, 2015 (IF: 1.1)

36. Bernard J. Martin, **Beom-Chan Lee**, and Kathleen H. Sienko, "A cutaneous positioning system", *Experimental Brain Research*, Vol. 233, No. 4, pp. 1237-1245, 2015 (IF: 1.6)

37. **Beom-Chan Lee**, Bernard J. Martin, Allison Ho, and Kathleen H. Sienko, "Postural reorganization induced by torso cutaneous covibration", *Journal of Neuroscience*, Vol. 33, No. 18, pp. 7870-7876, 2013 (IF: 4.0)

38. **Beom-Chan Lee**, Bernard J. Martin, and Kathleen H. Sienko, "The effects of actuator selection on non-volitional postural responses to torso-based vibrotactile stimulation", *Journal of NeuroEngineering and Rehabilitation*,

Vol. 10, No. 21, 2013 (IF: 5.2)

39. **Beom-Chan Lee**, Bernard J. Martin, and Kathleen H. Sienko, "Directional postural responses induced by vibrotactile stimulations applied to the torso", *Experimental Brain Research,* Vol. 222, No. 4, pp. 471-482, 2012 (IF: 1.6)

40. **Beom-Chan Lee**, Jeonghee Kim, Shu Chen, and Kathleen H. Sienko, "Cell phone based balance trainer", *Journal of NeuroEngineering and Rehabilitation*, Vol. 9, No. 10, 2012 (IF: 5.2)

41. **Beom-Chan Lee**, Shu Chen, and Kathleen H. Sienko, "A wearable device for real-time motion error detection and vibrotactile instructional cuing", *IEEE Transactions on Neural Systems and Rehabilitation Engineering*, Vol. 19, No. 4, pp. 374-381, 2011 (IF: 5.2)

42. Sun-Uk Hwang, **Beom-Chan Lee**, Jeha Ryu, Kwan Heng Lee, and Yong-Gu Lee, "Adaptive haptic rendering for time-varying haptic and video frame rates in multi-modal interactions", *Computer Animation and Virtual World*, Vol. 21, No. 1, pp. 25-38, 2010 (IF: 1.7)

43. Jong-Phil Kim, **Beom-Chan Lee**, Hyungon Kim, Jaeha Kim, and Jeha Ryu, "Accurate and Efficient CPU/GPUBased 3-DOF Haptic Rendering of Complex Static Virtual Environments", *Presence-Teleoperators and Virtual Environments*, Vol. 18, No. 5, pp. 340-360, 2009 (IF: 0.58 in 2018)

44. Jong-Phil Kim, **Beom-Chan Lee**, and Jeha Ryu, "Real-time Haptic Visualization of Printed Materials", *Journal of Computational Information Systems*, Vol. 2, pp. 81-87, 2006 (IF: N/A)

45. Jong-Phil Kim, Jeung-Chul Park, **Beom-Chan Lee**, Kwan H. Lee, and Jeha Ryu, "Digital Buddhist Image Creation by Haptic Deformation", *Edutainment 2006*, pp. 989-998, 2006 (IF: N/A)

Published Journal Abstracts

1. **Beom-Chan Lee**, Kelli Bechly, and Kathleen H. Sienko, "Cell phone based vibrotactile feedback system for home-based vestibular rehabilitation balance training", *Journal of Vestibular Research*, Vol. 20, No. 3-4, pp. 234-235, 2010 (IF: 2.9)

2. **Beom-Chan Lee** and Kathleen H. Sienko, "Wireless Mimic Device for Rehabilitation and Training Applications", *Journal of Medical Devices*, Vol. 3, No. 2, 027526, 2009 (IF: 0.8)

3. Vivek Vishwas Vichare, **Beom-Chan Lee**, Wendy Carender, Annamarie Asher, and Kathleen H. Sienko, "Vibrotactile Balance Rehabilitation Gait Assist Device", *Journal of Medical Devices*, Vol. 3, No. 2, 027509, 2009 (IF: 0.8)

Research Funding

Pending and Active Research Funding

1. **Beom-Chan Lee (PI)**, "Effects of a walking-assistance robot with real-time haptic biofeedback for active overground gait training in individuals post-stroke", Gwangju Institute of Science and Technology (GIST), April 2024-December 2026

2. **Beom-Chan Lee (UH PI)** and Jooeun Ahn (SNU PI), "Development and clinical assessment of a patient-tailored intelligent system for gait rehabilitation in stroke patients via real-time multiple assistance with

propulsion visual feedback and propulsion promotion", Brain Pool (BP) Program, National Research Foundation of Korea (NRF), November 2024-December 2026

Completed Research Funding (Since 2016)

1. **Beom-Chan Lee (PI)** and Seoung Hoon Park (Co-I), "Revolutionizing a treadmill-based fall prevention training technology", Neuromeka Co., Ltd., August 2024-July 2025

2. **Beom-Chan Lee (Mentor)** and Chihyeong Lee (Mentee), "Application of a treadmill-based training system for fall prevention and biomechanical understanding of individuals at high risk of falling", Graduate Student International Joint Research Program, SNU BK21 FOUR: Training Program for Global Leaders in Sports Science, Seoul National University (SNU), August 2024

3. **Beom-Chan Lee (UH PI)** and Jooeun Ahn (SNU PI), Global Visiting Fellow Program, SNU BK21 FOUR: Training Program for Global Leaders in Sports Science, College of Education, Seoul National University (SNU), May 2024-July 2024 and December 2024-February 2025

4. **Beom-Chan Lee (UH PI)** and Jooeun Ahn (SNU PI), "Detection and prevention of fall using an advanced fall inducing system", Brain Pool (PB) Program, National Research Foundation of Korea (NRF), December 2022-December 2023

5. **Beom-Chan Lee (UH PI)**, Bijan Najafi (BCM PI), Junmo An (UH Co-I), Sarvari Yellapragada (BCM Co-I), and Amir Sharfkhaneh (BCM Co-I), "Tele-exergame: Remotely-supervised game-based exercise platform for improving cognition and motor function in adult cancer survivors using telemedicine", University of Houston/Baylor College of Medicine Collaborative Pilot Grants, July 2020-December 2021

6. **Beom-Chan Lee (PI)**, "Fundamental research on the HMI and healthcare service for next-generation smart car including autonomous driving car and e-mobility", E-Mobility R&D Center Research Grant, Korea Automotive Technology Institute (KATECH), August 2019-December 2021

7. **Beom-Chan Lee (PI)** and Monthaporn S. Bryant (Co-I), "Systematic evaluations of a new smartphone-based wearable telerehabilitation system for use by people with Parkinson's disease", NIH Exploratory/Developmental Research Grant (R21), National Institutes of Health (NIH)/National Institute of Child Health and Human Development (NICHD), August 2019-July 2021

8. **Beom-Chan Lee (Subaward PI)** and Yoonjung Park (Subaward Co-I), "Developing and assessing wearable technologies to predict and prevent falls", ICT R&D program of Ministry of Science and ICT (MSIT)/Institute for Information and Communications Technology Promotion (IITP), Ministry of Science and ICT (MSIT); UH subaward with Korea Institute of Robot and Convergence (KIRO), June 2017-June 2021

9. **Beom-Chan Lee (PI)**, "Validation of smartphone-based sensory augmentation technology for home-based balance training of people with Parkinson's disease", Research Grants, American Parkinson's Disease Association (APDA), September 2017-August 2018

