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HYOSUB E. KIM

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ACADEMIC APPOINTMENTS

2023 - present	Assistant Professor, School of Kinesiology, The University of British Columbia
2021 - 2023	Joint Appointment, Interdisciplinary Neuroscience Graduate Program, University of Delaware
2019 - 2023	Joint Appointment, Department of Psychological & Brain Sciences, University of Delaware
2019 - 2023	Courtesy Appointment, Department of Biomedical Engineering
2019 - 2023	Joint Appointment, Biomechanics and Movement Science Program, University of Delaware
2018 - 2023	Assistant Professor, Department of Physical Therapy, University of Delaware
2015 - 2018	Postdoctoral Fellow, Department of Psychology and Helen Wills Neuroscience Institute, University of California, Berkeley

EDUCATION

2015	Ph.D., Neuroscience, University of Illinois at Chicago
2012	DPT, University of Illinois at Chicago
2000	B.M., Music Performance, The Juilliard School

RESEARCH GRANTS

Ongoing

2020 - 2024	National Institutes of Health (R01HD078330; PI: Darcy Reisman), *Behavioral and neurophysiologic processes of locomotor learning after stroke.* Role: Co-Investigator

Completed

2019 - 2023	National Science Foundation (M3X 1934650; PI: Jennifer Semrau), *Understanding and Enhancing Proprioception via Model-Based Human-Robot Interactions.* Role: Co-Principal Investigator
2019 - 2022	National Institutes of Health (K12HD055931), *Behavioral and computational processes of motor learning in individuals with Parkinson disease.* Role: PI/Scholar

PUBLICATIONS

[1] Jonathan M Wood, Susanne M Morton, and Hyosub E Kim. A reliable and efficient adaptive bayesian method to assess static lower limb position sense. *Journal of Neuroscience Methods*:109875, 2023.

[2] Isaac N Gomez, Serena R Orsinger, Hyosub E Kim, and Ian Greenhouse. Assessing corticospinal excitability during goal-directed reaching behavior. *JoVE (Journal of Visualized Experiments)*, (190):e64238, 2022.

[3] Allison E Miller, Emily Russell, Darcy S Reisman, Hyosub E Kim, and Vu Dinh. A machine learning approach to identifying important features for achieving step thresholds in individuals with chronic stroke. *Plos one*, 17(6):e0270105, 2022.

[4] Bernard t Hart, Titipat Achakulvisut, Ayoade Adeyemi, Athena Akrami, Bradly Alicea, Alicia Alonso-Andres, Diego Alzate-Correa, Arash Ash, Jesus Ballesteros, Aishwarya Balwani, et al. Neuromatch academy: a 3-week, online summer school in computational neuroscience. *Journal of Open Source Education*, 5(49):118, 2022.

[5] Jonathan S Tsay, Adrian M Haith, Richard B Ivry, and Hyosub E Kim. Interactions between sensory prediction error and task error during implicit motor learning. *PLoS computational biology*, 18(3):e1010005, 2022.

[6] Jonathan S Tsay, Hyosub Kim, Adrian M Haith, and Richard B Ivry. Understanding implicit sensorimotor adaptation as a process of proprioceptive re-alignment. *Elife*, 11:e76639, 2022.

[7] Jonathan S Tsay, Hyosub E Kim, Arohi Saxena, Darius E Parvin, Timothy Verstynen, and Richard B Ivry. Dissociable use-dependent processes for volitional goal-directed reaching. *Proceedings of the Royal Society B*, 289(1973):20220415, 2022.

[8] Guy Avraham, J Ryan Morehead, Hyosub E Kim, and Richard B Ivry. Reexposure to a sensorimotor perturbation produces opposite effects on explicit and implicit learning processes. *PLoS biology*, 19(3):e3001147, 2021.

[9] Hyosub E Kim, Guy Avraham, and Richard B Ivry. The psychology of reaching: action selection, movement implementation, and sensorimotor learning. *Annual review of psychology*, 72:61–95, 2021.

