Pilwon Hur, Ph.D.
115 E Reindl Way, USR Room 282D, Milwaukee, WI, 53212, USA
217-778-7549
hur@uwm.edu, pilwonhur@gmail.com

Ultimate Goal

- To help people with physical weaknesses or neurologic impairments enhance the overall quality of life by improving functional independence in their daily lives and enabling better integration into their community
- To help students become successful independent researchers and understand patients by heart

Appointment

Assistant Professor, Starting from Aug 2014
- Mechanical Engineering, Texas A&M University, College Station, USA
- Fields of Specialty: Rehab Robotics, Rehabilitation for Stroke, Exoskeleton, Sensory Prosthesis, Virtual Rehabilitation, Neuromechanics, Motor Control, Gait Analysis

Postdoctoral Research Fellow, Sep 2010 – June 2014
- Center for Ergonomics
- University of Wisconsin-Milwaukee
- Fields of Specialty: Rehabilitation for Stroke, Neuromechanics, Robot-Assisted Rehabilitation, Hand Exoskeleton, Sensory Prosthesis, VR-based Rehabilitation, Gait Analysis, Ergonomics

Education

Ph.D., Mechanical Engineering, Sep 2006 – Dec 2010
- University of Illinois at Urbana-Champaign, IL, USA
- Fields of Specialty: Controls, Dynamics and Applied Mathematics with Emphasis on Biomechanics and Postural Control
- Dissertation title: "*Quantification of the human postural control system to perturbations*"
  Advisor: Elizabeth T. Hsiao-Wecksler
  Other committee members: Karl Rosengren (Northwestern University), Srinivasa M. Salapaka, Prashant G. Mehta

M.S., Applied Mathematics, Sep 2008 – May 2010
- University of Illinois at Urbana-Champaign, IL, USA
- Fields of Specialty: Analysis and Optimization
  Advisor: Karen Mortensen

M.S., Mechanical Engineering, Sep 2004 – Aug 2006
- KAIST (Korea Advanced Institute of Science and Technology), Daejeon, Korea
- Fields of Specialty: Virtual Reality
- Thesis title: "*HLA-based Integration of Underwater Vehicle Simulations using X3D Multi-channel Visualization and a Motion Platform*"
  Advisor: Soonhung Han
  Other committee members: Dong Soo Kwon, Jung Kim

B.S., Mechanical Engineering, Mar 1998 – Aug 2004 (including Military Service)
- Hanyang University, Seoul, Korea
- Fields of Specialty: Robotics, Automatic Control, Mechatronics
- Thesis title: "*Implementation of a Clock using LEDs and Inverted Pendulum*"
  Advisor: Jahng-Hyon Park
- Summa Cum Laude

Busan High School, Mar 1995 – Feb 1998
- Summa Cum Laude

Publication

Journal Articles

- Published or In Press (12)

P13. **Pilwon Hur**, Kiwon Park, Karl Rosengren, Gavin Horn and Elizabeth Hsiao-Wecksler, "*Effects of air bottle design on postural control of firefighters*", Applied Ergonomics, Accepted, 2014

P12. **Pilwon Hur**, Yao-Hung Wan, and Na Jin Seo, "*Investigating the Role of Vibrotactile Noise in Early Response to Perturbation*", IEEE Transactions on Biomedical Engineering, Vol 61, Issue 6, pp1628-1633, 2014

P11. **Pilwon Hur**, Binal Motawar, and Na Jin Seo, "*Muscular responses to handle perturbation with different glove condition*", Journal of Electromyography & Kinesiology, Vol 24, Issue 1, pp159-164, 2014

P10. **Pilwon Hur**, Karl S. Rosengren, Gavin P. Horn, Denise L. Smith and Elizabeth T. Hsiao-Wecksler, "*Effect of protective clothing and fatigue on functional balance of firefighters*", J Ergonomics, S2: 004, 2013

P9. Leah R. Enders, **Pilwon Hur**, Michelle J. Johnson, and Na Jin Seo, "*Remote vibrotactile noise improves light touch sensation in stroke survivors' fingertips via stochastic resonance*", Journal of NeuroEngineering and Rehabilitation, 10:105, 2013

