
PERSONAL DATA

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EDUCATION

M.S. - Ph.D.	Electrical and Computer Engineering Seoul National University, Seoul, Republic of Korea Advisor: Byoungcho Lee (deceased), Yoonchan Jeong Thesis: Perceptual studies on holographic near-eye displays	2017.3 – 2023. 8
B.S.	Electrical and Computer Engineering Seoul National University, Seoul, Republic of Korea	2012. 3 – 2017. 2

WORK EXPERIENCE

Research Associate	University of Cambridge, Cambridge, UK - Advisor: Prof. Rafal Mantiuk, Graphics & Displays	2024. 3 – present
Postdoctoral Researcher	Seoul National University, Seoul, South Korea - Advisor: Prof. Yoonchan Jeong, OEQELAB	2023. 9 – 2024. 2
Research Collaborator	Meta, Seoul, South Korea - Manager: Wai Sze Tiffany Lam, Optics & Display Research	2023. 6 – 2023. 8
Research Scientist Intern	Meta Reality Labs, Redmond, WA, USA - Manager: Ying 'Melissa' Geng, Optics & Display Research	2022. 8 – 2023. 1

RESEARCH INTERESTS

- Computational Optics and Displays
 - Vision Science and Applied Perception
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RESEARCH EXPERIENCE**Holographic displays**

- Optical aberration and vision correction with holographic display
- Speckle-reduced holographic displays with an engineered light source / partially coherent light sources / temporal multiplexing technique
- High-quality computer-generated hologram optimization for a limited bit-depth, phase/amplitude-only spatial light modulator
- 2D/3D/4D computer-generated hologram optimization (RGB/RGB-depth map/Light field)
- Acceleration of computer-generated hologram rendering speed with parallel computation

Light field displays

- Compressive light field displays with additive/attenuation-based layers
- Super multi-view displays with directional backlight

Computational imaging

- Pick up of elemental images using light field camera
- Holographic microscopy

Vision science and Applied perception

- User experiment design, conduct, and analysis:
 - Optometry-based experiments (accommodation response, eye tracking, eye aberration measurement)
 - Psychophysics experiments (detection & discrimination task with QUEST)
 - Subjective quality evaluation experiments (pairwise comparison)
 - Interaction-based experiments (feature matching tasks)
 - Questionnaire-based experiments (motion sickness measurement)
- Image processing based on human visual characteristics (binocular vision, contrast sensitivity) and optical characteristics of the human eye (abnormal curvature, apodization, aberration)
- Perceptual quality evaluation metrics and perceptual loss function for 3D/4D/AR displays

SKILLS

- **Programming languages & tools:**
 - Programming: MATLAB, Python, PyTorch
 - Optical design: ZEMAX
 - Hardware control: Labview, Arduino
 - Rendering acceleration: CUDA
 - Graphics rendering: Unity C#, Blender
 - Prototype design: Autodesk Fusion 360
 - Vision science experiment: Psychtoolbox
 - Statistics: Scipy
 - Collaborative tools: git
- **Experiment experiences:**
 - **Computational displays:**
holographic display (phase modulators, digital micromirror devices)
light field (multi-layer, multi-view) display, High dynamic-range display (LCD stacks)
benchtop display implementation, AR/VR HMD prototyping
multi-device analog synchronization (display - light source - scanning device)
laser/LED-based experiments
2D/3D geometry, display photometry, colorimetry calibration
 - **Computational imaging:** digital holography, adaptive optics
 - **Subjective/objective study:** pairwise comparison, optometric measurement (eye-tracker, power refractor, aberrometer), psychophysics (QUEST)
- **Language:**
Korean (Native) / English (Fluent)

HONOR AND AWARDS

1. SIGGRAPH Asia 2024 Best Paper Award (Honorable Mention) (~5% among the acceptances)
2. Sejong Science Fellowship (overseas track) 2024 (National Research Foundation of Korea grant funded by Korean government) (~\$50,000)
3. Samsung Display Technical Paper Awards (Silver Prize, 2023)
4. Conference on Optoelectronics and Optical Communications (COOC) 2023 Best Paper Awards

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5. International Meeting on Information Display (IMID) 2019 Best Poster Paper Awards
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SELECTED PUBLICATIONS

(†: joint co-author, *: corresponding author)