[10] Jennifer B Listman, Jonathan S Tsay, Hyosub E Kim, Wayne E Mackey, and David J Heeger. Long-term motor learning in the "wild" with high volume video game data. *Frontiers in human neuroscience*, 15:777779, 2021.

[11] Allison Miller, Ryan T Pohlig, Tamara Wright, Hyosub E Kim, and Darcy S Reisman. Beyond physical capacity: factors associated with real-world walking activity after stroke. *Archives of physical medicine and rehabilitation*, 102(10):1880–1887, 2021.

[12] Benjamin Parrell, Hyosub E Kim, Assaf Breska, Arohi Saxena, and Richard Ivry. Differential effects of cerebellar degeneration on feedforward versus feedback control across speech and reaching movements. *Journal of Neuroscience*, 41(42):8779–8789, 2021.

[13] Jonathan S Tsay, Guy Avraham, Hyosub E Kim, Darius E Parvin, Zixuan Wang, and Richard B Ivry. The effect of visual uncertainty on implicit motor adaptation. *Journal of neurophysiology*, 125(1):12–22, 2021.

[14] Jonathan S Tsay, Hyosub E Kim, Darius E Parvin, Alissa R Stover, and Richard B Ivry. Individual differences in proprioception predict the extent of implicit sensorimotor adaptation. *Journal of Neurophysiology*, 125(4):1307–1321, 2021.

[15] Jonathan M Wood, Susanne M Morton, and Hyosub E Kim. The consistency of prior movements shapes locomotor use-dependent learning. *ENeuro*, 8(5), 2021.

[16] Guy Avraham, J Ryan Morehead, Maya Malaviya, Hyosub E Kim, and Richard B Ivry. Explicit and implicit processes exhibit opposite effects upon relearning a sensorimotor perturbation. *Advances in Motor Learning and Motor Control (MLMC)*, 2020.

[17] Jonathan S Tsay, Adrian M Haith, Richard B Ivry, and Hyosub E Kim. Distinct processing of sensory-prediction error and target error during implicit motor adaptation. *Advances in Motor Learning and Motor Control (MLMC)*, 2020.

[18] Jonathan M Wood, Hyosub E Kim, Margaret A French, Darcy S Reisman, and Susanne M Morton. Use-dependent plasticity explains aftereffects in visually guided locomotor learning of a novel step length asymmetry. *Journal of neurophysiology*, 124(1):32–39, 2020.

[19] Hyosub E Kim, Darius E Parvin, and Richard B Ivry. The influence of task outcome on implicit motor learning. *Elife*, 8:e39882, 2019.

[20] Jonathan S Tsay, Guy Avraham, Hyosub E Kim, DE Parvin, Z Wang, and Rich B Ivry. The effect of visual uncertainty on implicit sensorimotor adaptation. *Advances in Motor Learning and Motor Control (MLMC)*, 2019.

[21] Charalambos C Charalambous, Carolina C Alcantara, Margaret A French, Xin Li, Kathleen S Matt, Hyosub E Kim, Susanne M Morton, and Darcy S Reisman. A single exercise bout and locomotor learning after stroke: physiological, behavioural, and computational outcomes. *The Journal of physiology*, 596(10):1999–2016, 2018.

[22] Hyosub E Kim, J Ryan Morehead, Darius E Parvin, Reza Moazzezi, and Richard B Ivry. Invariant errors reveal limitations in motor correction rather than constraints on error sensitivity. *Communications Biology*, 1(1):19, 2018.

[23] Kristan A Leech, Hyosub E Kim, and T George Hornby. Strategies to augment volitional and reflex function may improve locomotor capacity following incomplete spinal cord injury. *Journal of neurophysiology*, 119(3):894–903, 2018.

[24] Hyosub E Kim, Darius E Parvin, Matthew A Hernandez, and Richard B Ivry. Implicit rewards modulate sensorimotor adaptation. *Advances in Motor Learning and Motor Control (MLMC)*, 2017.