P8. **Pilwon Hur**, Binal Motawar, and Na Jin Seo, "*Hand breakaway strength model – Effects of glove use and handle shapes on a person's hand strength to hold onto handles to prevent fall from elevation*", Journal of Biomechanics, Vol 45, Issue 6, pp958-964, 2012

P7. Binal Motawar, **Pilwon Hur**, James Stinear, and Na Jin Seo, "*Contribution of intracortical inhibition in voluntary muscle relaxation*", Experimental Brain Research, Vol 221, Issue 3, pp299-308, 2012

P6. **Hur, P.**, Shoter, A.K, Mehta, P., and Hsiao-Wecksler, E.T, *"Invariant Density Analysis: modeling and analysis of the postural control system using Markov chains",* IEEE Transactions on Biomedical Engineering, Vol 59, Issue 4, pp 1094-1100, 2012

P5. Park, K., **Hur, P**., Rosengren, S. K.K, Horn, G.P., and Hsiao-Wecksler, E.T., "*Effect of load carriage on gait due to firefighting air bottle configuration*", Ergonomics, Vol 53, Issue 7, pp882-891, 2010

P4. **Hur, P**., Duiser, B.A., Salapaka, S., and Hsiao-Wecksler, E.T. "*Measuring robustness of the postural control system to a mild impulsive perturbation*", IEEE Transactions on Neural Systems and Rehabilitation Engineering, Vol 18, Issue 4, pp 461-467, 2010

P3. Horn, G.P., Hsiao-Wecksler, E.T., Rosengren, K.K., **Hur, P**., Park, K., and Smith, D. "*Slips, trips, and falls on the fireground - A study at IFSI*", Fire Rescue, Vol 27, Issue 1, pp56-58, 2009

P2. **Pilwon Hur**, Byounghyun Yoo, Jeongsam Yang, and Soonhung Han, "*An underwater vehicle simulator with immersive interface using X3D and HLA*", SIMULATION, Transactions of the Society for Modeling and Simulation International, Vol 85, Issue 1, pp 33-44, 2009

P1. **Pilwon Hur**, Jeongsam Yang, and Soonhung Han, "*An Underwater Vehicle Simulator using X3D and a Motion Chair in a Multi-Channel Display Room*", Soc CAD/CAM Eng, Vol 13, Issue 1, pp45-57, 2008

- Submitted and Under Revision (1)

S1. **Pilwon Hur**, Yao-Hung Wan, and Na Jin Seo, "*Improving the Handle Design for the Greatest Hand Breakaway Strength*", Applied Ergonomics

- In Preparation (8)

I1. **Pilwon Hur**, Hyun Gu Kang, Lewis A. Lipsitz, and Elizabeth T. Hsiao-Wecksler, "*Invariant Density Analysis of Postural Sway and Prospective Fall Risk in Community-Dwelling Elderly*"

I2. Sunghoon Shin**, Pilwon Hur**, and Young-Hoo Kwon, "*Two different golf swing styles and their effects on lower extremities and lumbar spine*", In Preparation

I3. **Pilwon Hur** and Kurt Beschorner, "*Investigating the Link between Kinematic Deviations and Recovery Response to Unexpected Slips*", In Preparation

I4. **Pilwon Hur**, Derek Kamper, Na Jin Seo, "*Improving assistive glove designs for stroke*

survivors using dynamic biomechanical models and optimization", In Preparation

I5. **Pilwon Hur**, Greg Slota, Na Jin Seo, "*Development of a biomechanical hand model to predict multi-segmental grip forces*", In Preparation

I6. **Pilwon Hur**, Marcella Kosmopoulos, Na Jin Seo, "*Effect of sensory enhancement on the upper extremity motor functions post stroke via remote vibrotactile stimulation*", In Preparation

I7. **Pilwon Hur**, Mojitaba Firoozabad, and Na Jin Seo, "*Determination of the optimal location of kinect sensor for upper-limb virtual rehabilitation*", In Preparation

I8. Jayashree Arunkumar**, Pilwon Hur**, Kishor Lakshminarayanan, and Na Jin Seo, "*Usability evaluation of a low-cost virtual reality rehabilitation game for stroke patients with upper limb impairment using Kinect and P5 Glove*", In Preparation

Book (1)

