

Seoung Hoon Park, Ph.D.

Assistant Professor in Health and Human Performance and Communication Sciences and Disorders
University of Houston

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EDUCATION

Postdoctoral Training in Neurorehabilitation 2019-2022
Shirley Ryan AbilityLab and Northwestern University Chicago, IL, USA
Mentors: Ming Wu and William Zev Rymer

Ph.D., Kinesiology – Motor Neuroscience 2014-2019
University of Florida Gainesville, FL, USA
Dissertation: Low-frequency Oscillations in Force Output - Relevance to Healthy and At-risk-for-stroke Older Adults
Mentor: Evangelos A. Christou

M.S., Kinesiology – Motor Learning and Control 2010-2012
Seoul National University Seoul, South Korea
Thesis: Differential contribution of visual and auditory information to accurately predict the direction and rotational motion of a visual stimulus
Advisor: Seonjin Kim

B.S., Kinesiology 2004-2010
Seoul National University Seoul, South Korea
* 2-year compulsory military service (2005 - 2007)

PROFESSIONAL EXPERIENCE

Assistant Professor on Tenure Track 2022-Date
Department of Health and Human Performance
Department of Communication Sciences and Disorders
Department of Clinical Sciences
University of Houston

Postdoctoral Research Fellow 2019-2022
Legs + Walking Lab, Shirley Ryan AbilityLab Chicago, IL, USA
Department of Physical Medicine and Rehabilitation, Northwestern University
Mentors: Ming Wu, Ph.D. and William Zev Rymer, M.D., Ph.D.

Graduate Assistant 2014-2019
Department of Applied Physiology and Kinesiology, University of Florida Gainesville, FL, USA
Mentor: Evangelos A. Christou, Ph.D.

Graduate Assistant 2010-2012
Motor Behavior Laboratory, Seoul National University Seoul, South Korea
Advisor: Seonjin Kim, Ph.D.

RESEARCH FOCUS

- Neuromuscular mechanisms for impaired motor control and learning in neurological diseases
- Developing neurorehabilitation tools and protocols for improving motor control and function with emphasis on walking, balance, and swallowing in people with neurological diseases
- Behavioral and neural changes in response to rehabilitative interventions in individuals with neurological diseases

RESEARCH PUBLICATIONS

Peer-reviewed Journal Publications:

16. **Park SH**, Yan S, Dee W, Reed R, Roth EJ, Rymer WZ, & Wu M. Repeated adaptation and de-adaptation to the pelvis resistance force facilitate retention of motor learning stroke survivors. *Journal of Neurophysiology*. 2022 (doi: 10.1152/jn.00046.2022).
15. **Park SH**, Hsu C, Dee W, Roth EJ, Rymer WZ, & Wu M. Enhanced error facilitates motor learning in weight shift and increases use of the paretic leg during walking at chronic stage after stroke. *Experimental Brain Research*. 2021 (doi: 10.1007/s00221-021-06202-9).
14. **Park SH**, Hsu C, Lin J, Dee W, Roth EJ, Rymer WZ, & Wu M. Increased motor variability facilitates motor learning in weight shift toward the paretic side during walking in individuals post-stroke. *European Journal of Neuroscience*. 53, 3490-3506, 2021 (doi: 0.1111/ejn.15212).
12. **Park SH**, Hsu C, Dee W, Roth EJ, Rymer WZ, & Wu M. Gradual adaptation to pelvis perturbation during walking reinforces motor learning of weight shift toward the paretic side in individuals post-stroke. *Experimental Brain Research*. 239, 1701-1713, 2021 (doi: 10.1007/s00221-021-06092-x).
12. **Park SH**, Lin J, Dee W, Hsu C, Roth EJ, Rymer WZ, & Wu M. Targeted Pelvic Constraint Force Induces Enhanced Use of the Paretic Leg During Walking in Persons Post-Stroke. *IEEE Transactions on Neural Systems and Rehabilitation Engineering*. 28(10), 2184-2193, 2020 (doi: 10.1109/TNSRE.2020.3018397).
11. Casamento-Moran A, Delmas S, **Park SH**, Yacoubi B, & Christou EA. Reaction to a visual stimulus: Anticipation with steady and dynamic contractions. *Journal of Human Kinetics*. 69(1), 17-27, 2019 (doi: 10.2478/hukin-2019-0025).
10. **Park SH**, Wang Z, McKinney W, Khemain P, Lui S, Christou EA, & Mosconi NW. Functional Motor Control Deficits in Aging Fragile X Mental Retardation 1 Premutation Carriers. *Experimental Brain Research*. 237(9), 2269-2278, 2019 (doi: 10.1007/s00221-019-05566-3).
9. **Park SH**, Kim C, Yacoubi B, & Christou EA. Control of oscillatory force tasks: low-frequency oscillations in force and modulation of muscle activity. *Human Movement Science*. 64, 89-100, 2019 (doi: 10.1016/j.humov.2019.01.009).
8. **Park SH** & Kwon M. The effect of trial-to-trial variability during practice of force control tasks on motor learning. *Journal of Korean Society for the Study of Physical Education*. 23(2), 127-136, 2018 (doi: 10.15831/JKSSPE.2018.23.2.127).

