

iMiD 2020

The 20th International Meeting on Information Display
August 25 - 28, 2020 / Online Conference



Prof. Hwi Kim (Korea University, Korea)

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Prof. Hwi Kim was born in Seoul, South Korea, in 1977. He received the Ph.D. and M.S. degrees from the school of Electrical and Computer Engineering, Seoul National University, South Korea, in 2007 and 2003, respectively. He has served as a faculty member in Korea University (Sejong Campus) since 2010, and has worked in the fields of optical metamaterials, computational electromagnetics, holography and diffractive optics. His research covers the practical applications of optical metamaterials, plasmonics and holography as well as the fundamental aspects of optics. In 2017, Prof. Kim was selected as the leader of hologram technology in '100 leading technologies and leaders in 2025 of South Korea' by The National Academy of Engineering of Korea (NAEK) with the contribution to the development of computational holography and holographic three-dimensional display technology. He has conducted long term research on the parallel frequency domain method for electromagnetics super-computing and wrote a book "Fourier Modal Method and Its Applications in Computational Nanophotonics," (CRC Press, Taylor Francis Group, 2012).

POSITIONS/RESEARCH EXPERIENCE

- Mar. 2019 – present
Professor in Department of Electronics and Information Engineering, College of Science and Technology, **Korea University**
- Mar. 2014 – Feb. 2019
Associate professor in Department of Electronics and Information Engineering, College of Science and Technology, **Korea University**
- Mar. 2010 – Feb. 2014
Assistant professor in Department of Electronics and Information Engineering, College of Science and Technology, **Korea University**
- Apr. 2008 – Feb. 2010
Senior Researcher in **Samsung Electronics** LCD business
- Sep. 2007 – Mar. 2008
Post Doc. Researcher in National Creative Research Center for Active Plasmonics application systems of Electrical Engineering and Computer Science, **Seoul National University**

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EDUCATION

- Mar. 2003-Aug. 2007
Ph. D in Electrical Engineering and Computer Science, **Seoul National University** (Seoul, Korea)
(Thesis: Mathematical modeling of nanophotonic networks, advised by prof. Byoungho Lee)
- Mar. 2001-Feb. 2003
M.S. in Electrical Engineering and Computer Science, **Seoul National University** (Seoul, Korea)
(Thesis: A study on optimal synthesis and analysis of subwavelength scale binary diffractive optical elements,)
- Mar. 1996-Aug. 2000
B.S. in Electrical Engineering and Computer Science, **Seoul National University** (Seoul, Korea)

RESEARCH INTERESTS

Nano-photonics	(Plasmonics, Metamaterials, Photonic crystals)
Computational Electromagnetics	(Fourier modal method, Parallel computation)
Optimization	(Iterative method, Genetic algorithm)
Holography and Diffractive optics	(Design of holographic 3D display)
Geometrical Design	(Design of advanced imaging system)

Activities

- Mar. 2019 - present
Department chair of Electronics and Information Engineering, Korea University, Sejong Campus
- Mar. 2015 - present
Director of KU Sejong Business Incubation Center, Korea University, Sejong Campus
Director of KU Sejong Startup Education Center, Korea University, Sejong Campus
- Jul. 2016 – Feb. 2018
Vice President for Korea University Research and Business Foundation, Korea University, Sejong Campus

Additional

- Male, born on May 05, 1977 in Seoul, South Korea, Nationality: South Korea

SCI JOURNAL PUBLICATIONS (Recent three years)

1. S. Hwang, J. Cho, S. Jeon, H.-J. Kang, Z.-J. Zhao, S. Park, Y. Lee, J. Lee, M. Kim, J. Hahn, B. Lee, J. Jeong, **H. Kim**, and J. R. Youn, "Glod-Nanocluster-Assisted Nanotransfer Printing Method for Metasurface hologram fabrication", Scientific reports 9 , Article number : 3051, 2019.
2. S.-W. Park, G. Park, Y. Kim, J. Lee, J. H. Cho, Y. Yi, and **H. Kim**, "Metrological sensitivity improvement of through-focus scanning optical microscopy by controlling illumination coherence," Optics Express, Vol. 27, No. 32, pp. 1981-1990, 2019.
3. Y. Jeon, S. Baek and **H. Kim**, "Wave optic modeling of semi-transparent textured curved surfaces" Optics Express, Vol. 26, No. 22, pp. 28517-28530, 2018.
4. G. Lee, J. Hong, S. Hwang, S. Moon, H. Kang, S. Jeon, **H. Kim**, J. Jeong, and B. Lee, "Metasurface eyepiece for augmented reality" Nature Communications Vol. 9, 4562, 2018.
5. J. Cho, S. Kim, S.-W. Park, B. Lee, and **H. Kim**, "DC-free on-axis holographic display using a phase-only spatial light modulator" Optics Letters, Vol. 43, No.14, pp. 3397-3400, 2018.
6. **H. Kim**, J. Kwon, and J. Hahn, "Accelerated synthesis of wide-viewing angle polygon computer-generated holograms using the interocular affine similarity of three-dimensional scenes" Optics Express, Vol. 26, No. 13, pp. 16853-16874, 2018.
7. M. Kim, S. Lim, G. Choi, Y. Kim, **H. Kim**, and J. Hahn, "Expanded Exit-Pupil Holographic Head-

