

Jae-Hyun Jung, PHD FAAO

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PROFESSIONAL EXPERIENCE

SCHEPENS EYE RESEARCH INSTITUTE, HARVARD UNIVERSITY, BOSTON, MA

ASSISTANT PROFESSOR, 2021 - Present

- Lead visual perception projects with multi-disciplinary backgrounds (Vision Science, Computer Science, Optics, Optometry) as PI of [Junglab](#). Secured [NIH R01 \\$2M 4yr grant](#) as PI, Co-I of [NIH R01 \\$5M 5yr grant](#)
- Conducted research on the visibility limitation in current monocular/binocular see-through HMDs due to visual bistability (rivalry) with mobility characteristics (retinal eccentricity, background depth, and eye movements). Simulated different see-through displays on Unity and Meta Quest 2 & Vive Eye Pro HMDs ([Han 2023^{*DAE}](#))
- Developed pedestrian perception model (field of view, head rotation, space management, walking speed, and locomotion) in collision detection and avoidance with multiple VR pedestrians using HMD (Meta Quest Pro & Unity). Evaluated field of view through HMD and calibrated real and virtual worlds using AR. ([Hwang 2023^{*DPAE}](#)). Analyzing walking behaviors and buiding a collision prediction model (time-to-collision) on Matlab.
- Developed a visual perception model with blind field using multi-layer freq. analysis ([Peli 2023^{*DPA}](#))
- Developed optical vision assistive device (field expansion) for field loss patients' mobility ([Falahati 2023^{*DPAE}](#))
- Developed photographic depiction of visual perception through vision assistive devices ([Jung 2021^{*DPAE}](#))
- Consultant: Samsung (Eye movement in UX, 2021), [LetinAR](#) (Image quality in AR display, 2020-2021)

INSTRUCTOR (Tenure-track Faculty), 2015 – 2021

- DoD Vision Research \$3M 5yr grant and 3 small grants (\$30k each) as PI. Co-I of [NIH R01 \\$5M 5yr grant](#)
- AR vision assistive device development: developed new optical see-through element ([Peli 2017^{*DPAE}](#)), field expansion device ([Jung 2018^{*DPAE}](#)), and evaluated them in VR walking simulator ([Jung 2020^{*DPAE}](#))
- Developed wide field expansion device for field loss patients using 3D-printing ([Peli 2020^{*DPAE}](#))
- Image processing to improve object recognition with visual prostheses: Developed light-field imaging ([Jung 2015^{*DPAE}](#)), bipolar edge filtering based on human visual perception model ([Jung 2016^{*DPAE}](#)), motion parallax with gaze locking ([Qiu 2018^{*DPA}](#)) to remove/suppress background clutter in object recognition. Demonstrated the improvements in object recognition studies with human subjects. Three [US patents](#) granted.
- Developed computation model of temporal visual perception of retinal stimulation ([Avraham 2021^{*DPA}](#))

POSTDOC FELLOW (Prof. Eli Peli) 2012 – 2015

- Research Fellowship Award, National Research Foundation of Korea (\$30k)
- Developed real-time image processing and VR display methods ([Jung 2013^{*DPAE}](#)) for light-field displays ([Kim 2013^{*DA}](#)) and microscopy ([Kim 2014^{*DA}](#))
- Trained in vision science and optometry/ophthalmology (Schepens) and computational photography (MIT)

EDUCATION

PhD in Electrical Engineering and Computer Science, Seoul National University, South Korea (2012)

- Light-field imaging and 3D displays. Human factors in visual perception of 3D displays (Prof. ByoungHo Lee)

BS (*Magna cum Laude*) in Electrical Engineering, Pusan National University, South Korea (2007)

SELECTED HONORS AND PRIZES

Fellow of the American Academy of Optometry (2019)

Alice Adler Award in Faculty Development, Harvard Medical School (2017)

Promobilia Research Award (2015), Merck Young Scientist Award (2009)

TECHNICAL SKILLS

MATLAB, Pyschoolbox, Python, LightTools, Zemax, SPSS, C++, OpenCV, Meta Quest 2, Vive Eye Pro, Rhinoceros 3D, Keyshot, Unity, WordPress, MS Office

*Contribution: Design (D), Programming/Implementation (P), Analysis (A), Experiment (E)