7. Delmas S, Casamento-Moran A, **Park SH**, Yacoubi B, & Christou EA. Motor planning perturbation: changes in speed and structure of the response. *Journal of Neurophysiology*, 120, 2059-2065, 2018 (doi: 10.1152/jn.00323.2018).
6. Ernster AE, **Park SH**, Yacoubi B, Christou EA, Casamento-Moran, Singer ML, & Humbert IA. Motor transfer from the corticospinal to the corticobulbar pathway. *Physiology & Behavior*, 191, 155-161, 2018 (doi: 10.1016/j.physbeh.2018.04.016).
5. **Park SH**, Casamento-Moran A, Singer ML, Ernster AE, Yacoubi B, Humbert IA, & Christou EA. Integration of Visual Feedback and Motor learning: Corticospinal vs. Corticobulbar Pathway. *Human Movement Science*, 58C, 88-96, 2018 (doi: 10.1016/j.humov.2018.01.002).
4. **Park SH**, Casamento-Moran A, Yacoubi B, & Christou EA. Voluntary reduction of force variability via modulation of low-frequency oscillations. *Experimental Brain Research*, 235, 2717-2727, 2017 (doi: 10.1007/s00221-017-5005-5).
3. **Park SH**, Kwon M, & Christou EA. Motor output oscillations with magnification of visual feedback in older adults. *Neuroscience Letters*, 647, 8-13, 2017 (doi: 10.1016/j.neulet.2017.03.011).
2. **Park SH**, Kwon M, Solis D, Lodha N, & Christou EA. Motor control differs for increasing and releasing force. *Journal of Neurophysiology*, 115 (6), 2924-2930, 2016 (doi: 10.1152/jn.00715.2015).
1. **Park SH**, Kim SJ, Kwon M, & Christou EA. Differential contribution of visual and auditory information to accurately predict the direction and type of stimulus. *Applied Physiology, Nutrition, and Metabolism*, 41 (3), 235-243, 2016 (doi: 10.1139/apnm-2015-0390).

In Review:

3. **Park SH**, Lin J, Dee W, Keefer R, Rymer WZ, & Wu M. Swing-phase pelvis perturbation improves dynamic lateral balance during walking in individuals with spinal cord injury.
2. Yan S, **Park SH**, Reed R, Dee W, Rojas A, Rymer WZ & Wu M. Trunk support improves walking in children with cerebral palsy.
1. **Park SH**, Dee W, Reed R, Roth EJ, Rymer WZ, & Wu M. Plantar stimulation paired with laterally directed force and swing phase resistance improves walking performance in individuals post-stroke.

In preparation:

7. **Park SH**, Yan S, Dee W, Reed R, Rymer WZ, & Wu M. Phase-dependent versus constant sensory stimulation with pelvis assistance force enhances locomotor adaptation and reduces step-to-step variability in people with spinal cord injury.
6. Yan S, **Park SH**, Reed R, Dee W, Rojas A, Rymer WZ, & Wu M*. Neuromuscular responses of the neck and trunk muscles of children with cerebral palsy during a robotic hippotherapy training with various movement frequencies and intensities.