10. **Beom-Chan Lee (PI)**, "A novel ankle rehabilitation system for facilitating recovery of stroke patients", Research Progress Grant, College of Liberal Arts and Social Science, University of Houston, March 2017-February 2018

11. **Beom-Chan Lee (PI)**, "Development of accurate and reliable algorithms for evaluating Parkinsonian tremor", Michael E. DeBakey Veterans Affairs Medical Center (MEDVAMC), June 2016-September 2017

12. **Beom-Chan Lee (Subaward PI and Co-I)**, Monthaporn S. Bryant (PI), George R. Jackson (Co-I), Fariha Zaheer (Co-I), and Charles G. Minard (Co-I), "Effect of resistance exercise on tremor and hand dexterity in Parkinson's disease", Veterans Administration (I21), National Institutes of Health (NIH)/U.S. Department of

Veterans Affairs (VA); UH subaward with Michael E. DeBakey Veterans Affairs Medical Center (MEDVAMC), March 2016-September 2017

13. **Beom-Chan Lee (PI)**, "The effects of exercise training combined with assistive technologies on spasticity, balance, and gait in individuals with post-stroke hemiparesis", Research Grants, Korea Institute of Robot and Convergence (KIRO), September 2016-August 2017

14. **Beom-Chan Lee (PI)**, "Validation of smartphone-based sensory augmentation technology for home-based balance training of people with Parkinson's disease", Research Grants, American Parkinson's Disease Association (APDA), September 2016-August 2017

15. **Beom-Chan Lee (PI)**, "The effects of smartphone-based biofeedback for home-based balance training in Parkinson's disease", Research Progress Grant, College of Liberal Arts and Social Science, University of Houston, March 2016-February 2017

16. **Beom-Chan Lee (Co-I)**, Michael Cottingham (PI), and Don Lee (Co-I), "Development of measures for classification system for athletes with disabilities", Research Progress Grant, College of Liberal Arts and Social Science, University of Houston, March 2016-February 2017

Other Publications

***** = Beom-Chan Lee as the corresponding/senior author

§ = UH graduate student/post-doc first author supervised by Beom-Chan Lee

‡ = UH graduate student first author supervised by Beom-Chan Lee as dissertation co-chair

¥ = Non-UH graduate student/post-doc first author mentored by Beom-Chan Lee

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Magazine

1. **Beom-Chan Lee**, Jong-Phil Kim, and Jeha Ryu, "K-Touch Haptic API for Various Datasets", *Graphics Live*, pp. 82-89, September, 2006

Peer-reviewed Full Conference Papers

1. §Adriele Rivera, ‡Hyunje Park, Seoung Hoon Park, Jooeun Ahn, and ***Beom-Chan Lee**, "Treadmill-delivered propulsion-augmenting training with real-time propulsive-force biofeedback for post-stroke gait", *International Conference on Neurorehabilitation (ICNR)*, September 29-October 2, Seoul, South Korea, 2026 (In review)

2. ¥Gaju Shin, ¥Chihyeong Lee, Seoung Hoon Park, ***Beom-Chan Lee**, and Jooeun Ahn, "Short-term transfer of propulsion-targeted treadmill training to overground gait symmetry and weaker-limb ankle joint entropy in older adults", *International Conference on Neurorehabilitation (ICNR)*, September 29-October 2, Seoul, South Korea, 2026 (In review)

3. ‡Hyunje Park, §Adriele Rivera, ***Beom-Chan Lee**, and Seoung Hoon Park, "Synergistic effects of phase-specific spinal stimulation and visual feedback on hip stabilizer activation post-stroke", *International Conference on Neurorehabilitation (ICNR)*, September 29-October 2, Seoul, South Korea, 2026 (In review)

4. ¥Chihyeong Lee, Jooeun Ahn, and ***Beom-Chan Lee**, "Evaluating the impact of different slipping velocities on falls and non-falls induced by a programmable split-belt treadmill", *47th Annual International Conference of*

the IEEE Engineering in Medicine and Biology Society (EMBS), pp. 1-4, July 14-17, 2025

5. Jooeun Ahn and ***Beom-Chan Lee**, "Adaptive perturbation-based training system for enhanced stability in older adults: Leveraging instrumented split-belt treadmills for advanced fall prevention", *Korea Robotics Conference (KRoC)*, pp. 1139-1140, February 12-15, 2025

6. Seoung Hoon Park and ***Beom-Chan Lee**, "Development and preliminary evaluation of a real-time multiple assistance system for asymmetric gait rehabilitation using an instrumented treadmill", *24th International Conference on Control, Automation and Systems (ICCAS)*, pp. 947-952, October 29-November 1, 2024

7. §Dongyual Yoo, Chihyeong Lee, Jooeun Ahn, and ***Beom-Chan Lee**, "Age-related adaptation of the body's kinematic responses to unpredictable trip perturbations induced by a split-belt treadmill", *45th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBS)*, pp. 1-4, July 24-27, 2023

8. §Dongyual Yoo, Chihyeong Lee, Jooeun Ahn, and ***Beom-Chan Lee**, "Association between age and body's kinematic responses to unpredictable gait perturbation", *41st International Society of Biomechanics in Sports (ISBS) Conference*, Vol. 41, No. 1, pp. 1-4, July 12-16, 2023

9. §Junmo An, Jiyeon Kim, Eugene C. Lai, and ***Beom-Chan Lee**, "Effects of a smartphone-based wearable telerehabilitation system for in-home dynamic weight-shifting balance exercises by individuals with Parkinson's disease", *42nd Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBS)*, pp. 5678-5681, July 20-24, 2020

10. §Junmo An, Dongyual Yoo, and ***Beom-Chan Lee**, "Electrocortical activity changes in response to unpredictable trip perturbations induced by a split-belt treadmill", *41th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBS)*, pp. 110-113, July 23-27, 2019

11. §Alberto Fung, Eugene C. Lai, and ***Beom-Chan Lee**, "A new smart balance rehabilitation system technology platform: Development and preliminary assessment of the Smarter Balance System for home-based balance rehabilitation for individuals with Parkinson's disease", *40th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBS)*, pp. 1534-1537, July 18-21, 2018

12. ***Beom-Chan Lee**, Bernard J. Martin, Timothy A. Thrasher, and Charles S. Layne, "A new fall-inducing technology platform: development and assessment of a programmable split-belt treadmill", *39th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBS)*, pp. 3777-3780, July 11-15, 2017

13. ***Beom-Chan Lee**, Dae-Hee Kim, Younsun Son, Kap-Ho Seo, Dongyual Yoo, Sung Ho Park, and Alberto Fung, "Development and assessment of a novel ankle rehabilitation system for stroke survivors", *39th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBS)*, pp. 3773-3776, July 11-15, 2017

14. Muhammad Raheel Afzal, Sanghun Pyo, Min-Kyun Oh, Young Sook Park, **Beom-Chan Lee**, and Jungwon Yoon, "Haptic based gait rehabilitation system for stroke patients", *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, pp. 3198-3203, October 9-14, 2016

15. ***Beom-Chan Lee** and Alberto Fung, "Smartphone-based sensory augmentation technology for home-based balance training", *15th International Conference on Control, Automation and Systems (ICCAS)*, pp. 947-952, October 13-16, 2015