- Mounted Display With High-Speed Digital Micromirror Device" ETRI Journal, Vol. 40, No. 3, pp.366-375, 2018.
8. J. Lee, G. Park, T. Je, S. Woo, Y. Yoo, J. Jeong, E. Jeon, and **H. Kim**, "Geometric and Wave Optic Features in the Optical Transmission Patterns of Injection-molded Mesoscale Pyramid Prism Patterned Plates" Current Optics and Photonics Vol. 2, No 2, pp. 140-146, 2018.
 9. S.-W. Park, G. Park, Y. Kim, J. Cho, J. Lee, and **H. Kim**, "Through-focus scanning optical microscopy with Fourier modal method," Optics Express, Vol. 26, No. 9, pp. 11649-11657, 2018.
 10. H. Park, H. Yun, C. Choi, J. Hong, **H. Kim**, and B. Lee "Huygens' optical vector wave field synthesis via in-plane electric dipole metasurface," Optics Express, Vol. 26, No. 8, pp. 10649-10660, 2018.
 11. G. Lee, G. Yoon, S. -Y. Lee, H. Yun, J. Cho, K. Lee, **H. Kim**, J. Rho, and B. Lee, "Complete amplitude and phase control of light using broadband holographic metasurfaces," Nanoscale, 2017, DOI: 10.1039/C7NR07154J
 12. H. Park, J. Kim, Y. JEON, B.Lee, and **H. Kim**, "Regularized Huygens' plasmonic wave field synthesis using metal-clad plasmonic waveguide array," Optics Letters, vol. 42, No. 18, pp. 3610-3613, 2017.
 13. J. Roh, S. Baek, and **H. Kim**, "Numerical visualization of aperiodic scalar optical wave fields," Optics Express, vol. 25, Issue 13, pp. 14715-14724, 2017.
 14. J. Roh, K. Kim, E. Moon, S. Kim, B. Yang, J. Hahn, and **H. Kim**, "Full-color holographic projection display system featuring an achromatic Fourier filter," Optics Express, vol. 25, Issue 13, pp. 14774-14782, 2017.
 15. E.-Y. Song, G.-Y. Lee, H. Park, K. Lee, J. Kim, J. Hong, **H. Kim**, and B. Lee, "Compact Generation of Airy Beams with C-Aperture Metasurface," Advanced Optical Materials, vol. 5, Issue 10, 1601028, 2017.
 16. R. Ulbricht, H. Sakuma, Y. Imade, P. H. Otsuka, M. Tomoda, O. Matsuda, **H. Kim**, G.-W. Park, and O. B. Wright, "Elucidating gigahertz acoustic modulation of extraordinary optical transmission through a two-dimensional array of nano-holes," Applied Physics Letters, Vol. 110, no. 9, article 091910, 2017.
 17. S. Park, J. Roh, S. Kim, J. Park, H. Kang, J. Hahn, Y. Jeon, S. Park and **H. Kim**, "Characteristics of complex light modulation through an amplitude-phase double-layer spatial light modulator," Optics Express, Vol. 25, Issue 4, pp. 3469-3480, 2017.
 18. Y. Lim, K. Hong, **H. Kim**, H.-E. Kim, E.-Y. Chang, S. Lee, et al., "360-degree tabletop electronic holographic display," Optics Express, vol. 24, pp. 24999-25009, 2016.
 19. E.-Y. Song, S.-Y. Lee, J. Hong, K. Lee, Y. Lee, G.-Y. Lee, **H. Kim**, and B. Lee, "A double-lined metasurface for plasmonic complex-field generation," Laser and Photonics Reviews, vol. 10, no. 2, pp. 299-308, 2016.
 20. H. Park, S. -Y. Lee, J. Kim, B. Lee and **H. Kim**, "Near-infrared coherent perfect absorption in plasmonic metal-insulator-metal waveguide", OPTICS EXPRESS Vol. 23, No.19, pp.24464 - 24474, 2015.
 21. M. Seo, J. W. Lee and **H. Kim**, "Role of dielectric properties in terahertz field transmission", Journal of Applied Physics 117, 223109 (2015).
 22. J.-R. Lee, E.-c. Jeon, **H. Kim**, S.-W. Woo, T.-J. Je, Y.-E. Yoo and E.-S. Lee, "Optical Characterization and Manufacturing of an Optical Plate for Increasing Light Efficiency of LED Systems", INTERNATIONAL JOURNAL OF PRECISION ENGINEERING AND MANUFACTURING Vol. 16, No.7, pp.1355-1360.
 23. E. Y. Song, J. Cho, **H. Kim**, W. Y. Choi, and B. Lee, "Double bi-material cantilever structures for complex surface plasmon modulation", Optics Express, Vol. 23, Issue 5, pp. 5500-5507, 2015.
 24. D. Im, J. Cho, J. Hahn, B. Lee, and **H. Kim**, "Accelerated synthesis algorithm of polygon computer-generated holograms," Optics Express, Vol. 23, Issue 3, pp. 2863-2871, 2015.
 25. W. Lee, D. Im, J. Paek, J. Hahn, and **H. Kim**, "Semi-analytic texturing algorithm for polygon computer-generated holograms," Optics Express, Vol. 22, Issue 25, pp. 31180-31191, 2014.
 26. E. Moon, S.-W. Park, H. Chung, J.-Y. Lee, C. Bae, J.-W. Kim, J. Paek, and **H. Kim**, "Truncated corner cubes with near-perfect retroreflection efficiency," Applied Optics, Vol. 53, Issue 33, pp. 7972-7978, 2014.