5. Yan S, Janis K, Gaebler-Spira DJ, **Park SH**, Dee W, Reed R, Rymer WZ, & Wu M*. Effects of lateral perturbation force training on reactive balance in children with cerebral palsy during walking.
4. Yan S, **Park SH**, Dee W, Reed R, Rojas A, Rymer WZ, & Wu M. Adaptation of lateral trunk support during walking in children with cerebral palsy.
3. **Park SH**, Yan S, Dee W, Reed R, Rymer WZ, & Wu M. Intermittent versus continuous adaptation to pelvis assistance during walking improves mediolateral balance in people with spinal cord injury.
2. **Park SH**, Yan S, Dee W, Reed R, Roth EJ, Rymer WZ, & Wu M. Enhanced phasic calf muscle activation with swing resistance enhances propulsion of the paretic leg in people post-stroke.
1. **Park SH**, Yan S, Dee W, Reed R, Roth EJ, Rymer WZ, & Wu M. Constraint on non-paretic leg swings during overground walking improves paretic propulsion and walking speed in people post-stroke.

RESEARCH FUNDING

Ongoing:

Completed / Previous Support:

NIH-NICHD, R01 HD 083314 National Institutes of Health <i>Improved dynamic lateral balance of humans with SCI</i> Role: Postdoc Research Associate	Wu (PI)	1/2021-6/2022
NIH-NINDS, R01 NS 115487 National Institutes of Health <i>Neuromuscular mechanisms of specific trunk interventions in children with cerebral palsy</i> Role: Postdoc Research Associate	Wu (PI)	3/2021-6/2022
NIH-NICHD, R01 HD 082216 National Institutes of Health <i>Constraint induced movement therapy for walking in individuals post stroke</i> Role: Postdoc Research Associate	Wu (PI)	8/2019-3/2021
NIH-NINDS, R21 NS 096258 National Institutes of Health <i>Motor control deficits following transient ischemic attack</i> Role: Graduate Research Associate	Christou (PI)	9/2016-8/2019

In Review:

Not Funded Applications:

AHA Postdoctoral Fellowship **Park (PI)** **2022-2024**
American Heart Association \$ 140,952
Effect of enhanced motor activity and sensory feedback during walking with constraint force in people post stroke
Role: Principal Investigator

NIDILRR, Switzer Fellowship **Park (PI)** **2021-2022**
Administration for Community \$ 70,000
Living
Application of constraint force paired with transcutaneous electrical stimulation for walking in individuals post stroke
Role: Principal Investigator

AHA Postdoctoral Fellowship **Park (PI)** **2021-2023**
American Heart Association \$ 134,236
Application of constraint force paired with transcutaneous electrical stimulation for walking in individuals post stroke
Role: Principal Investigator

NIDILRR, Switzer Fellowship **Park (PI)** **2020-2021**
Administration for Community \$ 70,000
Living
Application of constraint force paired with enhanced sensory feedback induces forced use of the paretic leg and improves gait symmetry in individuals post-stroke
Role: Principal Investigator

TEACHING EXPERIENCE

Course Teaching:

- **Applied Human Anatomy APK 2100 & 2100C.** Teach the three 3-hour undergraduate courses per semester in the APK program at the University of Florida. 2014-2019.
- **Swimming and Weight Training (051.012, 051.014, & 051.018).** Teach the undergraduate courses in the kinesiology program at Seoul National University. 2013-2014.

INVITED PRESENTATIONS

- Applying lateral pelvis resistance versus assistance during walking enhances weight shift and use of the paretic leg in individuals post-stroke. Grand Rounds, Department of Physical Medicine and Rehabilitation, Northwestern University, Chicago, IL, USA, 2021.
- Does constraint-induced forced use of the affected leg during locomotor practice improve walking performance in individuals post-stroke? Korean Society of Sport Biomechanics International Conference, Chuncheon, South Korea, 2020.
- Low-frequency oscillations and control of steady force. Human Movement Science Seminar, Seoul National University, Seoul, South Korea, 2019.