[25] Hyosub E Kim, Christopher K Thompson, and T George Hornby. Muscle activation varies with contraction mode in human spinal cord injury. *Muscle & nerve*, 51(2):235–245, 2015.

[26] Hyosub E. Kim, Daniel M. Corcos, and T. George Hornby. Increased spinal reflex excitability is associated with enhanced central activation during voluntary lengthening contractions in human spinal cord injury. *Journal of Neurophysiology*, 2015.

[27] Andrew C. Smith, Todd B. Parrish, Mark A. Hoggarth, Jacob G. McPherson, Vicki M. Tysseling, Marie Wasielewski, Hyosub E. Kim, T. George Hornby, and James M. Elliott. Potential associations between chronic whiplash and incomplete spinal cord injury. *Spinal Cord Series and Cases*, 2015.

[28] Hyosub Kim, Segun Sulaimon, Sandra Menezes, Anne Son, and Warren JC Menezes. A comparative study of successful central nervous system drugs using molecular modeling. *Journal of Chemical Education*, 88(10):1389–1393, 2011.

Preprints

[29] Hyosub E Kim. Bayes-toolbox: a python package for bayesian statistics. PsyArXiv, 2023.

SOFTWARE

[1] bayes-toolbox: a Bayesian statistics package written in Python (link)

HONORS AND AWARDS

2021	Best Abstract in Basic Science category, APTA Combined Sections Meeting
2014	Promotion of Doctoral Studies (PODS) II Scholarship, Mary Lou Barnes Award for best application within Neurology, Foundation for Physical Therapy
2013	Promotion of Doctoral Studies (PODS) I Scholarship, Patricia Leahy Award for best application within Neurology, Foundation for Physical Therapy
2013	Baskin Award for Excellence in Research, Shirley Ryan AbilityLab (formerly Rehabilitation Institute of Chicago)
2012	Florence P. Kendall Doctoral Scholarship, Foundation for Physical Therapy
2012	Graduation Prize for Best Research Report, University of Illinois at Chicago

INVITED TALKS

2023	*The Bayesian Statistics Toolbox: Building a robust, replicable Bayesian workflow for the behavioral and neural sciences*, PyMCon (recording link)
2021	*An introduction to Bayesian decision models*, Cognitive Psychology Seminar, University of Delaware
2020	*How computational modeling can advance neurorehabilitation: Insights from studies of individuals with chronic stroke*, APTA Combined Sections Meeting
2019	*Systems interactions in sensorimotor learning*, Ohio Musculoskeletal and Neurological Institute, Ohio University
2019	*Behavioral and computational features of implicit motor learning*, Department of Mathematical Sciences, University of Delaware
2019	*Behavioral and computational features of implicit motor adaptation*, Department of Psychological & Brain Sciences, University of Delaware
2017	*Implicit rewards modulate sensorimotor adaptation*, Advances in Motor Learning and Motor Control (MLMC)
2015	*Modulation of soleus H-reflexes during dynamic contractions in individuals with incomplete spinal cord injury*, APTA Combined Sections Meeting

SELECTED ABSTRACTS

[1] Jonathan Martin Wood, Hyosub E Kim, and Susanne M Morton. Reinforcement learning drives performance changes during locomotion but does not impact implicit motor memory. In *APTA Combined Sections Meeting (CSM)*, 2023.

[2] Gregg Eschelmuller, Braelyn Gandossi, J Timothy Inglis, Richard B Ivry, Hyosub Kim, and Romeo Chua. Discrimination of visual-proprioceptive trajectories during passive movements with muscle vibration. In *Exercise, Movement, and Sport (SCAPPS)*, 2022.

[3] Annika Szarka, Braelyn Gandossi, Gregg Eschelmuller, J Timothy Inglis, Richard B Ivry, Hyosub Kim, and Romeo Chua. Influence of muscle vibration on implicit sensorimotor adaptation. In *Exercise, Movement, and Sport (SCAPPS)*, 2022.