16. ‡Stefan Madansingh, Timothy A. Thrasher, Charles S. Layne, and ***Beom-Chan Lee**, "Smartphone based fall detection system", *15th International Conference on Control, Automation and Systems (ICCAS)*, pp. 370-374,

October 13-16, 2015

17. David R. Temple, **Beom-Chan Lee**, and Charles S. Layne, "Effects of tibialis anterior muscle vibration on quiet stance", *IEEE Symposium on Haptic Interfaces for Virtual Environment and Teleoperator Systems (HAPTICS)*, pp. 523-528, February 23-26, 2014

18. **Beom-Chan Lee**, Allison Ho, Bernard J. Martin, and Kathleen H. Sienko, "Effects of co-vibrotactile stimulations around the torso on non-volitional postural responses", *34th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBS)*, pp. 6149-6152, August 28-September 1, 2012

19. **Beom-Chan Lee**, Bernard J. Martin, and Kathleen H. Sienko, "Comparison of non-volitional postural responses induced by two types of torso based vibrotactile stimulations", *IEEE Symposium on Haptic Interfaces for Virtual Environment and Teleoperator Systems (HAPTICS)*, pp. 195-198, March 4-7, 2012

20. **Beom-Chan Lee** and Kathleen H. Sienko, "Effects of attractive versus. repulsive vibrotactile instructional cues on motion replication tasks", *33rd Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBS)*, pp. 3533-3536, August 30-September 3, 2011

21. **Beom-Chan Lee** and Kathleen H. Sienko, "Balance training via multimodal biofeedback", *International Conference on Fall Prevention and Protection (ICFPP)*, pp. 77-80, May 19-20, 2010

22. **Beom-Chan Lee**, Sun-Uk Hwang, Hyungon Kim, Yong-Gu Lee, and Jeha Ryu, "Smooth haptic interaction methods in augmented reality haptics", *International Workshop on Ubiquitous Virtual Reality (IWUVR)*, pp. 44-47, July 8-11, 2009

23. **Beom-Chan Lee**, Hyeshin Park, Junhun Lee, and Jeha Ryu, "Tactile visualization with mobile AR on handheld device," *International Workshop on Haptic and Audio Interaction Design (HAID)*, pp. 11-21, November 29-30, 2007

24. Yongwon Seo, **Beom-Chan Lee**, Yeongmi Kim, Jong-Phil Kim, and Jeha Ryu, "K-HapticModeler^{TM}: A Haptic Modeling Scope and Basic Framework", *IEEE International Workshop on Haptic Audio Visual Environments and Their Applications (HAVE)*, pp. 136-141, October 12-14, 2007

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26. Duck-Bong Kim, **Beom-Chan Lee**, Hyeshin Park, Jong-Phil Kim, Jeha Ryu, Kwang Hee Ko, Renato Pajarla, and Kwan Heng Lee, "Point-based surfaces from unorganized points for multi-modal interaction", *Asia-Pacific Workshop on Visual Information Processing (VIP),* pp. 157-160, November 7-9, 2006

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Conference Abstracts

1. [¥]Chihyeong Lee, **Beom-Chan Lee**, and Jooeun Ahn, "Toward human-like motion in musculoskeletal simulation: Generative Adversarial Imitation from Observation (GAIfO)", *10th World Congress of Biomechanics (WCB)*, July 11-15, Vancouver, BC, Canada, 2026 (Accepted on 02/25/2026)

2. [¥]Gaju Shin, [¥]Chihyeong Lee, Seoung Hoon Park, **Beom-Chan Lee**, and Jooeun Ahn, "Transfer effects of Adaptive Propulsion Enhancement eXperience (APEX) training on gait symmetry and weak-leg joint entropy during overground walking in older adults", *10th World Congress of Biomechanics (WCB)*, July 11-15, Vancouver, BC, Canada, 2026 (Accepted on 02/25/2026)

3. [§]Adriele Rivera, [‡]Hyunje Park, Seoung Hoon Park, Jooeun Ahn, and ***Beom-Chan Lee**, "Real-time modulation of split-belt treadmill speed enhances gait propulsion and neuromuscular engagement in post-stroke hemiparesis", *10th World Congress of Biomechanics (WCB)*, July 11-15, Vancouver, BC, Canada, 2026 (Accepted on 02/25/2026)

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5. [‡]Hyunje Park, ***Beom-Chan Lee**, Dimitry Sayenko, Sheng Li, and Seoung Hoon Park, "Mediolateral treadmill perturbations enhance paretic leg use during walking in people post-stroke", *TIRR Foundation's Mission Connect Neurotrauma Symposium*, November 21, Houston, TX, USA, 2025

6. [§]Adriele Rivera, [‡]Hyunje Park, [¥]Chihyeong Lee, Jooeun Ahn, Seoung Hoon Park, and ***Beom-Chan Lee**, "Enhancing paretic propulsion post-stroke via real-time visual biofeedback and adaptive dual-belt treadmill control", *55th Annual Meeting of the Society for Neuroscience (SfN)*, November 15-19, San Diego, CA, USA, 2025

7. [‡]Hyunje Park, ***Beom-Chan Lee**, Dimitry Sayenko, Sheng Li, and Seoung Hoon Park, "Targeted mediolateral platform shifts induce adaptive use of the paretic leg during gait in stroke", *55th Annual Meeting of the Society for Neuroscience (SfN)*, November 15-19, San Diego, CA, USA, 2025

8. Seoung Hoon Park, [‡]Hyunje Park, Jooeun Ahn, and ***Beom-Chan Lee**, "Propulsion-facilitating gait training enhances paretic leg function in stroke survivors", *9th International Conference on Biomedical Engineering and Bioinformatics (ICBEB)*, September 19-21, Prague, Czech Republic, 2025

9. Catherine Park and ***Beom-Chan Lee**, "AI-based identification of minimal risk factors for adolescent suicidal behaviors", *9th International Conference on Biomedical Engineering and Bioinformatics (ICBEB)*, September 19-21, Prague, Czech Republic, 2025

10. [¥]Chihyeong Lee, Jooeun Ahn, and ***Beom-Chan Lee**, "Effects of slip velocity and duration on fall incidence: Evidence from unexpected slip perturbations induced by a split-belt treadmill", *49th Annual Meeting of American Society for Biomechanics (ASB)*, August 13-16, Pittsburgh, PA, USA, 2025

11. HeeYeon Jo, Jeong Woo Lee, *Catherine Park, and ***Beom-Chan Lee**, "AI-based biomarkers representing frailty in older adults with hypertension and diabetes mellitus", *Institute for Healthcare Improvement (IHI) Forum*, December 8-11, Orlando, FL, USA, 2024

12. Sun Oke Kim, Sang Mi Kim, Catherine Park, and ***Beom-Chan Lee**, "Risk factors for type 2 diabetes in individuals with a familial predisposition", *Institute for Healthcare Improvement (IHI) Forum*, December 8-11, Orlando, FL, USA, 2024

13. **Beom-Chan Lee**, Sun Oke Kim, and Catherine Park, "Biomarkers related to suicidal behaviors in Adolescents before, during, and after COVID-19", *Institute for Healthcare Improvement (IHI) Forum*, December 8-11, Orlando, FL, USA, 2024