CONFERENCE PRESENTATIONS

National/International:

18. **Park SH**, Yan S, Dee W, Reed R, Roth E, Rymer W, & Wu M. Repeated locomotor adaptation and de-adaptation facilitate retention of motor learning during walking in individuals post-stroke. *Society for Neuroscience*, 2021.
17. Yan S, **Park SH**, Reed R, Dee W, Rojas AM, Rymer WZ, & Wu M. Trunk support improves treadmill walking in children with cerebral palsy. *Society for Neuroscience*, 2021.
16. **Park SH**, Dee W, Reed R, & Wu M. Application of constraint force paired with enhanced sensory feedback induces forced use of the paretic leg and improves gait symmetry in individuals post-stroke. *International Society of Electrophysiology and Kinesiology*, 2020.
15. **Park SH**, Lin J, Dee W, Hsu C, Roth EJ, Rymer WZ & Wu M. Forced use of the affected leg during walking improves gait in individuals with stroke. *NASPSA*, 2020.
14. **Park SH**, Kwon M, & Christou EA. Magnification of visual feedback alters modulation of motor neuron pool in older adults. *Society for Neuroscience*, 2019.
13. **Park SH**, Wang Z, McKinney W, Christou EA, & Mosconi MW. Functional motor control deficits in fragile x mental retardation 1 gene premutation carriers. *ACSM Annual Meeting*, 2019.
12. McKinney WS, Wang Z, **Park SH**, Christou EA, & Mosconi MW. Precision sensorimotor control in aging FMR1 premutation carriers. *Midwest Fragile X Research Exchange*, 2019.
11. **Park SH**, Kim C, Yacoubi B, & Christou EA. Control of dynamic force tasks: low-frequency oscillations in force and modulation of muscle activity. *Society for Neuroscience*, 2018.
10. Delmas S, Casamento-Moran A, **Park SH**, Yacoubi B, & Christou EA. Motor planning muscle activation patterns and reaction time. *Society for Neuroscience*, 2018.
9. Ernster AE, **Park SH**, Yacoubi B, Christou EA, Casamento-Moran, Singer ML, & Humbert IA. Cross-pathway transfer between the ankle and tongue. *Dysphagia Research Society*, 2018.
8. **Park SH**, Casamento-moran A, Singer ML, Ernster AE, Yacoubi B, Humbert IA, & Christou EA. Motor learning for corticospinal and corticobulbar pathways. *Society for Neuroscience*, 2017.
7. **Park SH**, Kwon M, & Christou EA. Motor output oscillations with magnification of visual feedback in older adults. *Progress in Motor Control*, 2017.
6. Delmas S, Casamento-Moran A, **Park SH**, Yacoubi B, & Christou EA. Motor output variability increases reaction time variability. *Progress in Motor Control*, 2017.
5. **Park SH**, Casamento-moran A, Yacoubi B, & Christou EA. Voluntary reduction of force variability via modulation of low-frequency oscillations. *Society for Neuroscience*, 2016.
4. Casamento-moran A, **Park SH**, Yacoubi B, & Christou EA. Low-frequency oscillations in force slow reaction time. *Society for Neuroscience*, 2016.
3. **Park SH**, Kwon M, Solis D, Lodha N, & Christou EA. Motor control differs for increasing and releasing force. *Society for Neuroscience*, 2015.
2. Kim C, **Park SH**, Paez Cecilia, Moon H, & Christou EA. Low-frequency oscillations in force and muscle activity relate to force variability during sinusoidal tasks. *The 24th Annual Meeting of the Neural Control of Movement*, 2015. (Sole Presenter)

1. Kim HJ, Yang JH, Koo DH, **Park SH**, Jung YJ, Jeong DH, Park SY, & Seo JS. Effect of the Wingate-induced Muscle Fatigue on Coordination of Upper Limb During Reaching Task: Kinematic Analysis. *The 5th Asia-Pacific Conference on Exercise and Sports Science*, 2011.

