

# YOUNGJIN KIM

Postdoctoral Researcher

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## EDUCATION

B.S.	<b>Electrical and Computer Engineering</b>	2012. 3 –
	Seoul National University, Republic of Korea Advisor: Byung Gook Park (deceased)	2019. 2
Ph.D.	<b>Electrical and Computer Engineering</b>	
	Seoul National University, Republic of Korea (Graduation with Distinguished Dissertation Award) Advisor: <a href="#">Byoungcho Lee</a> (deceased) <a href="#">Yoonchan Jeong</a>	2019.3 – 2025. 2

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## PROFESSIONAL EXPERIENCE

Visiting	<b>Stanford University</b> , CA, USA	2023. 12 –
Researcher	Advisor: <a href="#">Mark Brongersma</a>	2024. 2
Research	<b>Meta Reality Labs</b> , WA, USA	2024.6 –
Scientist Intern	Department: Optics, Photonics, and Light Systems (OPALS) Research Research subject: Development of new waveguide architecture	2024. 10
Postdoc.	<b>Electrical and Computer Engineering</b> Seoul National University, Republic of Korea Advisor: <a href="#">Yoonchan Jeong</a>	2025.3 –

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## RESEARCH EXPERIENCE

- **Metasurface folded optics (Waveguide-type)**
  - Nanostructure design using near-field simulation (RCWA, FDTD, FEM, etc.)
  - Design of waveguide-type folded metasurface system using ray-tracing or customized wave-optics simulations for ultraslim and integrated imaging system
  - Hands-on wafer single-side / double-side nanofabrication using lithography-techniques (+5 years)
- **Computational design of optical systems leveraging metasurface optics**
  - Joint optimization of metasurface and spatial light modulator (SLM) phase profiles
  - End-to-end optimization of metalens imaging system (Hardware + Software co-design)
  - Metasurface proxy model design for fully differentiable optimization framework
  - Metagrating optimization through rigorous coupled-wave analysis using automatic differentiation
- **Application to AR,VR systems / Cameras / Holographic display / Microscopy**

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**SKILLS**

<b>Numerical simulations</b>	<b>Optical near-field simulations:</b> RCWA (Python, Pytorch), FEM (COMSOL Multiphysics), FDTD (Lumerical)
	<b>Optical far-field simulations:</b> Ray-optic simulation (Zemax), Wave-optic simulation (MATLAB, Python, Pytorch)
	<b>Computational optics design:</b> Data-driven optimization through machine-learning framework (Pytorch), Inverse design of periodic nanostructures using automatic-differentiation (Pytorch)
	<b>Programming languages &amp; tools:</b> MATLAB, Python (Pytorch), ZPL (for Zemax)
<b>Experimental experiences</b>	Photography, Holographic display with spatial light modulator, Laser/LED-based experiments
<b>Device fabrication</b>	<b>Nanofabrication:</b> Electron beam lithography, Photolithography (Aligner, Maskless lithography), Electron beam evaporation, Plasma-enhanced chemical vapor deposition (PECVD), Reactive ion etching (RIE), Focused ion beam (FIB) milling
	<b>Measurement:</b> Scanning electron microscope (SEM), Ellipsometry
<b>Languages</b>	Korean (Native) / English (Fluent)

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**JOURNAL PUBLICATIONS**

First Author (4)

† : equal contribution

1. **Y. Kim**<sup>†</sup>, T. Choi<sup>†</sup>, G.-Y. Lee, C. Kim, J. Bang, J. Jang, Y. Jeong, and B. Lee, "[Metasurface Folded Lens System for Ultrathin Cameras](#)," **Science Advances**, vol. 10, no. 44, pp. eadr2319, 2024.
  2. S.-W. Nam<sup>†</sup>, **Y. Kim**<sup>†</sup>, D. Kim, and Y. Jeong, "[Depolarized Holography with Polarization-multiplexing Metasurface](#)," **ACM Transactions on Graphics (SIGGRAPH Asia)**, vol. 42, no. 6, article 200, 2023.
  3. **Y. Kim**, G.-Y. Lee, J. Sung, J. Jang, and B. Lee, "[Spiral Metalens for Phase Contrast Imaging](#)," **Advanced Functional Materials**, vol. 32, no. 5, pp. 2106050, 2022.
  4. Y. Park<sup>†</sup>, **Y. Kim**<sup>†</sup>, C. Kim, G.-Y. Lee, H. Choi, T. Choi, Y. Jeong, and B. Lee, "[End-to-end Optimization of Metalens for Broadband and Wide-angle Imaging](#)," **Advanced Optical Materials**, vol. 13, no. 9, pp. 2402853, 2025.
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**JOURNAL PUBLICATIONS**

Co-Author (7)

1. S.-J. Kim, C. Kim, **Y. Kim**, J. Jeong, S. Choi, W. Han, J. Kim, and B. Lee, "[Dielectric metalens: properties and three-dimensional imaging applications](#)," **Sensors**, vol. 21, no. 13, pp. 4584, 2021.
2. J. Jang, G.-Y. Lee, **Y. Kim**, C. Kim, Y. Jeong, and B. Lee, "[Dispersion-Engineered Metasurface Doublet Design for Broadband and Wide-Angle Operation in the Visible Range](#)," **IEEE Photonics Journal**, vol. 15, no. 4, pp. 1-