14. [‡]Hyunje Park, **Beom-Chan Lee**, Sheng Li, Dimitry Sayenko, and Seoung Hoon Park, "Influence of phasic transcutaneous spinal stimulation paired with visually guided weight transfer in people post stroke", *TIRR foundation's Mission Connect 2024 Scientific Symposium*, November 22, Houston, TX, USA, 2024

15. ***Beom-Chan Lee**, "Design, development, and clinical assessments of smartphone-based telerehabilitation and fall recovery training technologies", Plenary Session, *Korean Society of Sport Biomechanics-Korean Society for Biomechanics Joint Conference*, December 1, Jeonju, S. Korea, 2023

16. ***Beom-Chan Lee**, "Revolutionizing telerehabilitation technologies: Empowering lives through smartphones, wearables, and sensory augmentation", Human-Tech Convergence Program, *2023 Hanyang University BK 21 International Symposium*, November 10, Seoul, S. Korea, 2023

17. ***Beom-Chan Lee**, "Smartphone-based telerehabilitation technology for home-based balance training of people with Parkinson's disease", *17th International Symposium for Aging (ISA)*, October 21, Hwasun, S. Korea, 2023

18. ***Beom-Chan Lee**, "Neuro-biomechanical control and adaptation in response to unpredictable gait perturbations", *2022 Global Conference of Sports Science*, February 13, Seoul, S. Korea, 2023

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21. ***Beom-Chan Lee**, Bernard J. Martin, Junmo An, and Kap-Ho Seo, "Vibrotactile cueing improves kinematic recovery after unexpected slip perturbations induced by a split-belt treadmill", *44th Annual Meeting of the American Society of Biomechanics (ASB)*, August 4-7, 2020

22. [§]Junmo An, Jiyeon Kim, Eugene C. Lai, and ***Beom-Chan Lee**, "Association between activities-specific balance confidence, dynamic gait index, and physical activity in people with Parkinson's disease", *44th Annual Meeting of the American Society of Biomechanics (ASB)*, August 4-7, 2020

23. [§]Junmo An, Dongyual Yoo, and ***Beom-Chan Lee**, "Electrocortical activity while standing, walking, and recovery after unpredictable trip perturbations", *49th Annual Meeting of the Society for Neuroscience (SfN)*,

October 19-23, 2019

24. David R. Temple, **Beom-Chan Lee**, Patrick Leung, and Charles S. Layne, "Effects of achilles tendon vibration, fingertip light touch, and fingertip noise on postural control", *49th Annual Meeting of the Society for Neuroscience (SfN)*, October 19-23, 2019

25. Charles S. Layne, **Beom-Chan Lee**, Patrick Leung, and David R. Temple, "Effects of achilles tendon vibration and foot noise on postural control", *49th Annual Meeting of the Society for Neuroscience (SfN)*, October 19-23, 2019

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27. Charles S. Layne, Rakshatha Kabbaligere, and **Beom-Chan Lee**, "Gravitational unloading delays adaptation to support surface translations", *48th Annual Meeting of the Society for Neuroscience (SfN)*, November 3-7, 2018

28. Rakshatha Kabbaligere, **Beom-Chan Lee**, and Charles S. Layne, "Kinematic and neuromuscular adaptation to unloaded walking", *48th Annual Meeting of the Society for Neuroscience (SfN)*, November 3-7, 2018

29. Rakshatha Kabbaligere, **Beom-Chan Lee**, and Charles S. Layne, "Interaction between visual flow and tendon vibration during postural control", *47th Annual Meeting of the Society for Neuroscience (SfN)*, November 11-15, 2017

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31. Bernhard Suter, David R. Young, **Beom-Chan Lee**, and Charles S. Layne, "Temporal gait measures associated with overground versus treadmill walking in Rett syndrome", *National Organization for Rare Diseases (NORD) Annual Meeting*, October 16-17, 2017

32. §Alberto Fung, Eugene C. Lai, and ***Beom-Chan Lee**, "Smarter Balance System: Smartphone-based biofeedback technology for clinical and/or home-based balance rehabilitation", *International Society for Posture and Gait Research (ISPGR) World Congress*, June 25-29, 2017

33. ‡Stefan Madansingh, **Beom-Chan Lee**, and Charles S. Layne, "Sensorimotor adaptation is generalized within individuals among manual and locomotor tasks", *NASA Human Research Program Investigators' Workshop (HRP IWS)*, January 23-26, 2017

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35. Amber M. Chelette, **Beom-Chan Lee**, Timothy A. Thrasher, Rakshatha Kabbaligere, and Charles S. Layne, "Interaction of attention, instructions, and proprioception in a joint matching and N-Back task", *46th Annual Meeting of the Society for Neuroscience (SfN)*, November 12-16, 2016

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of vision and ankle proprioception during a bipedal posture task", *46th Annual Meeting of the Society for Neuroscience (SfN)*, November 12-16, 2016

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39. Monthaporn S. Bryant, Craig D. Workman, Hao Meng, **Beom-Chan Lee**, Fariha Jamal, George R. Jackson, and Michele K. York, "Multidirectional treadmill training in de novo patients with Parkinson's disease: gait, balance and kinematics changes", *4th World Parkinson Congress*, September 20-23, 2016

40. Bernard J. Martin, Timothy A. Thrasher, Charles S. Layne, and ***Beom-Chan Lee**, "A possible challenge to sensorimotor adaptation", *45th Annual Meeting of the Society for Neuroscience (SfN)*, October 17-21, 2015

41. Stacey L. Gorniak, **Beom-Chan Lee**, and Jing Wang, "Cognitive interference effects during manual force production in adults with Type II Diabetes", *45th Annual Meeting of the Society for Neuroscience (SfN)*, October 17-21, 2015

42. ***Beom-Chan Lee**, Stanley P. Fisher, Charles S. Layne, and Timothy A. Thrasher, "Assessment of guidance modality on weight-shifting balance exercises in individuals with Parkinson's disease", *International Society for Posture and Gait Research (ISPGR) World Congress*, June 29-July 2, 2015

43. ‡Stefan Madansingh, Timothy A. Thrasher, Charles S. Layne, and ***Beom-Chan Lee**, "Real-time smartphone based fall detection platform for at-risk populations", *International Society for Posture and Gait Research (ISPGR) World Congress*, June 29-July 2, 2015

44. ***Beom-Chan Lee**, Timothy A. Thrasher, and Charles S. Layne, "The effects of vibrotactile cuing on recovery performance from treadmill-induced trip in healthy young adults", *International Society for Posture and Gait Research (ISPGR) World Congress*, June 29-July 2, 2015

45. ***Beom-Chan Lee**, Stefan Madansingh, Timothy A. Thrasher, and Charles S. Layne, "The effects of vibrotactile cuing on recovery kinetics after treadmill-induced trip in healthy young adults", *44th Annual Meeting of the Society for Neuroscience (SfN)*, November 15-19, 2014

46. Charles S. Layne, David R. Temple, and **Beom-Chan Lee**, "Effects of tibialis anterior vibration on anterior-posterior center of pressure while exposed to various forward translations", *44th Annual Meeting of the Society for Neuroscience (SfN)*, November 15-19, 2014

47. Hao Meng, **Beom-Chan Lee**, Charles S. Layne, and Stacey L. Gorniak, "Effects of adiposity on postural stability in overweight and obese adults", *44th Annual Meeting of the Society for Neuroscience (SfN)*, November 15-19, 2014