Local/State:

23. **Park SH**, Lin J, Dee W, Hsu C, Roth EJ, Rymer WZ, & Wu M. Forced use of the paretic leg induced by a targeted resistance force applied to the pelvis during walking in individuals post-stroke. *Research Day, Northwestern University*, 2020.
22. **Park SH**, Wang Z, McKinney W, Christou EA, & Mosconi MW. Motor Control Deficits in Aging Fragile X Mental Retardation 1 Premutation Carriers. *Graduate Student Research Day, University of Florida*, 2019.
21. **Park SH**, Wang Z, McKinney W, Christou EA, & Mosconi MW. Functional Motor Control Deficits in Aging Fragile X Mental Retardation 1 Premutation Carriers. *14th Annual Neuromuscular Plasticity Symposium, College of Public Health and Health Professions, University of Florida*, 2019.
20. **Park SH**, Wang Z, McKinney W, Christou EA, & Mosconi MW. Functional Motor Control Deficits in Aging Fragile X Mental Retardation 1 Premutation Carriers. *The D. K. Stanley Lecture Series, College of Health & Human Performance, University of Florida*, 2019.
19. **Park SH**, Kim C, Yacoubi B, & Christou EA. Steadiness of dynamic force tasks: low-frequency oscillations in force and muscle activity. *Graduate Student Research Day, University of Florida*, 2018.
18. **Park SH**, Kim C, Yacoubi B, & Christou EA. Control of dynamic force tasks: low-frequency oscillations in force and modulation of muscle activity. *13th Annual Neuromuscular Plasticity Symposium, College of Public Health and Health Professions, University of Florida*, 2018.
17. **Park SH**, Kim C, Yacoubi B, & Christou EA. Low-frequency oscillations in force and muscle activity during sinusoidal force tasks. *The D. K. Stanley Lecture Series, College of Health & Human Performance, University of Florida*, 2018.
16. **Park SH**, Casamento-moran A, Yacoubi B, & Christou EA. Voluntary reduction of force variability via modulation of oscillations in force from 0-1 Hz. *Graduate Student Research Day, University of Florida*, 2017.
15. Ernster AE, **Park SH**, Yacoubi BK, & Christou EA, Casamento-Moran A, Singer ML, Humbert IA. Test of cross-systems transfer between corticobulbar and corticospinal pathways during goal directed tasks of the tongue and ankle. *College of Public Health and Health Professions Research Day, University of Florida*, 2017.
14. **Park SH**, Casamento-moran A, Yacoubi B, & Christou EA. Voluntary reduction of force variability via modulation of oscillations in force from 0-1 Hz. *Annual Diversity Graduate Research Symposium, University of Florida*, 2017.
13. Delmas, S, Casamento-Moran, A, **Park SH**, Yacoubi B, & Christou EA. Anticipation and reaction time. *Undergraduate Research Day, University of Florida*, 2017.
12. **Park SH**, Casamento-moran A, Yacoubi B, & Christou EA. Voluntary reduction of force variability via modulation of oscillations in force from 0-1 Hz. *The D. K. Stanley Lecture Series, College of Health & Human Performance, University of Florida*, 2017.
11. **Park SH**, Casamento-moran A, Yacoubi B, & Christou EA. Voluntary reduction of force variability via modulation of oscillations in force from 0-1 Hz. *12nd Annual Neuromuscular Plasticity Symposium, College of Public Health and Health Professions, University of Florida*, 2017.