27. J. Kim, S.-Y. Lee, Y. Lee, **H. Kim**, and B. Lee, "Tunable asymmetric mode conversion using the dark-mode of three-mode waveguide system," *Optics Express*, Vol. 22, Issue 23, pp. 28683-28696, 2014.
28. E.-c. Jeon, J.-R. Lee, T.-J. Je, D.-S. Choi, Y.-B. Ham, E.-S. Lee, S.-K. Choi, **H. Kim**, "Quantitative analysis on air-dispensing parameters for manufacturing dome lenses of chip-on-board LED system," *INTERNATIONAL JOURNAL OF PRECISION ENGINEERING AND MANUFACTURING* Vol. 15, No. 11, pp. 2437-2441, 2014.
29. K. Yoon, S. Choi, J. Paek, D. Im, J. Roh, J. Kwon, and **H. Kim**, "Iridescent Specular Structural Colors of Two-Dimensional Periodic Diffraction Gratings," *Journal of the Optical Society of Korea*, Vol. 18, Issue 5, pp. 616-622, 2014.
30. S.-W. Park, E. Moon, H. Chung, J.-Y. Lee, C. Bae, J.-W. Kim, and **H. Kim**, "Quasi-retroreflection from corner cubes with refractive free-form surfaces," *Applied Optics*, Vol. 53, Issue 28, pp. 6605-6611, 2014.
31. **H. Kim**, C.-Y. Hwang, K.-S. Kim, J. Roh, W. Moon, S. Kim, B.-R. Lee, S. Oh, and J. Hahn, "Anamorphic optical transformation of an amplitude spatial light modulator to a complex spatial light modulator with square pixels [Invited]," *Applied Optics*, Vol. 53, Issue 27, pp. G139-G146, 2014.
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33. J. Park, J.-H. Kang, A. P. Vasudev, D. T. Schoen, **H. Kim**, E. Hasman, and M. L. Brongersma, "Omnidirectional Near-Unity Absorption in an Ultrathin Planar Semiconductor Layer on a Metal Substrate," *ACS Photonics*, 1 (9), pp 812-821, 2014.
34. S. Choi, S. Baek, D. Im, H. K. Kahng, and **H. Kim**, "Quantitative modal analysis of optical power flow and energy loss in photonic structures with a dipole emission source," *Optics Express*, Vol. 22 Issue 15, pp.18499-18512, 2014.
35. J. Kim, S.-Y. Lee, H. Park, **H. Kim**, and B. Lee, "Slow surface plasmon pulse excitation in metal-insulator-metal plasmonic waveguide with chirped grating," *Optics Express*, Vol. 22, Issue 15, pp. 18464-18472, 2014.
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37. H.-G. Choo, M. Park, H.-E. Kim, C. Bae, B. G. Chae, **H. Kim**, K. Moon, J. Kim, and J. Hahn, "Real-time pupil tracking backlight system for holographic 3D display (Invited Paper)," *Chinese Optics Letters*, Vol. 12, Issue 6, pp. 060004-, 2014.
38. C.-Y. Hwang, S. Oh, I.-K. Jeong, and **H. Kim**, "Stepwise angular spectrum method for curved surface diffraction," *Optics Express*, Vol. 22, Issue 10, pp. 12659-12667, 2014.
39. M. Park, B. G. Chae, H.-E. Kim, J. Hahn; **H. Kim**, C. H. Park, K. Moon, and J. Kim, "Digital Holographic Display System with Large Screen Based on Viewing Window Movement for 3D Video Service," *ETRI Journal*, Vol. 36 Issue 2, p232, 2014).
40. E. Moon, M. Kim, J. Roh, **H. Kim**, and J. Hahn, "Holographic head-mounted display with RGB light emitting diode light source," *Optics Express* 22, pp. 6526-6534, 2014.