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49. ***Beom-Chan Lee**, "Towards ubiquitous balance aids through sensory augmentation, *US-Korea Conference*, August 6-9, 2014

50. **Beom-Chan Lee**, Allison Ho, Bernard J. Martin, and Kathleen H. Sienko, "Postural reorganization in response to torso-based co-vibrotactile stimulation", *42nd Annual Meeting of the Society for Neuroscience (SfN)*, October 13-17, 2012

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53. **Beom-Chan Lee**, Duck-Bong Kim, In-Yeop Chang, Hyeshin Park, Kwang Hee Ko, Penato Pajarola, Kwan H. Lee, and Jeha Ryu, "Meshless visual and haptic interaction from a real-time depth image", *44th International Conference and Exhibition on Computer Graphics and Interactive Techniques (ACM SIGGRAPH)*, August 5-9, 2007

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55. **Beom-Chan Lee**, Jong-Phil Kim, Jeung-Chul Park, Kwan H. Lee, and Jeha Ryu, "Haptic deformation using graphics hardware and kd-trees", *43rd International Conference and Exhibition on Computer Graphics and Interactive Techniques (ACM SIGGRAPH)*, July 30-August 3, 2006

56. **Beom-Chan Lee**, Jong-Phil Kim, Jongeun Cha, and Jeha Ryu, "K-Touch^{TM} haptic API for various datasets", *43rd International Conference and Exhibition on Computer Graphics and Interactive Techniques (ACM SIGGRAPH)*, July 30-August 3, 2006

57. Jong-Phil Kim, **Beom-Chan Lee**, and Jeha Ryu, "A hapitc rendering for hybrid environments", *42nd International Conference and Exhibition on Computer Graphics and Interactive Techniques (ACM SIGGRAPH)*, July 31-August 4, 2005

Media Coverage

1. "Walking the walk", Fall Magazine, University of Houston, December 2018

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2. "New smartphone-based system could help people with Parkinson's disease (PD)", Spring Newsletter, American Parkinson Disease Association (APDA), April 2018

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3. "Sensor-packed smart belt could help Parkinson's patients stay on their feet", Digital Trends, January 17, 2018

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4. "Smart belt helps Parkinson's patients with balance", CliniCrowd, August 13, 2017

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5. "Wearable balance system aims to help lessen fall risk among Parkinson's patients", Rehab Management, August 7, 2017

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9. "This sensor-packed smart belt could keep Parkinson's patients from falling", Health and Wellbeing News, August 2, 2017
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https://parkinsonsnewstoday.com/2017/07/17/parkinsons-disease-balance-problems-targeted-by-new-wearable-biofeedback-technology/

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18. "UH Moment: Parkinson's disease balancing app", Houston Public Media, June 25, 2017

    https://www.houstonpublicmedia.org/articles/shows/uh-moment/2017/06/25/206217/uh-moment-parkinsons-disease-balancing-app/

Awards, Honors, and Scholarships

1. Research poster excellence award, TIRR foundation's Mission Connect 2024 Scientific Symposium, November 2024
2. Provost's travel fund award, University of Houston, October 2024
3. Brain Pool (PB) program award, National Research Foundation of Korea, July 2024
4. Brain Pool (PB) program award, National Research Foundation of Korea, December 2022
5. Provost's travel fund award, University of Houston, May 2018
6. GenDepot poster award, KSEA-KABMS-KOES West Gulf Coast Conference, November 2017 (graduate student first author)
7. Most distinguished alumni award, Gwangju Institute of Science and Technology, November 2017
8. Dr. David Watson Graduate Student Poster Award, NASA Human Research Program Investigators' Workshop, February 2017 (graduate student first author)
9. GenDepot poster award, Korean-American Scientists and Engineers Association West Gulf Coast Regional Conference, November 2016 (postdoctoral fellow first author)
10. Provost's travel fund award, University of Houston, October 2015
11. Provost's travel fund award, University of Houston, December 2014
12. Best poster candidate, IEEE Symposium on Haptic Interfaces for Virtual Environment and Teleoperator Systems, February 2014
13. Best paper candidate, IEEE Symposium on Haptic Interfaces for Virtual Environment and Teleoperator Systems, March 2012
14. Best paper award, KHCI conference, February 2006
15. Scholarship student, Korea Research Foundation, 2004-2008
16. Best graduation project award, Kangwon National University, November 2003
17. Scholarship student, Brain Korea 21, 2001-2003

Patents

£ = Lead inventor

1. £**Beom-Chan Lee**, Jeha Ryu, Junhun Lee, Yeongmi Kim, Jeha Kim, Hyungon Kim, Sunyoung Kim, and Sungjun Park, "Actual Feeling Book System for Multimodal Immersive Interaction and Method Therefore", Registration number: 10-1554589-00-00, September 15, 2015, Korea

2. Jeha Ryu, £**Beom-Chan Lee**, Sun-Uk Hwang, Hyeshin Park, and Yong-Gu Lee, "Method and System for Haptic Interaction in Augmented Reality", Registration number: US8243099B2, August 14, 2012, USA, and Registration number: JP4977725B2, July 18, 2012, Japan

3. £**Beom-Chan Lee**, Sun-Uk Hwang, Hyeshin Park, Yong-Gu Lee, and Jeha Ryu, "Stable and Smooth Haptic Interaction Method and System in Augmented Reality", Registration number: 10-0927009-00-00, November 9, 2009, Korea

4. £Jong-Phil Kim, Jeha Ryu, and **Beom-Chan Lee**, "Haptic Rendering and Device by Using Local Occupancy Map Instance", Registration number: 10-0787952-00-00, September 17, 2007, Korea

5. Jeha Ryu, £Changhoon Seo, Bongchul Kang, and **Beom-Chan Lee**, "Display and Methodology of CallerID through Tactile Haptic Interface", Application number: PCT/KR2006/000618, February 22, 2007, Korea (pending)

6. Jeha Ryu, £Changhoon Seo, Bongchul Kang, and **Beom-Chan Lee**, "Display and Methodology of CallerID through Tactile Haptic Interface", Registration number: 10-0672078-00-00, January 15, 2007, Korea

7. £**Beom-Chan Lee**, Jong-Phil Kim, and Jeha Ryu, "Kinesthetic/Tactile Haptic Rendering Software Development Toolkit (SDK)", Registration number: 2005-01-169-006517, December 13, 2005, Korea

8. £Jongeun Cha, **Beom-Chan Lee**, Yeongmi Kim, Yongwon Seo, and Jeha Ryu, "Haptic Modeler by using Haptic User Interface (HUI)", Registration number: 2005-01-169-006516, December 13, 2005, Korea

9. £Jongeun Cha, Jong-Phil Kim, **Beom-Chan Lee**, Yeongmi Kim, Yongwon Seo, and Jeha Ryu, "Tactile User Interface Editor", Registration number" 2005-01-169-006515, December 13, 2005, Korea

10. £Jong-Phil Kim, **Beom-Chan Lee**, and Jeha Ryu, "Haptic Rendering Program", Registration number: 2005-01-169-003286, June 10, 2005, Korea

Invited Research Presentations and Lectures

1. "Advancing in-home telerehabilitation: Smartphone-based wearable systems for balance training in Parkinson's disease", Daegu Gyeongbuk Institute of Science and Technology, April 23, 2025

2. "Systematic investigation of gait perturbations and falls: advancing fall-inducing technology with a split-belt treadmill", National Rehabilitation Center, March 12, 2025

