Exponent®
Engineering & Scientific Consulting


# Sunwoo Kwon, Ph.D.

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## Professional Profile

Dr. Kwon has extensive knowledge and experience in human perception, vision, cognition, attention, visually guided behaviors, eye movements, clinical vision and visual impairments, decision making, and object recognition. He applies these experiences and expertise to investigate human factors in a wide range of scenarios such as automobile, motorcycle, bicycle, and truck accidents including those that involve pedestrians. Additionally, Dr. Kwon has investigated accidents in industrial and occupational settings as well as trip-and-fall incidents.

Dr. Kwon has investigated the scopes of human visual perception, visually-guided behaviors, and performance using both psychophysical methods as well as state-of-the-art eye tracking, optical imaging, and virtual reality to further understand how active vision, such as eye movements, process visual information in surrounding environments to understand human perception and motor responses across both clinical and neurotypical populations.

Prior to joining Exponent, Dr. Kwon received his Ph.D. and M.A. in Brain and Cognitive Sciences at University of Rochester, NY, and continued his research as a postdoctoral fellow at the Center of Innovation in Vision and Optics and Herbert Wertheim School of Optometry & Vision Science, UC Berkeley, CA. Dr. Kwon continues to collaborate as a research mentor and an advisor at the School of Optometry, UC Berkeley and as a collaborator at the Center for Brains, Minds, and Machines, MIT.

Dr. Kwon's doctoral dissertation addressed how eye movements and attention interact to provide predictions for visually guided behaviors across visual space in both patients and neurotypical populations. His postdoctoral work extended the research to investigate how abnormal eye movements (both involuntary and voluntary) in patients limit visual perception and motor action.

## Academic Credentials & Professional Honors

Ph.D., Brain and Cognitive Sciences, University of Rochester, 2020

M.A., Brain and Cognitive Sciences, University of Rochester, 2019

M.S., Biology, University of California, San Diego, 2015

B.S., Cell Biology and Biochemistry, University of California, San Diego, 2012

Center for Innovation in Vision & Optics (CIVO) Research Fellowship, UC Berkeley

Center for Brains, Minds, and Machines Research Fellowship (CBMM, MIT, Harvard & Marine Biological Laboratory)

 

Computational Sensory-Motor Neuroscience Research Fellowship (CoSMo/NeuroMatch, University of Minnesota)

## Professional Affiliations

Human Factors and Ergonomics Society (HFES), Member

Vision Science Society (VSS), Member

Optical Society of America (OPTICA), Member

## Languages

Korean

English

## Publications

Kwon, S., Fahrenthold, B. K., Cavanaugh, M. R., Huxlin, K. R., & Mitchell, J. F. (2022). Perceptual restoration fails to recover unconscious processing for smooth eye movements after occipital stroke. eLife, 11, e67573.

Gepshtein, S., Pawar, A., Kwon, S., Savel'ev, S., and Albright, T.D. (2022). Spatially distributed computation in cortical circuits. Science Advances, 8(16), eabl5865.

Kwon, S. (2020). Understanding how pre-saccadic attention influences predictive oculomotor behavior and the underlying neural circuitry. University of Rochester, NY (PhD Dissertation).

Kwon, S., Rolfs, M., Mitchell, J (2019). Pre-saccadic motion integration drives a predictive post-saccadic following response. Journal of Vision, 19(11): 12, 1-19.

**Presentations**

Gomes-Tomaz, A., Kwon, S., Levi, D., Harmening, WM., and Sayim, B. (2023). Impact of crowding on visual appearance in amblyopia. European Conference on Visual Perception (ECVP), Paphos, Cyprus.

Kwon, S. & Levi, D. (2023). Fixational instability impedes visually-guided behaviors in patients with amblyopia. Vision Science Society (VSS), St. Petersburg, FL.

Kwon, S. & Levi, D. (2022). Fixational instability affects visually-guided behaviors. Center for Innovations in Vision & Optics, Herbert Wertheim School of Optometry & Vision Science Berkeley, CA

Kwon, S. (2022). Dissociation between perception and action: V1 is necessary for predictive eye movements. Harvard Medical School & Blavatnik Institute, Boston, MA

Chan, S., Levi, D., Kwon, S. (2022). Behind the scenes: what are you doing when looking for Waldo. American Academy of Optometry (AAOPT), San Diego, CA.

Kwon, S., Levi, D. (2022). Impact of fixational eye movements on complex visual search task in amblyopia. Annual Vision Science Meeting, Lake Tahoe, CA

Kwon, S. (2022). Dissociation between perception and action: impact of occipital stroke on predictive eye movements. Bay Area Vision Research Day (BAVRD), San Francisco, CA.

Belen, J., Kwon, S. (2022). Beyond V1: Interocular difference in visual search. Herbert Wertheim School of Optometry & Vision Science, Berkeley, CA

Kwon, S. (2022). Dissociation between perception and action: unilateral V1-stroke and its impact on predictive eye movements. Department of Neurology, Johns Hopkins University, School of Medicine, MD.

Kwon, S., Mitchell, J., Huxlin, K (2020). V1 is necessary for predictive oculomotor behavior. Department of Psychology, Humboldt University, Berlin, Germany.

Kwon, S., Mitchell, J., Huxlin, K (2019). V1 is necessary for predictive “ocular following”. Department of Psychology, New York University, NY.

Kwon, S., Mitchell, J., Huxlin, K (2019). Dissociation between perception and predictive oculomotor behavior in retrained cortically blind fields. Optical Society of America (OSA/OPTICA) Fall Vision Meeting (FVM), Washington D.C.

Kwon, S., Kryven, M., Tenenbaum, J (2019). Eye movements reflect social inference. Center for Brains, Minds, and Machines (CBMM) & MIT, Woods Hole, MA.

Kwon, S., Mitchell, J. & Huxlin, K. (2019). Dissociation between perception and predictive oculomotor behavior in retrained cortically blind fields. Vision Science Society (VSS), St. Petersburg, FL.

Kwon, S., Rolfs, M., & Mitchell, J. (2019). Pre-saccadic attention to motion initiates predictive ocular following. Vision Science Society (VSS), St. Petersburg, FL.

Kwon, S., Rolfs, M., & Mitchell, J. (2018). Pre-saccadic motion integration drives pursuit for saccades to motion apertures. Vision Science Society (VSS), St. Petersburg, FL.

Kwon, S., Albright, T.D., & Gepshtein, S. (2017). Invariant tuning of lateral interactions between visual stimuli. Vision Science Society (VSS), St. Petersburg, FL.

Kwon, S., Albright, T.D., and Gepshtein, S. (2014). Invariants of center-surround interactions. Vision Science Society (VSS), St. Petersburg, FL.

## Peer Reviews

Journal of Vision

Vision Research

BMC Ophthalmology

Investigative Ophthalmology & Visual Science

Journal of the Neurological Sciences