1. **Pilwon Hur**, 2012, "*Understanding the human postural control system: Mathematical Methods to Quantify the Human Postural Control System and the Applications*", LAMBERT Academic Publishing, ISBN: 978-3-8484-8495-9

Invited Talks and Conference Presentations (40)

C40. Invited Talk: Hyun Gu Kang, Wenjun Li, **Pilwon Hur**, and Lewis Lipsitz, "*Fall risk in older adults: Posture, distractions, and statistics in multidisciplinary teams*", The 7th International Symposimum on Biomathematics and Ecology Education and Research 2014, Oct 2014, Normal, IL, USA

C39. Invited Talk: **Pilwon Hur**, "*Optimality of human movement: diagnosis and rehabilitation for enhanced quality of life*", University of Tennessee-Knoxville, Feb 17, 2014, Knoxville, TN, USA

C38. Invited Talk: **Pilwon Hur**, "*Optimality of human movement: diagnosis and rehabilitation for enhanced quality of life*", Texas A&M University, Feb 11, 2014, College Station, TX, USA

C37. Mojitaba Firoozabad, **Pilwon Hur**, and Na Jin Seo, "*Determination of the optimal location of kinect sensor for upper-limb virtual rehabilitation*", World Congress on Biomechanics in joint with American Society of Biomechanics 2014, Jul 2014, Boston, MA, USA

C36. Marcella Kosmopoulos, **Pilwon Hur**, Leah Enders, and Na Jin Seo, "*Effect of remote subthreshold vibrotactile noise on hand function post stroke*", World Congress on Biomechanics in joint with American Society of Biomechanics 2014, Jul 2014, Boston, MA, USA

C35. **Pilwon Hur**, Derek Kamper, and Na Jin Seo, "*Optimizing cable-driven assistive glove design to help open post stroke paretic hand*", World Congress on Biomechanics in joint with American Society of Biomechanics 2014, Jul 2014, Boston, MA, USA

C34. Jayashree Arunkumar**, Pilwon Hur**, Kishor Lakshminarayanan, and Na Jin Seo, "*Usability evaluation of a low-cost virtual reality rehabilitation game for stroke patients with upper limb impairment using Kinect and P5 Glove*", World Congress on Biomechanics in joint with American Society of Biomechanics 2014, Jul 2014, Boston, MA, USA

C33. Invited Talk: **Pilwon Hur**, "*Improving quality of life: understanding fall mechanisms and potential fall preventions*", Florida International University, Nov 6, 2013, Miami, FL, USA

C32. **Pilwon Hur**, Seyed Hadi Salehi, and Na Jin Seo, "*Development of biomechanical index finger model to predict multi-segmental grip forces for varying finger postures*", American Society of Biomechanics 2013, Sep 2013, Omaha, NE, USA

C31. **Pilwon Hur**, Ying-Ling Tseng, and Na Jin Seo, "*Somatosensory cortex activity in response to fingertip stimulation can increase with remote subthreshold vibrotactile noise: An EEG study*", American Society of Biomechanics 2013, Sep 2013, Omaha, NE, USA

C30. Jayashree Arunkumar, **Pilwon Hur**, Binal Motawar, and Na Jin Seo, "*Low-cost virtual reality game for upper limb rehabilitation using Kinect and P5 glove*", American Society of Biomechanics 2013, Sep 2013, Omaha, NE, USA

C29. Vincent Crocher, **Pilwon Hur**, and Na Jin Seo, "*Low-cost virtual rehabilitation games: House of Quality to meet patient expectations*", International Conference on Virtual Rehabilitation 2013, Aug 2013, Philadelphia, PA, USA

C28. Invited Talk: **Pilwon Hur**, "*Improving assistive gloves for stroke survivors using dynamic*

biomechanical models and optimization", R24-Engineering for Neurological Rehabilitation Meeting, Rehabilitation Institute of Chicago, June 17-18, 2013, Chicago, IL, USA

C27. Invited Talk: **Pilwon Hur**, "*Upper and lower limbs rehabilitation for the neurologically impaired patients*", DGIST, Feb, 2013, Daegu, Korea

C26. Invited Lecture: **Pilwon Hur**, "*How mechanical noise enhance human sensation?*", Series of Seminars at the Center for u-Healthcare, Soon Chun Hyang University, Oct, 2012, Asan, Korea