3. "Neuro-biomechanical signal analysis across diverse human intentions and locomotor mechanisms", School of Mechanical Engineering and Department of Control and Robot Engineering, Gyeongsang National University, February 7, 2025

4. "Transformative technologies in telerehabilitation: Leveraging mobile, wearable, and

sensory augmentation", Division of Digital Health Care, Yonsei University, October 25, 2024

5. "Empowering telerehabilitation through a smartphone, wearables, and sensory augmentation", Department of Control and Robot Engineering, Gyeongsang National University, July 15, 2024

6. "Revolutionizing rehabilitation technologies for improving balance performance and reducing falls", Department of Rehabilitative and Assistive Technology, National Rehabilitation Center, December 11, 2023

7. "Smarter Balance System (SBS): Telerehabilitation system for in-home balance exercises used by people with Parkinson's disease", Invited lecture, College of Information Technology, Kangwon National University, October 25, 2023

8. "Smartphone-based telerehabilitation technology for home-based balance training of people with Parkinson's disease", 17th International Symposium for Aging (ISA), October 21, Hwasun, S. Korea, 2023

9. "Development and clinical assessment of a fall prevention training and prediction system for the elderly", Rehabilitation Research Seminar, 2023 Global Healthcare Week & National Rehabilitation Center, August 17, Pusan, S. Korea, 2023

10. "Advanced signal processing and applications of inertial measurement unit", Department of Naval Architecture and Ocean Engineering, Pusan National University, August 16, 2023

11. "Development and clinical assessment of a smartphone-based telerehabilitation system and a fall-inducing technology platform", School of Mechanical Engineering, Pusan National University, August 16, 2023

12. "Balance and gait rehabilitation using a smartphone-based technology and fall-inducing platform", Human Health Care Lab Mini Symposium, National Rehabilitation Center, May 31, Seoul, S. Korea, 2023

13. "Neuro-biomechanical responses following unpredictable gait perturbations using an advanced fall-inducing system", Brain Korea (BK) 21 FOUR (Fostering Outstanding Universities for Research) program special lecture, Kangwon National University, April 18, 2023

14. "A novel fall-inducing system and neuro-biomechanical responses to gait perturbations", School of Integrated Technology, Gwangju Institute of Science and Technology, March 28, 2023

15. "Conducting scientific research and writing scholarly journal articles", Deptartment of Physical Education, Seoul National University, March 3, 2023

16. "Wearable/robot-assisted balance rehabilitation and age-related neuromuscular responses to gait perturbations induced by a split-belt treadmill", 10-10 initiative lecture series, Seoul National University, February 3, 2023

17. "Wearable and robot-assisted systems for balance and gait rehabilitation", Sungkyunkwan University, June 24, 2022

18. "Design, development, and assessment of wearable and robot-assisted rehabilitation systems", Seoul National University, June 9, 2022

19. "Wearable/robot-assisted rehabilitation systems and new fall-inducing system", Korea Advanced Institute of Science and Technology, June 7, 2022

20. "Wearable and robot-assisted systems for balance rehabilitation and fall recovery training", Gwangju Institute of Science and Technology, May 31, 2022

21. “Design, development, and assessment of smartphone-based telerehabilitation system”, Kyung Hee University, May 27, 2022

22. “Robot-assisted/wearable balance rehabilitation systems and fall-inducing technology platform”, National Rehabilitation Center, May 25, 2022

23. “Brain activities depending on the perception of situation during driving”, Korea Automotive Technology Institute, May 23, 2022

24. “Towards smarter technology for balance and gait rehabilitation”, Gwangju Institute of Science and Technology Alumni Conference, November 3, 2017

25. “Learning and relearning stable balance and locomotion with assistive technology”, Rehabilitation Service Robot R&BD Support Cluster, Korea Institute of Robot and Convergence, July 11, 2017

26. “Wearable biofeedback technologies for balance rehabilitation”, Korea Institute of Robot and Convergence, October 13, 2016

27. “Technology-assisted motor learning in human performance”, College of Health Sciences, Ewha Womans University, July 15, 2015

28. “Vibrotactile biofeedback technologies to improve balance performance”, Division of Nursing Science, Ewha Womans University, July 15, 2015

29. “Vibrotactile biofeedback technology for balance and gait rehabilitation”, School of Mechanical Engineering, Gyeongsang National University, July 14, 2015

30. “Adaptation versus cuing-based recovery performance from a simulated trip”, School of Mechatronics, Gwangju Institute of Science and Technology, July 13, 2015

31. “Smartphone based biofeedback technology for improving biomechanics of balance and posture”, 28th International University Sports Federation Conference, July 12, 2015

32. “Vibrotactile biofeedback technologies to improve balance performance”, Department of Mechanical Engineering, Korea Advanced Institute of Science and Technology, July 10, 2015

33. “The effect of vibrotactile cuing on recovery strategies from a treadmill-induced trip”, Pittsburgh Claude D. Pepper Older Americans Independence Center and Department of Bioengineering, University of Pittsburgh, April 28, 2015

34. “Sensory augmentation for balance and gait rehabilitation”, School of Mechatronics, Gwangju Institute of Science and Technology, August 1, 2014

35. “Wearable sensors and systems in healthcare”, Korea Automotive Technology Institute, July 29, 2014

36. “Towards ubiquitous balance aids through sensory augmentation”, Department of Computer Engineering, Kyung Hee University, July 25, 2014

37. “Wearable balance aid through sensory biofeedback and cutaneous contribution to posture”, Korea Institute of Industrial Technology, July 24, 2014

Exhibitions and Demonstrations

1. "Haptic deformation and material property modeling system", 16th Symposium on Haptic Interfaces for Virtual Environment and Teleoperator Systems, Reno, Nevada, March 13-14, 2008

2. "Digilog Book", Interactive Design Art and Technology (iDAT), Singapore Science Center, Singapore, Indonesia, December 7-10, 2008

3. "Multimodal Haptic Interactions", Next Generation PC Fair, COEX, Seoul, Korea, November 28-December 1, 2007

4. "Interactive Haptic Systems for Medical, Education, and Entertainment Purposes", Next Generation PC Fair, KINTEX, Ilsan, Korea, November 16-18, 2006

5. "Realistic Broadcasting System", SEK/IT Techno Mart/ITRC Forum, COEX, Seoul, Korea, June 21-24, 2006

6. "K-Touch^{TM} Haptic API and Wearable Tactile Display", Global Sources Electronics and Components China Sourcing Fair, AsiaWorld-Expo, Hong Kong, April 15-18, 2006

7. "Haptic Deformation, Games, and Various Haptic Algorithms", Conference on HCI/VR/CG/DESIGN, Phoenixpark, PyeongChang, Korea, February 13-19, 2006

8. "K-Touch^{TM} Haptic API and Haptic Modeling", IT-SoC 2005 and Next Generation PC Fair, COEX, Seoul, Korea, November 3-5, 2005

9. "Realistic Broadcasting System", SEK/IT Techno Mart/ITRC Forum, COEX, Seoul, Korea, June 9-11, 2005

10. "Virtual Buddhist Image Sculpting Experience System with Haptic Interface", Conference on HCI/VR/CG/DESIGN, EXCO, Daegu, Korea, January 31-February 3, 2005