41. S. W. Park, Y. Park, Y. Yi, and **H. Kim**, "Iterative method for optimal design of flat spectral response arrayed waveguide gratings," *Applied Optics* 52, 7295-7301, 2013.
42. H. J. Kim, S. P. Pack, Y. Yi, and **H. Kim**, "Pulsed dipole radiation in a transformation-optics wedge waveguide designed by azimuthal space compression," *Optics Express* 21, 22532-22539, 2013.
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44. E. Y. Song, **H. Kim**, W. Y. Choi, and B. Lee, "Active directional beaming by mechanical actuation of double-sided plasmonic surface gratings," *Optics Letters* 38, 3827-3829, 2013.
45. J. Jang, J. Hong, **H. Kim**, and J. Hahn, "Light-folded projection three-dimensional display," *Applied Optics* 52, 2162-2168, 2013.
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 48. J. Hahn and **H. Kim***, "Uncertainty-managed phase-shifting digital holography," *Optics Letters*, vol. 37, no. 21, pp. 4492-4494, 2012.
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 50. S. Cho, J. Park, S. Lee, **H. Kim**, and B. Lee, "Coupling of spin and angular momentum of light in plasmonic vortex," *Optics Express*, vol. 20, pp. 10083-10094, 2012.
 51. **H. Kim**, J. Cho, J. Park, S. Han, and S. Seo, "Generation of mid-field concentrated beam arrays using periodic metal annular apertures," *Applied Optics*, vol. 51, no. 8. Pp. 1076-1085, 2012.
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 57. H.-J. Choi, J.-H. Jung, **H. Kim**, and B. Lee, "Analysis of the Motion Picture Quality of Stereoscopic Three-dimensional Images," *Journal of the Optical Society of Korea*, vol. 14, no. 4, pp. 383-387. 2010.
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 61. **H. Kim**, J. Park, S.-W. Cho, S.-Y. Lee, M. King, and B. Lee, "Synthesis and dynamic switching of surface plasmon vortices with plasmonic vortex lens," *Nano Letters*, vol. 10, no. 2, pp. 529-536, 2010.
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 64. **H. Kim**, Junghyun Park, and B. Lee, "Tunable directional beaming from subwavelength metal slits with metal-dielectric composite surface gratings," *Optics Letters*, vol 34, no. 17, pp. 2569-2571, 2009.
 65. **H. Kim** and B. Lee, "Unidirectional surface plasmon polariton excitation on single slits with oblique backside illumination," *Plasmonics*, vol. 4, no. 2, pp. 153-159, 2009.
 66. E.-H. Kim, J. Hahn, **H. Kim**, and B. Lee, "Profilometry without phase unwrapping using multi-frequency and four-step phase-shift sinusoidal fringe projection," *Optics Express*, vol. 17, no. 10, pp. 7818-7830, 2009.
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 68. **H. Kim**, J. Hahn, and B. Lee, "The use of negative index planoconcave lens array for wide-viewing

- angle integral imaging," *Optics Express*, vol. 16, no. 26, pp. 21865-21880, 2008.
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