C25. Invited Talk: **Pilwon Hur**, "*Rehabilitation of the patients with physical weakness and neurologic impairments*", Hanyang University, Oct, 2012, Seoul, Korea

C24. Invited Talk: **Pilwon Hur**, "*Sensory enhancement via vibrotactile stimulation and its effect on the motor response post stroke*", DGIST, Oct, 2012, Daegu, Korea

C23. **Pilwon Hur**, Yao-Hung Wan and Na Jin Seo, "*Effect of vibrotactile stimulation on the response time to handle perturbation*", Society for Neuroscience 2012, Oct 2012, New Orleans, LA, USA

C22. **Pilwon Hur**, Daniel Lomo-Tettey and Na Jin Seo, "*Improving an assistive glove for stroke survivors using advanced biomechanical model*", Society for Neuroscience 2012, Oct 2012, New Orleans, LA, USA

C21. **Pilwon Hur** and Kurt Beschorner, "*Investigating the Link between Kinematic Deviations and Recovery Response to Unexpected Slips*", American Society of Biomechanics 2012, Aug 2012, Gainesville, FL, USA

C20. **Pilwon Hur**, Yao-Hung Wan, and Na Jin Seo, "*Effect of Vibrotactile Stimulation on the Response Time to Handle Perturbation*", Chicago Neuromechanics Symposium, April 2012, University of Chicago, IL, USA

C19. Yao-Hung Wan, **Pilwon Hur**, and Na Jin Seo, "*Optimizing Rung Design to Increase Hand Breakaway Strength for Prevention of Ladder Fall*", Chicago Neuromechanics Symposium, April 2012, University of Chicago, IL, USA

C18. Binal Motawar, **Pilwon Hur**, and Na Jin Seo, "*Roles of cutaneous sensation and gloves with different coefficients of friction on fall recovery during simulated ladder falls*", American Society of Biomechanics 2011, Aug 2011, Long Beach, CA, USA

C17. **Pilwon Hur**, Binal Motawar, and Na Jin Seo, "*Effects of glove and ladder rung design on prevention of ladder fall*", American Society of Biomechanics 2011, Aug 2011, Long Beach, CA, USA

C16. **Pilwon Hur**, Hyun Gu Kang, Lewis A. Lipsitz, and Elizabeth T. Hsiao-Wecksler, "*Fall Risk Estimation of Community-Dwelling Elderly using Invariant Density Analysis*", American Society of Biomechanics 2010, Aug 2010, Providence, RI, USA

C15. Invited Talk: **Pilwon Hur**, Hyun Gu Kang, Lewis Lipsitz, and Elizabeth T. Hsiao-Wecksler, "*Invariant Density Analysis of Postural Sway and Fall-Risk Estimation Model of Community-Dwelling Elderly Adults*", World Congress on Biomechanics, Aug 2010, Singapore

C14. **Pilwon Hur**, Hyun Gu Kang, Lewis A. Lipsitz, and Elizabeth T. Hsiao-Wecksler, "*Invariant Density Analysis of Postural Sway and Prospective Fall Risk in Community-Dwelling Elderly*", American Society of Biomechanics 2009, Aug 2009, Penn State University, PA, USA

C13. Sunghoon Shin, and **Pilwon Hur**, "*Effect of Golf Swing Styles on Resultant Joint Moments of Low Body Joints and L4/L5*", American Society of Biomechanics 2009, Aug 2009, Penn State University, USA

C12. **Pilwon Hur**, K. Alex Shorter, and Elizabeth T. Hsiao-Wecksler, "*Examining quiet standing center of pressure data using invariant density analysis*", Proceedings of the ASME 2009 Summer Bioengineering Conference, June 2009, Lake Tahoe, CA, USA

C11. **Pilwon Hur**, K. Alex Shorter, and Elizabeth T. Hsiao-Wecksler, "*Modeling and analysis of posturographic data using Markov chains*", Society of Engineering Science, Oct 2008, University of Illinois at Urbana-Champaign, IL, USA

C10. **Pilwon Hur**, and Elizabeth T. Hsiao-Wecksler, "*Estimating the moment of inertia of the human body as a single link inverted pendulum model*", North American Congress on Biomechanics, Aug 2008, University of Michigan at Ann-Arbor, USA

