Exponent®
Engineering & Scientific Consulting

Sunwoo Kwon, Ph.D.

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Professional Profile

Dr. Kwon has expertise in human vision, perception, and cognitive processes with extensive experience analyzing how environmental and perceptual factors influence visual perception, decision-making and visually guided behavior. He applies this expertise to evaluate how vision, perception, attention, memory, and cognition contribute to a wide range of scenarios, including automotive, industrial, occupational, and residential incidents; warning compliance; product liability; and human factors issues related to trip-and-fall and slip-and-fall events under varying lighting conditions.

Dr. Kwon's expertise also focuses on driver perception and behavior in motor vehicle accidents, encompassing incidents involving motorcycles, bicycles, micromobility devices, trucks, and pedestrians. His analytical approach combines psychophysical methods with state-of-the-art technologies—such as eye-tracking, optical imaging, computational modeling, and virtual/augmented reality (including head-mounted displays)—to assess how individuals perceive and respond to complex visual environments, including patterns of gaze and visual attention during navigation. He leverages these insights to analyze how visibility, conspicuity, attention, and driver or pedestrian behavior contributes to accidents across a range of transportation scenarios.

Prior to joining Exponent, Dr. Kwon served as a Postdoctoral Research Fellow at the Herbert Wertheim School of Optometry and Vision Science at the University of California, Berkeley. He earned his Ph.D. in Brain and Cognitive Sciences from the University of Rochester, where his research focused on vision science, specifically the study of eye movements, perception, information processing, decision-making, and attention across complex visual environments in both individuals with corrected-to-normal vision and those with visual impairments. Since 2010, Dr. Kwon has devoted his research to advancing the scientific understanding of human vision and perception, with an emphasis on how these processes shape behavior and decision-making in real-world contexts.

Dr. Kwon continues to collaborate with and mentor researchers at the Herbert Wertheim School of Optometry and Vision Science at the University of California, Berkeley, where he serves as a Research Advisor and Scientist. His current work investigates how visual quality and visual acuity affect eye movements, perception, gaze behavior, decision-making, and motor response.

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)

Licenses and Certifications

Certified English XL Tribometrist (CXLT)

Academic Appointments

Research Advisor & Scientist, Herbert Wertheim School of Optometry & Vision Science, UC Berkeley, California, 2023-Present

Professional Affiliations

Human Factors and Ergonomics Society (HFES)

Vision Sciences Society (VSS)

Society for Automotive Engineers (SAE)

Optical Society of America (OPTICA)

American Academy of Optometry (AAOPT)

Society for Neuroscience (SfN)

Korean American Bar Association (KABA)

Languages

Korean

English

Publications

Kwon, S., Belen, J.C., Yeritsyan, A., and Levi, D. M. (2026). "Reduced visual acuity disrupts fixational stability but fails to fully capture amblyopic eye movements," Optometry & Vision Science, American Academy of Optometry, 103(2), e70047: 1-16. DOI: 10.1002/ovs2.70047

Krauss, D., **Kwon, S.**, Tavassoli, A., and Olson, P. (2026). Driver eye movements and visual attention (5th Ed., pp. 49-64). Lawyers and Judges Publishing Company, Inc.

Krauss D., King D., **Kwon, S.**, Dewar, R., and Olson, P. (2026). Driver experience and age (5th Ed., pp. 197-214). Lawyers and Judges Publishing Company, Inc.

Keller, N., Bui, Y., **Kwon, S.**, Byrne, K., Zimmermann, J., and Krauss, D. (2026). Micromobility (5th Ed., pp. 187-196). Lawyers and Judges Publishing Company, Inc.

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.

Kwon, S., Gepshtein, S., Albright, T.D. (2015). Psychophysical mapping of spatial interactions between visual stimuli. University of California, San Diego (UCSD), CA (MS Dissertation).

Presentations

Kwon, S., Yeritsyan, A., and Levi, D. M. (2026). Large language model performance in ophthalmic patient education: Amblyopia and age-related macular degeneration. Vision Sciences Society (VSS), St. Petersburg, FL.

Yeritsyan, A., **Kwon, S.**, and Levi, D. M. (2026). AI chatbots outperform AAO brochures on AMD questions. The Association for Research in Vision and Ophthalmology (ARVO), Denver, CO.

Kwon, S. (2026). Navigating the unknown: visual search, peripheral vision, and attentional limits in space exploration environments. American Society of Civil Engineers (ASCE) 20th International Conference on Earth & Space, College Station, TX.

Kwon, S., Belen, J., Lien, J., Yeritsyan, A., Do, N., and Levi, D. M. (2024). Reduced visual acuity due to defocus cannot fully account for the abnormal fixational eye movements of persons with amblyopia. Vision Sciences Society (VSS), St. Petersburg, Florida.

Yeritsyan, A., Belen, J., Levi, D. M., and **Kwon, S.** (2024). Reduction in visual acuity due to retinal defocus contributes to fixational instability. Bay Area Vision Research Day (BAVRD) 36th Symposium, UC Berkeley, Berkeley, CA.

Chung, STL, **Kwon, S.**, Levi, D.M. (2024). Fine spatial vision is optimally adapted to the abnormal fixational eye movements of people with amblyopia. Vision Sciences Society (VSS), St. Petersburg, Florida.

Gomes-Tomaz, A., **Kwon, S.**, Levi, D. M., Harmening, W. M., & Sayim, B. (2024). Crowding and visual appearance in amblyopia. Vision Sciences Society (VSS), St. Petersburg, Florida.

Belen, J., Lien, J., Levi, D., **Kwon, S.** (2023). Impact of reduced visual acuity on oculomotor behavior. Bay Area Vision Research Day (BAVRD) 35th Symposium, UC Berkeley, Berkeley, CA.

Lien, J., Levi, D., **Kwon, S.** (2023). Effect of reduced visual acuity on fixational eye movements. Vision Science Summer Undergraduate Research (ViSUR) & Inclusive Excellence Program, UC Berkeley, Berkeley, CA.

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., Liu, T., Yang, F. (2018). Frequency effects in face gender adaptation using deep convolutional network model. Computational Sensory-Motor Neuroscience (CoSMo), University of Minnesota, Minneapolis, MN.

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.

Additional Education & Training

Postdoctoral research fellowship in Optometry and Vision Science, Herbert Wertheim School of Optometry and Vision Science, UC Berkeley, CA, 2023.

Editorships & Editorial Review Boards

PLOS Computational Biology, Editor, 2024-2025

Peer Reviews

Journal of Vision

Vision Research

BMC Ophthalmology

Investigative Ophthalmology & Visual Science

Journal of the Neurological Sciences

Frontiers in Psychology & Perception Science

PLOS Computational Biology

Human Factors and Ergonomics Society (HFES)