TEACHING and MENTORSHIP

Teaching

Courses Taught

KIN 3309: Biomechanics (Spring/Fall 2015-2018, Spring 2019, Spring 2020, Fall 2021, Spring/Fall 2022, Spring/Fall 2024, Spring/Fall 2025, Spring 2026)

KIN 1352: Foundations of Kinesiology, Health, and Fitness (Spring 2026)

PEP 7398: Journal Club (Spring 2015, Fall 2016)

PEP 8390: Contemporary Issues in Health and Human Performance (Spring 2017)

PEP 8350: HHP Candidacy Project Research (Fall 2017)

Courses Developed

PEP 7397: Advanced Biomechanical Signal Processing and Analysis (Spring 2016, Fall 2019, Fall 2024)

Guest Lecturer

PEP 8831: Integrated Systems Physiology (Fall 2014)

PEP 8303: HHP Research Seminar (Fall 2015, Fall 2016)

Supervision and Mentorship

Research Faculty

Junmo An, Ph.D., Research Assistant Professor, Department of Health and Human Performance, University of Houston, August 2019-July 2021; Role: PI

Postdoctoral Fellows

Jeongin Moon, Ph.D., Department of Physical Education, Seoul National University, January 2023-January 2025; ole: Research mentor

Myeounggon Lee, Ph.D., Department of Health and Human Performance, University of Houston, July 2021-February 2022; Role: PI

Jiyeon Kim, Ph.D., Department of Health and Human Performance, University of Houston, August 2019-July 2020; Role: PI

Junmo An, Ph.D., Department of Health and Human Performance, University of Houston, November 2018-July 2019; Role: PI

Younsun Son, Ph.D., Department of Health and Human Performance, University of Houston, July 2016-February 2018; Role: PI

Graduate Students

Adriele Rivera, Department of Health and Human Performance, University of Houston, August 2025-present; Role: Faculty advisor

Chihyeong Lee, Department of Physical Education, Seoul National University, December 2022-present; Role: Research mentor

Gaju Shin, Department of Health and Human Performance, University of Houston, August 2025-present; Role: Research mentor

Chihyeong Lee, Department of Physical Education, Seoul National University, December 2022-present; Role: Research mentor

Dongyual Yoo, Department of Health and Human Performance, University of Houston, September 2016-December 2020; Role: Faculty advisor

Alberto Fung, Department of Health and Human Performance, University of Houston, September 2015-February

2019; Role: Faculty advisor

Awarded Doctorates

Hyunji Kim, "Development of a deep learning-based VO_2/VCO_2 estimation and fitness assessment model for individuals with spinal cord injury", Department of Physical Education, Seoul National University, January 2026; Role: Committee member

Chris Malaya, "Effects of simulated gravitational loading and unloading on kinematic and electromyographic variables during walking", Department of Health and Human Performance, University of Houston, December 2022; Role: Committee member

Dongyual Yoo, "Understanding the body's kinematic/kinetic responses and motor adaptation to unpredictable gait perturbation induced by a split-belt treadmill in young and older", Department of Health and Human Performance, University of Houston, December 2020; Role: Chair

Andrew Paek, "Decoding hand produced grip events from noninvasive scalp electroencephalography", Department of Electrical and Computer Engineering, University of Houston, Committee, May 2020; Role: Committee member

David Young, "Mechanisms of sensory integration during postural adaptation", Department of Health and Human Performance, University of Houston, May 2020; Role: Committee member

David Temple, "Effects of tendon vibration, light tough, and mechanical noise on postural control: Implications for somatosensory reweighting", Department of Health and Human Performance, University of Houston, December 2019; Role: Committee member

Ahsan Shahzad, "Falls detection, prediction and cognitive decline assessment based on inertial sensors", School of Electrical Engineering and Computer Science, Gwangju Institute of Science and Technology, February 2019; Role: Committee member

Rakshatha Kabbaligere, "Adaptive changes in gait and balance control to unloading", Department of Health and Human Performance, University of Houston, December 2018; Role: Committee member

Craig Workman, "The influence of dopaminergic medication on gait and balance automaticity and nonlinear regularity in Parkinson's disease", Department of Health and Human Performance, University of Houston, December 2018; Role: Committee member

Stefan Madansingh, "Leveraging sensorimotor adaptive generalizability to minimize dynamic fall risk", Department of Health and Human Performance, University of Houston, December 2016; Role: Co-chair

Amber Chelette, "The effect of age, cognition, and context on human responses to tendon vibration", Department of Health and Human Performance, University of Houston, December 2016; Role: Committee member

Recep Ali Ozdemir, "Cortical control of human upright stance", Department of Health and Human Performance, University of Houston, May 2016; Role: Research Mentor

Marius Dettmer, "Vibration of the foot sole as an intervention to improve older adults' postural stability", Department of Health and Human Performance, University of Houston, May 2014; Role: Research mentor

Awarded Masters

Il Seung Park, M.S., "Muscle synergy enables reinforcement learning to predict human-like sprinting without complex rewards", Department of Physical Education, Seoul National University, August 2025; Role: Research mentor

Changhwan An, M.S., "A comparison of gait dynamics in three walking environments: overground, self-paced treadmill, and fixed-speed treadmill", Department of Physical Education, Seoul National University, August 2025;

Role: Research mentor

Linh Vu, M.S., “Assessing lumbar kinematics with flexible strain sensor system”, Department of Industrial Engineering, University of Houston, January 2018; Role: Committee member

Dissertation and Thesis Mentoring (In Process)

Hyunji Kim, Ph.D., Department of Physical Education, Seoul National University, Committee

Undergraduate and Graduate Students

Aya Mozeyen, Department of Biology and Biochemistry, University of Houston, Fall 2025-present; Role: Faculty advisor

Andrea Hernandez, College of Education, University of Houston, Fall 2025-present; Role: Faculty advisor

Joshua Lim, undergraduate research assistant, Department of Psychology, University of Houston, 2024-present; Role: Faculty advisor

Joshua Doan, undergraduate research assistant, Department of Health and Human Performance, University of Houston, 2024-present; Role: Faculty advisor

Maya Palitz, undergraduate research assistant, Department of Health and Human Performance, University of Houston, 2024-present; Role: Faculty advisor

Mathew Mendoza, undergraduate research assistant, Department of Health and Human Performance, University of Houston, 2019-2021; Role: Faculty advisor

Richard Huh, undergraduate research assistant, Department of Health and Human Performance, University of Houston, 2019-2021; Role: Faculty advisor

Emily Song, undergraduate research assistant, Department of Biology and Biochemistry, University of Houston, 2019-2021; Role: Faculty advisor

Jahnavi Schneider, undergraduate research assistant, Department of Health and Human Performance, University of Houston, 2018; Role: Faculty advisor

Balu Kurup, undergraduate research assistant, Department of Health and Human Performance, University of Houston, 2018; Role: Faculty advisor

Kayla Bustos, undergraduate research assistant, Department of Health and Human Performance, University of Houston, 2018; Role: Faculty advisor

Mubeen Iqbal, undergraduate research assistant, Department of Health and Human Performance, University of Houston, 2016-2017; Role: Faculty advisor

Amy Tsang, undergraduate research assistant, Department of Health and Human Performance, University of Houston, 2016-2017; Role: Faculty advisor

Ayesha Masood, undergraduate research assistant, Department of Health and Human Performance, University of Houston, 2016; Role: Faculty advisor