[4] Jonathan S Tsay, Hyosub E Kim, Jordan A Taylor, Samuel D McDougle, Adrian M Haith, John W Krakauer, Richard B Ivry, and Collins Anne GE. Updates of explicit re-aiming to a visuomotor rotation occur via reinforcement learning. In *Society for the Neural Control of Movement*, 2022.

[5] Soumya Bhat, Kaneel Senevirathne, Anat Mirelman, and Hyosub E Kim. Classification of parkinson's disease status using machine learning and gait data. In *APTA Combined Sections Meeting (CSM)*, 2021.

[6] Emily Russell, Allison Miller, Darcy S Reisman, Hyosub E Kim, and Vu Dinh. A machine learning approach to predict stepping activity levels in individuals with chronic stroke. In *American Society of NeuroRehabilitation (ASNR)*, 2021.

[7] Jonathan S Tsay, Hyosub E Kim, and Richard B Ivry. A unified model of the sensory constraints on implicit adaptation. In *Society for the Neural Control of Movement*, 2021.

[8] Jonathan M Wood, Hyosub E Kim, and Susanne M Morton. A method to test lower limb position sense using a split belt treadmill. In *Society for Neuroscience*, 2021.

[9] Jonathan M Wood, Susanne M Morton, and Hyosub E Kim. Movement variability constrains locomotor use-dependent learning. In *Society for the Neural Control of Movement*, 2021.

[10] Stephanie Renee Albin, Andrew Craig Smith, Marie Wasielewski, Jacob G McPherson, Hyosub E Kim, Mark Andrew Hoggarth, Thomas George Hornby, and James Matthew Elliott. Incidence of reductions in leg muscle activation in severe whiplash associated disorders. In *APTA Combined Sections Meeting (CSM)*, 2020.

[11] Hyosub E Kim and Darcy Schwartz Reisman. How computational modeling can advance neurorehabilitation: insights from studies of individuals with chronic stroke. In *APTA Combined Sections Meeting (CSM)*, 2020.

[12] Jonathan Martin Wood, Hyosub E Kim, Darcy Schwartz Reisman, and Susanne M Morton. The contribution of use-dependent plasticity to locomotor learning. In *APTA Combined Sections Meeting (CSM)*, 2020.

[13] Guy Avraham, Darius E Parvin, Hyosub E Kim, J Ryan Morehead, and Richard B Ivry. Desensitization upon relearning for implicit sensorimotor adaptation. In *Society for Neuroscience*, 2019.

[14] Jonathan S Tsay, Darius E Parvin, Guy Avraham, Hyosub E Kim, Zixuan Wang, and Richard B Ivry. Perceptual uncertainty attenuates implicit motor adaptation. In *Cognitive Neuroscience Society*, 2019.

[15] Hyosub E Kim, Darius E Parvin, and Richard B Ivry. Use-dependent biases due to movement repetition are small and unaffected by rewards. In *Society for the Neural Control of Movement*, 2018.

[16] J Ryan Morehead, Hyosub E Kim, Darius E Parvin, Richard B Ivry, and Maurice A Smith. Searching for sensitization to visuomotor errors with task-irrelevant clamped feedback. In *Society for Neuroscience*, 2018.

[17] Benjamin Parrell, Hyosub E Kim, Assaf Breska, and Richard B Ivry. Dissociable effects of cerebellar degeneration on adaptation and online correction across motor domains. In *Society for Neuroscience*, 2018.

[18] Hyosub E Kim, Darius E Parvin, and Richard B Ivry. Target size effects on sensorimotor adaptation. In *Society for Neuroscience*, 2017.

[19] Hyosub E Kim, Darius E Parvin, and Richard B Ivry. Target size modulates motor adaptation from sensory prediction errors. In *Society for the Neural Control of Movement*, 2017.

[20] Hyosub E Kim, J Ryan Morehead, Matthew J Boggess, Wendy Shwe, Tanner C Dixon, Darius E Parvin, and Richard B Ivry. Sensorimotor adaptation during small visual error clamps: error size-dependent effects on rate but not magnitude. In *Society for Neuroscience*, 2016.