1. A. Chapiro, **D. Kim***, Y. Asano, and R. Mantiuk. "AR-DAVID: Augmented Reality Display Artifact Video Dataset" ACM Transactions on Graphics (**SIGGRAPH Asia 2024**), vol. 43, no. 6, article 186, 2024. (**Best Paper Award (Honorable Mention)**)
 2. **D. Kim†**, S.-W. Nam†, S. Choi†, J.-M. Seo, G. Wetzstein, and Y. Jeong. "Holographic Parallax Improves 3D Perceptual Realism" ACM Transactions on Graphics (**SIGGRAPH 2024**), vol. 43, no. 4, article 68, 2024.
 3. **D. Kim**, K. Bang, S. Lee, C. Jang, G. Li, and W.-T. Lam. "Full-color time-sequential super multi-view near-eye display with front-lit waveguide illumination", Optics Express, vol. 32, no. 14, pp. 23975-23988, 2024.
 4. S.-W. Nam†, Y. Kim†, **D. Kim**, and Y. Jeong "Depolarized Holography with Polarization-multiplexing Metasurface" ACM Transactions on Graphics (**SIGGRAPH Asia 2023**), vol. 42, no. 6, article 202, 2023.
 5. **D. Kim†**, S.-W. Nam†, B. Lee, J.-M. Seo, and B. Lee, "Accommodative holography: improving accommodation response for perceptually realistic holographic displays," ACM Transactions on Graphics (**SIGGRAPH 2022**), vol. 41, no. 4, article 111, 2022.
 6. B. Lee, **D. Kim**, C. Chen, S. Lee, and B. Lee, "High-contrast, speckle-free, true 3D holography via binary CGH optimization," Scientific Reports, vol. 12, article 2811, 2022.
 7. **D. Kim†**, S.-W. Nam†, K. Bang, B. Lee, S. Lee, Y. Jeong, J.-M. Seo, and B. Lee, "Vision-correcting holographic display: evaluation of aberration correcting hologram," Biomedical Optics Express, vol. 12, no. 8, pp. 5179-5195, 2021.
 8. S. Lee†, **D. Kim†**, S.-W. Nam, B. Lee, J. Cho, and B. Lee, "Light source optimization for partially coherent holographic displays with consideration of speckle contrast, resolution, and depth of field," Scientific Reports, vol. 10, article 18832, 2020.
 9. **D. Kim**, S. Lee, S. Moon, J. Cho, Y. Jo, and B. Lee, "Hybrid multi-layer displays providing accommodation cues," Optics Express, vol. 26, no. 13, pp. 17170-17184, 2018.
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TALKS**(10)**

1. Towards passing the Visual Turing Test with holographic displays, High-beam Seminar (virtual), University College London, UK, hosted by Prof. Kaan Aksit (2024. 10)
2. Enhancing perceptual realism in holographic displays, Samsung Research, Seoul, Korea (2024. 8)
3. Perceptual evaluation of holographic near-eye displays, Meta Reality Labs, Sunnyvale, USA (2024. 7)
4. Improving perceptual quality in holographic displays, Group Seminar, University of Cambridge, UK hosted by Prof. Daping Chu (2024. 6)

5. Improving perceptual quality in holographic displays, Rainbow Lab Seminar, University of Cambridge, UK hosted by Prof. Rafal Mantiuk (2024. 3)
 6. Improving perceptual quality in holographic displays, Holography advanced technology workshop, Seoul, Korea (2023.11)
 7. Perceptual reality through holographic near-eye displays, Electronics and Telecommunications Research Institute (ETRI), Daejeon, Korea (2023.9)
 8. Recent progress on holographic displays for AR/VR applications, Optics and Photonics Congress 2023, Jeju, Korea (2023.8)
 9. Perceptually realistic 2D, 3D holographic displays, IMID 2023, Busan, Korea (2023. 8)
 10. Perceptual reality through holographic near-eye displays, Optica Frontier in Optics: Virtual Reality and Augmented Vision, Rochester, NY, USA (2022. 10)
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PUBLIC DEMOS**(3)**

1. SIGGRAPH 2024 Emerging Technologies – Holographic Parallax [Kim et al., 2024, SIGGRAPH]
 2. CES 2020 – Tomographic near-eye displays [Lee et al., 2019, Nature Comm.]
 3. IMID 2019 – Tomographic near-eye displays [Lee et al., 2019, Nature Comm.]
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SERVICES

- Reviewer:
Journal
Nature publishing group: Nature Communications, Scientific Reports,
Optica (Formerly OSA): Optics Letters, Optics Express, Applied Optics, Biomedical Optics Express,
IEEE: IEEE Transactions on Image Processing,
ACM: ACM Transactions on Graphics
Conference - IEEE ISMAR (2023, 2024, 2025), Eurographics (2025), ACM SIGGRAPH (2025)
 - Member: ACM SIGGRAPH, SPIE, Optica, Optical Society of Korea
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