Chelsea Ngo, undergraduate research assistant, Department of Health and Human Performance, University of Houston, 2016; Role: Faculty advisor

Michael Appleman, undergraduate research assistant, Department of Health and Human Performance, University of Houston, 2016; Role: Faculty advisor

Andrea White, undergraduate research assistant, Department of Health and Human Performance, University of

Houston, 2015; Role: Faculty advisor

Crystal Okenkpu, undergraduate research assistant, Department of Health and Human Performance, University of Houston, 2015; Role: Faculty advisor

Liya Oommen, undergraduate research assistant, Department of Health and Human Performance, University of Houston, 2015; Role: Faculty advisor

Shernice Thomas, undergraduate research assistant, Department of Health and Human Performance, University of Houston, 2015; Role: Faculty advisor

Student Success

Hyunje Park, Pre-Candidacy Award, Department of Health and Human Performance, University of Houston, October 2025; Role: Faculty advisor

Adriele Rivera, Cullen Fellowship Travel Grant, University of Houston, October 2025; Role: Faculty advisor

Mathew Mendoza, Margie Sterr Scholarship, Department of Health and Human Performance, University of Houston, August 2020; Role: Faculty advisor

Dongyual Yoo, "A new robot-assisted therapy for stroke survivors: Effects of long-term stretching exercises on ankle range of motion, balance and gait", Graduate Research and Scholarship Projects Day, University of Houston, November 2017; Role: Faculty advisor

Alberto Fung, Pre Candidacy Project Research Award, Department of Health and Human Performance, University of Houston, April 2017; Role: Faculty advisor

Ayesha Masood, "Evaluation of delayed FDG-PET in differentiating progressive disease from pseudoprogression in brain tumors", Undergraduate Research Day, University of Houston, October 2016; Role: Faculty advisor

SERVICE

Academic Service (University of Houston)

University Member

Building Reliable Advances and Innovations in Neurotechnology (BRAIN) Center, Spring 2018-present

Center for Neuromotor and Biomechanics Research (CNBR), Summer 2013-present

Department Member

Faculty Search Committee for the Presidential Frontier Faculty Program, Fall 2021

Graduate Tuition Fellowships (GTF) Committee, Fall 2019-Fall 2021

Dietetic Internship Selection Committee, Fall 2017-Spring 2022

Graduate Research Degrees (GRD) Committee, Spring 2017-present

GRD Membership Committee, Fall 2017-Spring 2019

Faculty Search Committee for Director of Clinical Education, Fall 2016-Fall 2017

Faculty Search Committee for Biomechanics, Spring 2016

Undergraduate Studies Committee, Fall 2015-Spring 2017

Scholarship Committee, Fall 2014-Spring 2016

Faculty Search Committee for Motor Behavior, Fall 2014-Spring 2015

Comprehensive Examination Committee, Spring 2016-Spring 2018

- David Young (Spring 2018)
- Rakshatha Kabbaligere (Fall 2016)
- David Temple (Spring 2016)

Candidacy Paper Committee, Spring 2015-Spring 2017

- David Young (Spring 2017)
- Ram Kinker Mishra (Spring 2017)
- Rakshatha Kabbaligere (Spring 2016)
- Raul Amador (Spring 2016)
- Craig Workman (Spring 2015)

Professional Service

Editorial Board

Discover Robotics, Editorial Board Member, 2024-present

International Conference on Sport Sciences Research and Technology Support, International Program Committee, 2023 and 2025

Frontiers in Robotics and AI - Biomedical Robotics, Associate Editor, 2023-present

Bioengineering-Basel - Biomechanics and Sports Medicine, Special Issue Editor, 2023-present

Scientific Reports, Editorial Board Member, 2021-present

Journal of Physical and Rehabilitation Medicine Forecast, Editorial Board Member, 2017-present

Journal of Computer Engineering, Editorial Board Member, 2016-present

Grant Reviewer

National Centre of Competence in Research (NCCR) program, Swiss National Science Foundation (SNSF), June-July 2024

Human Exploration Research Opportunities (HERO), NASA, October 2021

John R. Evans Leaders Fund program, Canada Foundation for Innovation (CFI), February 2020

Small Business Innovation Research (SBIR) program, NIH National Cancer Institute (NCI), March 2018

NASA Space Technology Research Fellowship, 2014-2017

Manuscript Reviewer

Clinical Interventions in Aging

Design of Medical Devices Conference

Experimental Brain Research

Frontiers in Psychology-Movement Science and Sport Psychology

Frontiers in Robotics and AI-Biomedical Robotics

Gait and Posture

Gerontology

IEEE Engineering in Medicine and Biology Society

IEEE Haptics Symposium

IEEE Internet of Things Journal

IEEE Transactions on Biomedical Engineering

IEEE Transactions on Human-Machine Systems

IEEE Transactions on Neural Systems and Rehabilitation Engineering

IEEE Transactions on Haptics

IEEE-RAS-EMBS International Conference on Rehabilitation Robotics

Intelligent Service Robotics

Interacting with Computers

International Conference on Control, Automation and Systems

International Conference on Sport Sciences Research and Technology Support

Journal of Biomechanics

Journal of Diabetes Science and Technology

Journal of Intelligent Service Robotics

Journal of Medical Devices

Journal of NeuroEngineering and Rehabilitation

Journal of Physical and Rehabilitation Medicine Forecast

Journal of Physiology

Multisensory Research

PLoS One

Soft Robotics

Somatosensory and Motor Research

Service to Professional Organizations

Expert Advisory, Division of Clinical Rehabilitation Research, National Rehabilitation Center, Seoul, S. Korea, January 27, 2026

Expert Advisory Panel, Third Technical Roadmap Advisory Council, Department of Rehabilitative and Assistive Technology, National Rehabilitation Research Institute, National Rehabilitation Center, Seoul, S. Korea, April 2, 2024

Expert Advisory Panel, Second Technical Roadmap Advisory Council, Department of Rehabilitative and Assistive Technology, National Rehabilitation Research Institute, National Rehabilitation Center, Seoul, S. Korea, March 6, 2024

Keynote Speaker, Korean Society of Sport Biomechanics and Korean Society for Biomechanics Joint Conference, Jeonju, S. Korea, December 1-2, 2023

Expert Advisory Panel, Medical Industry Technical Support Center, Busan Technopark, Busan, S. Korea, November 17, 2023

International Program Committee, 11th International Conference on Sport Sciences Research and Technology Support, Rome, Italy, November 16-17, 2023

Expert Advisory Panel, Intelligent Medical Robotics Laboratory, School of Integrated Technology, Gwangju Institute of Science and Technology, Gwangju, S. Korea, November 8, 2023

Session Chair, 15th International Conference on Control, Automation and Systems, Busan, Korea, October 13-16, 2015

Professional Mentor, Technology Localization Program, Korea Institute of Industrial Technology, Santa Clara, USA, October 18-20, 2014

Professional Mentor, Technology Localization Program, Korea Institute of Industrial Technology, Santa Clara, USA, October 19-20, 2012

Professional Memberships

American Society of Biomechanics (ASB), 2020-present

International Society for Posture and Gait Research (ISPGR), 2014-present

Korean-American Scientists and Engineers Association (KSEA), 2011-present

Society for Neuroscience (SfN), 2009-present

Institute of Electrical and Electronics Engineers (IEEE), 2006-present