C9. Sunghoon Shin, **Pilwon Hur**, Jeffery Casebolt, and Young-Hoo Kwon, "*Weight transfer in*

different golf swing styles based on swing plane: a nonlinear dynamic approach", International Conference on Biomechanics in Sports, July 2008, Seoul National University, Korea

C8. **P. Hur**, K.S. Rosengren, G.P. Horn, T. Schroeder, S.E. Ashton-Szabo, and E.T. Hsiao-Wecksler, "*Assessment of postural sway during multiple load and visual conditions*", International Society of Electrophysiology and Kinesiology, June 2008, Naiagara fall, Canada

C7. Elizabeth T. Hsiao-Wecksler, **Pilwon Hur**, and Brett A. Duiser, "*Sway response and relative stability of the postural control system to an impulsive perturbation*", Society of Engineering Science, Oct 2007, College station, Texas

C6. **Pilwon Hur**, Brett A. Duiser, and Elizabeth T. Hsiao-Wecksler, "*Exploring the impulse response of the postural control system*", American Society of Biomechanics 2007, Aug 2007, Stanford university, USA

C5. **Pilwon Hur**, Seiji Naito, and Elizabeth T. Hsiao-Wecksler, "*Estimating lean angle through application of the gravity line projection algorithm*", American Society of Biomechanics 2007, Aug 2007, Stanford university, USA

C4. Hyokwang Lee, **Pilwon Hur**, Junkyu Park, and Soonhung Han, "*Real-time 3D Visualization of Underwater Vehicle Simulation*", Korea Society of CAD/CAM Engineers, Jan 2007, Peoyngchang, Korea

C3. Elizabeth T. Hsiao-Wecksler, Brett A. Duiser, and **Pilwon Hur**, "*Characterizing the sway response of the human postural control system to an impulse perturbation*", Neuroscience 2006, Oct 14~18, 2006, Atlanta, GA, USA

C2. **Pilwon Hur**, and Soonhung Han, "*Internet-Based X3D Visualization of Underwater Vehicle Simulation*", Korea Society for Simulation, 26 May 2006, Cheonan, Korea

C1. Invited Talk: **Pilwon Hur**, "*Tutorial on CLIPS*", Collaborative Engineering Lab, KAIST, Dec 2005, Korea

Granted Research

- American Heart Association (AHA), Postdoc Fellowship, 12POST12090039, $90,772, "*Effect of enhancement of somatosensation on hand function post stroke*", Pilwon Hur (PI) — 2012-2014
- NIH R24- Rehabilitation Engineering Research Network Center, $50,000, "*Improving assistive gloves for stroke survivors using dynamic biomechanical models and optimization*", Na Jin Seo (PI), Pilwon Hur (Co-I) — 2012-2013
- National Institute for Occupational Safety and Health (NIOSH), Pilot Project Research Training, $18,000, "*Development of a biomechanical hand model to predict multi-segmental finger flexion forces*", Pilwon Hur (PI) — 2012-2013
- NIOSH, Pilot Project Research Training, T42-OH008672, $20,000, "*Prevention of ladder fall by improved somatosensation and optimal rung design*", Pilwon Hur (PI) — 2011-2012
- Physical Medicine and Rehabilitation at Medical College of Wisconsin, PRO00014915, $5,000, "*Effect of botulinum toxin of the long finger flexor muscles on grip force control following stroke*", G. Tchekanov (PI), P. Hur (Co-I, Writer of the Proposal). — 2011-2013

Research Experience

Rehabilitation, Ergonomics, and Gait as a postdoctoral research fellow at University of Wisconsin-Milwaukee

- Identification of mechanism of sensory enhancement due to vibrotactile stimulation: EEG study, 2012-Current
- Design of an exoskeleton glove for the hand rehabilitation for stroke patients, 2012-Current (I4)
- Development of a biomechanical hand model to predict multi-segmental finger flexion forces, 2012-Current (I5)
- Effect of enhancement of somatosensation on hand function post stroke, 2012-Current (I6)
- Validation of Microsoft Kinect for upper extremity rehabilitation, 2012-Current (I7)
- Development and usability test for virtual rehabilitation games for stroke patients, 2012-Current (I8)
- Effect of vibrotactile stimulation on grip control in cortical level using fMRI, 2012-Current
- Development of devices for quantifying biceps spasticity for stroke survivors, 2011–Current

