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## PERSONAL DATA

<b>Family Name</b>	Kim
<b>First Name</b>	Dongyeon
<b>Nationality</b>	Republic of Korea
<b>Office address</b>	15 JJ Thomson Avenue, Cambridge CB3 0FD, United Kingdom
<b>E-mail</b>	<a href="mailto:dk721@cam.ac.uk">dk721@cam.ac.uk</a> (work) / <a href="mailto:dongyeon.kim93@gmail.com">dongyeon.kim93@gmail.com</a> (personal)
<b>Url</b>	<a href="https://dongyeon93.github.io/">https://dongyeon93.github.io/</a>
<b>Google Scholar</b>	<a href="https://scholar.google.com/citations?user=EYqTPIQAAAAAJ&amp;hl=ko">https://scholar.google.com/citations?user=EYqTPIQAAAAAJ&amp;hl=ko</a>

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## EDUCATION

<b>M.S. - Ph.D.</b>	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>B.S.</b>	Electrical and Computer Engineering Seoul National University, Seoul, Republic of Korea Advisor: Byung Gook Park (deceased)	2012. 3 – 2017. 2

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## WORK EXPERIENCE

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

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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
- Optimization of high-quality computer-generated hologram for a limited bit-depth, phase/amplitude-only spatial light modulator
- Acceleration of computer-generated hologram rendering speed with parallel computation
- 3D/4D computer-generated hologram optimization (RGB-depth map, Light field)

### Light field displays

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

### Visual perception

- User study design, conduct, and analysis:  
vision-correcting near-eye display/accommodation response measurement with benchtop display / eye-tracker-assisted visually induced motion sickness measurement and questionnaire-based user experience evaluation in immersive VR viewing experience / pairwise

- comparison-based subjective image quality evaluation
- Image processing based on human visual characteristics (binocular vision, contrast sensitivity) and optical characteristics of the human eye (abnormal curvature, apodization, aberration)

**Computational 3D photography**

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

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**SKILLS**

- **Programming languages & tools:**  
MATLAB, Python, PyTorch, Scipy, Zemax, Labview, Arduino, C/C++/C#, CUDA, Blender, Unity, Autodesk Fusion 360, Psychtoolbox
- **Experiment experiences:**  
**Computational Display:** holographic display, light field (multi-layer, multi-view) display, benchtop display implementation, AR/VR HMD prototyping, multi-device synchronization, laser/LED-based experiments, display geometry/photometry calibration  
**Computational Imaging:** digital holography, adaptive optics  
**Subjective/objective study:** human visual perception experiments, optometric measurement (eye-tracker, power refractor)
- **Language:**  
Korean (Native) / English (Fluent)

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**HONOR AND AWARDS**

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

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- multiplexing Metasurface” ACM Transactions on Graphics (**SIGGRAPH Asia 2023**), vol. 42, no. 6, article 202, 2023.
5. **D. Kim**<sup>†</sup>, S.-W. Nam<sup>†</sup>, 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**<sup>†</sup>, S.-W. Nam<sup>†</sup>, 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<sup>†</sup>, **D. Kim**<sup>†</sup>, 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****(9)**

1. Enhancing perceptual realism in holographic displays, Samsung Research, Seoul, Korea (2024. 8)
  2. Perceptual evaluation of holographic near-eye displays, Meta Reality Labs, Sunnyvale, USA (2024. 7)
  3. Improving perceptual quality in holographic displays, Group Seminar, University of Cambridge, UK hosted by Prof. Daping Chu (2024. 6)
  4. Improving perceptual quality in holographic displays, Rainbow Lab Seminar, University of Cambridge, UK hosted by Prof. Rafal Mantiuk (2024. 3)
  5. Improving perceptual quality in holographic displays, Holography advanced technology workshop, Seoul, Korea (2023.11)
  6. Perceptual reality through holographic near-eye displays, Electronics and Telecommunications Research Institute (ETRI), Daejeon, Korea (2023.9)
  7. Recent progress on holographic displays for AR/VR applications, Optics and Photonics Congress 2023, Jeju, Korea (2023.8)
  8. Perceptually realistic 2D, 3D holographic displays, IMID 2023, Busan, Korea (2023. 8)
  9. 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 Communications, Scientific Reports, Optics Express, Applied Optics, Biomedical Optics Express, IEEE Transactions on Image Processing, ACM Transactions on Graphics  
Conference - IEEE ISMAR 2023, 2024
  - Member: ACM SIGGRAPH, Optica (Formerly OSA), SPIE, Optical Society of Korea
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## **REFERENCE**

### **Rafal Mantiuk**

Professor  
Department of Computer Science and Technology, University of Cambridge  
William Gates Building, 15 JJ Thomson Avenue, Cambridge CB3 0FD, United Kingdom  
E-mail) [rafal.mantiuk@cl.cam.ac.uk](mailto:rafal.mantiuk@cl.cam.ac.uk)

### **Yoonchan Jeong**

Professor  
School of Electrical Engineering, Seoul National University  
1 Gwanak-ro, Gwanak-gu, Seoul 151-744, Korea  
E-mail) [yoontan@snu.ac.kr](mailto:yoontan@snu.ac.kr)

### **Jong-Mo Seo**

Professor  
School of Electrical Engineering, Seoul National University  
1 Gwanak-ro, Gwanak-gu, Seoul 151-744, Korea  
E-mail) [callme@snu.ac.kr](mailto:callme@snu.ac.kr)

### **Gordon Wetzstein**

Associate Professor  
School of Electrical Engineering, Seoul National University  
Packard Bldg, Room 236, 350 Jane Stanford Way, Stanford, CA, USA  
E-mail) [gordon.wetzstein@stanford.edu](mailto:gordon.wetzstein@stanford.edu)

**Ying “Melissa” Geng**

Manager, Optical Science  
Meta Reality Lab  
9845 Willows Rd, Redmond, WA, USA  
E-mail) [gengy@meta.com](mailto:gengy@meta.com)

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