TEACHING

2020 - 2023	Instructor, Clinical Neuroscience, University of Delaware
2019	Instructor, Seminar on Sensorimotor Learning, University of Delaware
2010 - 2014	Teaching Assistant, Systems Physiology and Plasticity, University of Illinois at Chicago
2013	Guest Lecturer, Biophysics, University of Illinois at Chicago
2008 - 2009	Classroom Assistant and Tutor, Math and Statistics, City Colleges of Chicago

MENTORING

Research Advisor

2019 - 2023	Jonathan Wood (primary advisor: Susanne Morton), PhD student in Biomechanics and Movement Science, University of Delaware
2018 - 2023	Jonathan Tsay (primary advisor: Rich Ivry), PhD student in Cognitive Neuroscience, University of California, Berkeley
2020 - 2023	Joie Tang, Undergraduate and Post-Bacc student, University of Delaware
2022	John Buggeln, PhD student in Biomechanics and Movement Science, University of Delaware
2021 - 2022	Nicholas Sekulski, Undergraduate student, University of Delaware
2020 - 2022	Heran Yosef, Undergraduate and Post-Bacc student, University of Delaware
2021	Suzannah Hoguet, Undergraduate student, University of Delaware
2020 - 2021	Kaneel Senevirathne, Master's student in Biomedical Engineering, University of Delaware
2020	Megan Phillips, Visiting undergraduate student, University of Delaware
2020	Zane Fechter, Visiting undergraduate student, University of Delaware
2019	Sospeter Nyabuti, Undergraduate student, University of Delaware
2018 - 2019	Xin Li, Postdoctoral Fellow, University of Delaware
2018 - 2019	Chanel Smith, Undergraduate student, University of Delaware
2016 - 2018	Matthew Hernandez, Undergraduate student, University of California, Berkeley
2015 - 2016	Wendy Shwe, Undergraduate student, University of California, Berkeley

Dissertation Committee

2019 - 2024	Duncan Tulimieri, Biomechanics and Movement Science, University of Delaware
2019 - 2023	Jonathan Wood, Biomechanics and Movement Science, University of Delaware
2021 - 2022	Riwa Safa, Cognitive Psychology, University of Delaware

Senior Thesis

2020	Joie Tang, University of Delaware
2019	Arohi Saxena, University of California, Berkeley

SERVICE

Professional Service

2020 - present	Programming Committee Member, Advances in Motor Learning and Motor Control (MLMC)
2021	Content Reviewer (Probability and Statistics pre-course and Bayesian Statistics lessons), Neuromatch Academy (NMA)
2020	Teaching Assistant, Neuromatch Academy (NMA)

Ad hoc Reviewer: *eLife, Journal of Cognitive Neuroscience, PLOS Computational Biology, eNeuro, European Journal of Neuroscience, Journal of Neurophysiology, Neuropsychologia, PLOS One, Attention, Perception, & Psychophysics, Scientific Reports, Neurorehabilitation & Neural Repair, Motor Control*

University Service

2023	Faculty search committee, Department of Physical Therapy
2019 - 2023	Coordinator, Biomechanics and Movement Science (BIOMS) Seminar
2021 - 2022	Executive Committee member, Interdepartmental Neuroscience Graduate (ING) Program
2018 - 2022	Admissions review, Department of Physical Therapy
2021	Diversity, Equity & Inclusion (DEI) Writing Group
2020 - 2021	Neurologic PT Curriculum Committee member
2019 - 2021	BIOMS Curriculum Committee member

OUTREACH

2020	Undergraduate Summer Research Program, University of Delaware
2019	NSF Research Experiences for Undergraduates (REU): Summer Workshop in Cognitive and Brain Sciences, University of Delaware
2019	Advancing Diversity in Physical Therapy (ADaPT), University of Delaware
2017	NSF Research Experiences for Undergraduates (REU), UC Berkeley
2016	NIH R25: Bridges to the Baccalaureate Program, UC Berkeley

PROFESSIONAL SOCIETIES

Society for Neuroscience
Society for the Neural Control of Movement
American Physical Therapy Association