- Investigation of botulinum toxin of the long finger flexor muscles on grip force control and muscle activation pattern following stroke, 2011–Current
- Design of a unilateral repetitive motion device (URMD) for the hand rehabilitation for stroke patients, 2012-2013
- Effect of vibrotactile stimulation on tactile sensation following stroke, 2012–2013 (P9)
- Investigation of role of sensory systems in detecting slip and fall accidents, 2011–2012 (I3)
- Investigation of the effect of cutaneous sensory enhancement on the reaction time to perturbation, 2011–2012 (P12)
- Optimal handle design and their breakaway strength, 2011–2012 (S1)
- Investigation of the contribution of intracortical inhibition in voluntary muscle contraction, 2010–2011 (P7)
- Investigation of the effect of handle shapes and coefficient of friction on breakaway strength, 2010–2011 (P8)
- Effect of cutaneous sensation and coefficients of friction on muscle reaction time to handle perturbation, 2010–2011 (P11)

Postural Control and Fall at UIUC

- Development of fall risk prediction model of the elderly, 2009-2010 (I1)
- Development of a novel method analyzing center of pressure movement using Markov chains, 2008-2010 (P6)
- Investigation of the effect of bottle configuration on the balance and gait performance of firefighters, 2007-2008 (P1, P5)
- Design of foot clearance sensing devices, 2007-2008
- Investigation of the effect of fatigue on the balance of firefighters, 2007-2008 (P4, P10)
- Development of a novel method for quantifying robustness of the human postural control system to an external perturbation, 2006-2008 (P4)

Virtual Reality at KAIST

- Integration of underwater vehicle simulators with multichannel display system and motion platform over HLA (High Level Architecture), 2005-2006 (P1, P2)
- Integration of virtual environments for national science museum, 2005–2006

Research Interests

- Development of upper and lower limb rehabilitation robots that can induce reactive involvement of neurologically-impaired patients
- Development of portable lower limb and upper limb orthoses
- Development of portable rehabilitation devices using mobile technology (e.g., smartphone)
- Development of sensory prostheses using vibro- and electrotactile stimulation
- Identification of fall mechanisms and risk factors of the stroke survivors and the elderly
- Development of algorithms for fall detection and prevention
- Identification of mechanisms of upper limb and lower limb neuromuscular impairment post stroke
- Neuroplasticity via rehabilitation engineering using TMS, EEG, and fMRI
- Development of low cost Virtual Reality system for virtual rehabilitation
- Mathematical modeling (or identification of Hamiltonian) of the stroke survivors' motor control

Teaching Experience

Instructor

- [MEEN612] Mechanics of Robot Manipulators, TAMU, 2014
- [ME340] Dynamics of Mechanical Systems (a.k.a Mechanical Vibration), UIUC, Summer, 2009

Teaching Assistant

- [TAM212] Introduction to Dynamics, UIUC 2008, 2009
- [ME360] Signal Processing, UIUC 2009
- [ME460] Industrial Control Systems (a.k.a Automatic Control), UIUC 2006

Math and Physics Tutor, 2006–2012

- Volunteered for 15 high school students in the community

Korean Language School, 2006–2012

- Served as a web programmer and a teacher

Courses I can teach

- Whole Body Musculoskeletal Biomechanics
- Human Postural Control and Sensorimotor System
- Nonlinear Biodynamics
- Applied Anatomy
- Applied Statistics and Experimental Design for Human Subjects
- Mechatronics and Mobile Technology for Rehabilitation Engineering
- Robotics
- Underactuated Robotics (including theoretical dynamic walker analysis)
- Control of Linear Systems
- Optimal Control
- Information Theory, Inference, and Estimation, and Neuromechanics for Human
- Mathematical Methods for Engineers
- Numerical Analysis
- Linear/Nonlinear Optimization
- Vector Space Methods for Optimization

Advising Experiences

- A doctoral student: exoskeleton design for stroke survivors, model development, dynamic simulation, UWM, 2011-Current
- A master student: biomechanical modeling for hand breakaway strength, experiment design, data analysis, manuscript drafting (Successfully defended on June 2012), UWM, 2011-2012
- An undergrad student: Analysis on muscle activation pattern during breakaway from a handle, Development of virtual reality system for rehabilitation, UWM, 2011-2012
- Three undergrad students: experimental setup, data analysis, UIUC, 2007