- 9, 2023.
3. C. Kim, J. Hong, J. Jang, G.-Y. Lee, **Y. Kim**, Y. Jeong, and B. Lee, "[Freeform Metasurface Color Router for Deep Sub-micron Pixel Image Sensors](#)," **Science Advances**, vol. 10, no. 22, pp. eadn9000, 2024.
  4. H. Son, T. Choi, K. Kim, **Y. Kim**, J. Bang, S.-J. Kim, B. Lee, and Y. Jeong, "[Strong Coupling Induced Bound States in the Continuum in a Hybrid Metal–Dielectric Bilayer Nanograting Resonator](#)," **ACS Photonics**, vol. 11, no. 8, pp. 3221-3232, 2024.
  5. T. Choi, C. Choi, J. Bang, **Y. Kim**, H. Son, C. Kim, J. Jang, Y. Jeong, and B. Lee, "[Multiwavelength Achromatic Deflector in the Visible Using a Single-Layer Freeform Metasurface](#)," **Nano Letters**, vol. 24, no. 35, pp. 10980-10986, 2024.
  6. E. Lee, Y. Jo, S.-W. Nam, M. Chae, C. Chun, **Y. Kim**, Y. Jeong, and B. Lee, "[Speckle Reduced Holographic Display System with a Jointly Optimized Rotating Phase Mask](#)," **Optics Letters**, vol. 49, no. 19, pp. 5659-5662, 2024.
  7. J. Bang, **Y. Kim**, T. Choi, C. Kim, H. Son, S.-J. Kim, Y. Jeong, and B. Lee, "[Cascaded Janus meta-optics: generalized platform for bidirectional asymmetric modulation of light](#)," **ACS Photonics**, vol. 12, no. 3, pp. 1666-1675, 2025.

## CONFERENCES

First Author (5)

1. **Y. Kim**, C. Kim, B. Lee, Y. Jeong, and B. Lee, "Meta-optic Miniaturized Telephoto Lens System," High Contrast Metastructures XII, SPIE Photonics West 2023, San Francisco, USA, paper 12432-32, Feb. 2023. (**Oral presentation**)
2. **Y. Kim**, C. Kim, and B. Lee, "Phase contrast imaging with multiwavelength achromatic spiral metalens," OSA Optical Design and Fabrication Congress, Virtual Conference, paper FW4C.3, Jun. 2021. (**Oral presentation**)
3. **Y. Kim**, J. Hong, and B. Lee, "Edge detection metalens with additional spiral phase profiles," The 20th International Meeting on Information Display (IMID 2020), Virtual Conference, paper 04-10-1232, Aug. 2020. (**Oral presentation**)
4. **Y. Kim**, C. Kim, and B. Lee, "Single-layer edge detecting metalens with combining hyperbolic and spiral phase profiles," The 14th Pacific Rim Conference on Lasers and Electro-Optics (CLEO PR 2020), Virtual Conference, paper P5-7, Aug. 2020.
5. **Y. Kim**, J. Hong, J. Sung, and B. Lee, "Transmission-Type Color Filters with Silicon Mie Resonators using Guided-Mode-Resonance," OSA Frontiers in Optics + Laser Science APS/DLS, Washington D.C., USA, paper JW4A.74, Sep. 2019.

## PATENTS

1. Y. Park, **Y. Kim**, G.-Y. Lee, B. Lee, Y. Jeong, "Double sided metalens and electronic device including the same" (US – Application No. 18/490,121)
2. Y. Jeong, S.-W. Nam, **Y. Kim**, D. Kim, "Holographic display using metasurface and metasurface optimization method" (US – Application No. 18/737,648)

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## RESEARCH EXPERIENCE - *Projects*

- **Metalens planar optic system for ultra-slim camera module**  
Student Lead Researcher, Samsung Science & Technology Foundation  
Jun. 2020 – July. 2023
- **Improvement of  $\mu$ LED optical characteristics using metasurface technology.**  
Researcher, Samsung Display  
March. 2021 – Feb. 2023
- **Research for integrated meta-photonics system and its application to mobile real-time 3D imaging**  
Researcher, National Research Foundation of Korea  
Mar. 2020 - November. 2022
- **Development of virtual reality technology using metasurface optics**  
Researcher, Samsung Display  
March. 2020 – Feb. 2021

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## HONOR AND AWARDS

- **Sejong Science Fellowship (Overseas Training Track)**  
National Research Foundation of Korea, 2025.
  - **Distinguished Dissertation Award**  
Seoul National University, 2025.
  - **Seoul National University Joint International Research Grant**  
Seoul National University, 2023.
  - **Silver Prize, Samsung Display Industry-Academia Technical Paper Awards**  
Samsung Display, 2023.
  - **Scholarship of Foundation for SNU ECE - Kim Jung Sik Fund**  
Seoul National University, 2021.
  - **Best Poster Paper Awards**  
Optics and Photonics Congress, Jeju, South Korea, 2021.
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