10. **Park SH**, Casamento-moran A, Yacoubi B, & Christou EA. Voluntary reduction of force variability via modulation of oscillations in force from 0-1 Hz. *Graduate Student Research Symposium, College of Health & Human Performance, University of Florida*, 2016.
9. **Park SH**, Neha Lodha, & Christou EA. Greater asymmetry in motor control for TIA. *11th Annual Neuromuscular Plasticity Symposium, College of Public Health and Health Professions, University of Florida*, 2016.
8. **Park SH**, Neha Lodha & Christou EA. Greater asymmetry in motor control for TIA. *The D. K. Stanley Lecture Series, College of Health & Human Performance, University of Florida*, 2016.
7. **Park SH**, Kwon MH, Solis D, Lodha N, & Christou EA. Motor control differs for increasing and releasing force. *Graduate Student Research Symposium, College of Health & Human Performance, University of Florida*, 2015.
6. **Park SH**, Kwon MH, Solis D, Lodha N, & Christou EA. Motor control differs for increasing and releasing force. *Graduate Student Research Day, University of Florida*, 2015.
5. Corti M, Casamento-Moran A, **Park SH**, Faris KJ, Piepenbrink B, & Christou EA, Subramony SH, Byrne BJ. Biomarkers in Friedreich's Ataxia: Identifying Appropriate Clinical Trial Endpoints. *CTSI Research Day, Clinical and Translational Science Institute, University of Florida*, 2015.
4. **Park SH**, Kim SJ & Christou EA. Different contribution of visual and auditory information to accurately predict the direction and type of stimulus. *The D. K. Stanley Lecture Series, College of Health & Human Performance, University of Florida*, 2015.
3. Kim C, **Park SH**, Paez C, Lodha N & Christou EA. Low-frequency oscillations in force and muscle activity relate to force variability during sinusoidal tasks. *10th Annual Neuromuscular Plasticity Symposium, College of Public Health and Health Professions, University of Florida*, 2015.
2. **Park SH**, Kim SJ, & Christou EA. Differential contribution of visual and auditory information to accurately predict the direction and type of stimulus. *10th Annual Neuromuscular Plasticity Symposium, College of Public Health and Health Professions, University of Florida*, 2015.
1. **Park SH**. Differential Effect of Visual and Auditory Information on Response Accuracy. *Graduate Student Research Symposium, College of Health & Human Performance, University of Florida*, 2014.

PROFESSIONAL AFFILIATIONS

- Society for Neuroscience (SfN)
- Society for the Neural Control of Movement (NCM)
- North American Society for the Psychology of Sport and Physical Activity (NASPPSA)
- American College of Sports Medicine (ACSM)
- Progress in Motor Control (PMC)
- International Society of Electrophysiology and Kinesiology (ISEK)

HONORS AND AWARDS

National/International:

- Graduate Student Writing Award, American Kinesiology Association, USA, 2019.
- Predoctoral Outstanding Research Award, Association of Korean Neuroscientists, USA, 2017.
- The Korean Honor Scholarship, The Embassy of The Republic of Korea, USA, 2017.

Northwestern University & Shirley Ryan AbilityLab:

- 1st place Sarah Baskin Outstanding Research Award, 2021.

University of Florida:

- Dr. Stacy E. and Mr. Joseph T. Cutrono Conference Scholarship Award, 2019.
- Graduate School Doctoral Dissertation Award, 2019.
- C.A. Boyd Scholarship Award, 2018.
- Outstanding Academic Achievement, 2018.
- Dr. Christian W. Zauner Scholarship Award, 2017.
- Outstanding Academic Achievement, 2017.
- David & Linda McCaughey Endowed Scholarship Award, 2016.
- Outstanding Academic Achievement, 2016.
- Outstanding International Student Award, 2015.
- Outstanding Academic Achievement, 2015.
- Grinter Fellowship, 2014-2015.

Seoul National University:

- Honor and early graduation from undergraduate, 2010.
- Cum Laude, 2010.

RESEARCH SKILLS

Software and Statistical Techniques:

- MATLAB
- LabVIEW
- Processing – Java programming
- Spike2
- Sony Vegas - video editing software
- SigmaPlot - scientific data graphing and statistical analysis software
- SPSS

Hardware and Data Collection Techniques:

- Surface Electromyography
- High-density Surface Electromyography and Decomposition
- Electroencephalography
- Inertia Measurement Units
- Motion Capture
- Force Plates
- Pressure Sensitive Walkway
- Instrumented Treadmill
- Load Cells
- Position Sensors

- Pressure Sensors
- Accelerometers
- Cable-driven Locomotor Training System
- Neuromuscular Electrical Stimulation
- Transcutaneous Electrical Stimulation
- Driving Simulator
- Eye Movement Tracking
- Lingual Control Measurement

REVIEWER AD HOC

- Transactions on Neural Systems & Rehabilitation Engineering
- Neuroscience Letters
- Journal of Motor Behavior
- Frontiers in Physiology
- Physical Therapy
- Journal of Human Kinetics
- Research Quarterly for Exercise and Sport
- Brain Sciences
- Scientific Reports