Professional Membership

- International Society for Virtual Rehabilitation, 2013–Current
- American Heart Association, 2012–Current
- Society for Neuroscience, 2012–Current
- World Congress on Biomechanics, 2010–Current
- Korean–American Scientist and Engineers Association, 2009–Current
- ASME–SBC, 2009–Current
- American Society of Biomechanics, 2007–Current
- Korean Society of Simulation, 2006–Current
- Korean Society of CAD/CAM, 2006–Current

Reviewer

- World Congress on Biomechanics, 2014–Current
- American Society of Biomechanics, 2012–Current
- American Society of Biomechanics, Chair of "Falls" session, 2012–Current
- International Conference on Biomedical Engineering and Biotechnology, 2013–Current
- Clinical Biomechanics, 2013–Current
- Journal of Biomechanics, 2012–Current
- Journal of Applied Biomechanics, 2011–Current
- Quality and Reliability Engineering International, 2010–Current
- International Journal of Computer Integrated Manufacturing, 2012–Current

Honors & Awards

Student Travel Award

- World Congress on Biomechanics (2010)
- International Conference on Virtual Rehabilitation (2013)

Paul D. Doolen Scholarship on Aging

- Nominated as alternate winner (2009, 2010)

Graduate Travel Award

- Graduate College, UIUC (Fall 2007)

Schaller Travel Award

- Dept. of Mechanical Science and Engineering, UIUC (Fall 2007)

National Scholarship

- Ministry of Science and Technology, Korea (Aug 2004 – Aug 2006)

Summa Cum Laude
- Hanyang University, Seoul, Korea (Aug 2004)

Merit-based Scholarship
- Hanyang University, Seoul, Korea (Fall 1998, Spring 1999, Fall 1999, Spring 2004)

Skills

Biomechanics
- Analyses of postural control and gait, inverse dynamics of the human during gait, passive dynamic walker, various nonlinear dynamic techniques
- Motion analysis: Vicon Motion Systems, Motion Analysis Corp., Optotrak
- Force platform: AMTI Corp., Bertec with treadmill, GaitRite gait mat
- EMG: Delsys Inc., Bortec Biomedical Ltd.
- EEG: NeuroScan
- Stimulator: Transcranial Magnetic Stimulation (Magstim Bistim2), Transcutaneous Electrical Nerve Stimulation (DS7), Tactor C3
- Pressure sensor: Novel Pedar and Pliance

Software
- MATLAB, Mathematica, LabVIEW, OpenSim, Visual Studio, Borland Builder, Xcode, Photoshop, Illustrator, Flex, Flash, AutoCAD, CATIA, SPSS and etc.

Programming
- C, C++, C#, Java, Visual Basic, PHP, Action Script, Python
- Windows, Network (UDP, TCP, HLA), Database (MySQL, MSSQL, Oracle), 3D graphics (Direct3D, OpenGL, OSG, X3D), Internet Application (RIA by Flex), Web programming (PHP), XML, Web Service, iPhone and Android Apps

Hardware
- Analog/Digital circuit design, Artwork for PCB design (EAGLE), Microprocessor (AVR, PIC, Arduino), PC interfaces with serial and parallel communications, and etc.

Applied Mathematics
- Signal processing, Stochastic modeling, Optimization, Functional Analysis, Numerical Analysis

Virtual Reality
- Multichannel 3D visualization in distributed environment
- CAVE (Computer Aided Virtual Environment)

Extra Activities

- Ordained Deacon, Korean Church at Champaign-Urbana (KCCU), 2010-Current
- Webmaster for Korean Church, and Korean Student Association in UIUC, 2007–Current
- Development of Library Information System for Korean Language School in Champaign, 2009-2010
- Development of Election System for Samil Church, Korea, 2004
- Software Engineer at Department of Defense, Korea, 2000-2003
- Medic at Military Hospital of the 36th Infantry Division, Korea, 2000-2003
- Flutist, Piano Accompanist at Churches (Daedong, Samil Churches and KCCU), 1992-2010