

Seungwoo Lee, Ph.D.

Professor

Department of Integrative Energy Engineering, College of Engineering
KU-KIST Graduate School of Converging Science and Technology

Korea University, Anam-ro 145, Seoul 02841, Korea

email: seungwoo@korea.ac.kr

web: seungwoo.korea.ac.kr & hope.korea.ac.kr

Educations

Korea Advanced Institute of Science and Technology (KAIST), Korea

- Ph.D., Chemical and Biomolecular Engineering, 2011

- M.S., Chemical and Biomolecular Engineering, 2007

Sogang University, Korea

- B.S., Chemical Engineering, 2005 with *Magna cum Laude*

Professional Appointments

- Full Professor (W/ tenured), 2024-

Department of Integrative Energy Engineering, College of Engineering

KU-KIST Graduate School of Converging Science and Technology,

Department of Biomicrosystem Technology

Korea University

- Visiting scholar at William M. Shih group, 2024-2025

Wyss Institute for Biologically Inspired Engineering

Harvard University

- Associate Professor, 2021-2024

Department of Integrative Energy Engineering, College of Engineering

Korea University

- Assistant Professor, 2018-2019; Associate Professor, 2019-2024

KU-KIST Graduate School of Converging Science and Technology,

Department of Biomicrosystem Technology, and KU Photonics Center

Korea University

- Assistant Professor, 2014-2018

SKKU Advanced Institute of Nanotechnology (SAINT),

Nano Engineering & Chemical Engineering,

Sungkyunkwan University (SKKU)

- Postdoctoral Fellow at William M. Shih group, 2012-2014

Wyss Institute, Dana-Farber Cancer Institute, and Harvard Medical School

Harvard University

- Postdoctoral Fellow (alternative military service) at Bumki Min group, 2011-2012

Department of Mechanical Engineering

Korea Advanced Institute of Science and Technology (KAIST)

Awards

2025 나노코리아 2025 나노연구혁신부문 과학기술정보통신부 장관상
 2025 Elsevier 2024 World Top 2% Scientist (Elsevier 선정 2024년 세계 최상위 (2%) 연구자 선정)
 2025 고려대학교 서울캠퍼스 교외연구비 수주/기술이전 실적 우수교원 (책임수업시간 감면 대상)
 2024 고려대학교 서울캠퍼스 교외연구비 수주/기술이전 실적 우수교원 (책임수업시간 감면 대상)
 2024 진정한 학술상 수상
 2024 Fellow of the young Korean Academy of Science and Technology (한국차세대과학기술한림원 회원)
 2023 국가연구개발우수성과 100선 (융합부문 최우수, 과학기술정보통신부)
 2023 The Hall of Fame (Outstanding researcher) at Korea University (고려대학교 연구 명예의전당)
 2023 SRFC Grant Recipient (Samsung Research Funding & Incubation Center for Future Technology)
 2023 8th Korea University Pagoda Research Award (고려대학교 제8회 석탑연구상 수상)
 2022 ASML Korea Tech Young Professor Paper Award, 최우수상 (1위)
 2020 OSK Rising Stars 30 (한국광학회 30주년 기념)
 2019 나노소재기술개발사업 대표 성과
 2018 SRFC Grant Recipient (Samsung Research Funding & Incubation Center for Future Technology)
 2010 삼성휴먼테크 논문대상 금상
 2010 KAIST 암천논문상 (KAIST 화학공학과 올해의 논문)
 2009 삼성휴먼테크 논문대상 은상

Publications

* Corresponding author; "Equal contribution; _Group members of mine

I 18. Jaewon Lee", Hayun Ahn", Kyung Hoon Rho, Shelley F.J. Wickham*, William M. Shih*, and Seungwoo Lee*, "3D DNA origami-enabled molecularly addressable optical nanocircuit", [arXiv: 2508.05440](https://arxiv.org/abs/2508.05440), **Science Advances**, In revision, 2025.

I 17. YongDeok Cho", Hyeon Ho Kim", Sewon Ahn", Jaewon Lee, Jieun Lee, Kwangjin Kim, Soyul Kwak, Hoodam Lee, Kyungsik Choi, Kyonghwa Song, and Seungwoo Lee*, "Colloidal opaline composites as throughput-scalable, fully transparent, and color-tunable radiative cooling exterior films for outdoor photovoltaics", **Advanced Functional Materials**, In press, 2025.

I 16. Il-Buem Lee", Hyun-Min Moon", Jin-Sung Park, Se-Hwan Lee, Jaewon Lee, Sung Hun Park, Seungwoo Lee, Seok-Cheol Hong*, and Minhaeng Cho*, "Determination of the absolute concentration of Rayleigh particles via scattering microscopy" **ACS Photonics**, In press, 2025.

I 15. Sung Hun Park", Jaewon Lee", ChaeEon Kim, Byungsoo Kang, Ashwin Gopinath*, and Seungwoo Lee*, "Selective binding of DNA origami on self-assembled monolayer-patterned gold substrate" **ACS Materials Letters**, In press, 2025.

I 14. Kwangjin Kim", Jieun Lee", Jaewon Lee", Jin Young Kim, Hae-Seok Lee, and Seungwoo Lee*, "Are nanophotonic intermediate mirrors really effective in enhancing the efficiency of perovskite tandem solar cells?" **Nanophotonics**, vol. 14, p. 1239, 2025.

I 13. Sergey G. Menabde", Yongjun Lim", Kirill Voronin", Jacob T. Heiden, Alexey Y. Nikitin*, Seungwoo Lee*, and Min Seok Jang*, "Polaritonic Fourier crystals," **Nature Communications**, vol. 16, p. 2530, 2025.

I 12. Jaewon Lee", Jangwon Kim", Gregor Posnjak", Anastasia Ershova", Daichi Hayakawa, William M. Shih, W. Benjamin Rogers*, Yonggang Ke*, Tim Liedl*, and Seungwoo Lee*, "DNA origami colloidal crystals: opportunities and challenges," **Nano Letters**, vol. 25, p. 16, 2025.

I 11. Jaeyeon Jo", Jinseok Ryu", Ji-Hyeok Huh, Hyeohn Kim, Da Hye Seo, Jaewon Lee, Min Kwon, Seungwoo Lee*, Ki Tae Nam*, and Miyoung Kim*, "Direct three-dimensional observation of the plasmonic near-fields of a nanoparticle with circular dichroism," **ACS Nano**, vol. 18, p. 32769, 2024.

110. Yongjun Lim, Seung Jae Hong, Joona Bang, YongDeok Cho, and Seungwoo Lee*, "Fourier surfaces reaching full-color diffraction limits," **Advanced Materials**, vol. 36, p. 2470323, 2024.

109. NaYeoun Kim", Ji-Hyeok Huh", YongDeok Cho", Sung Hun Park, Hyeon Ho Kim, Kyung Hun Rho, Jaewon Lee, and Seungwoo Lee*, "Achieving optical refractive index of 10-plus by colloidal self-assembly," **Small**, vol. 20, p. 2404223, 2024.

108. Hyeon Ho Kim, Soyul Kwak, Jaewon Lee, Eunji Im, Aaswath Raman, and Seungwoo Lee*, "Structured fluids as colorful paintable radiative coolers," **Cell Reports Physical Science**, vol. 5, p. 102068, 2024.

107. Gregor Posnjak*, Xin Yin, Paul Butler, Oliver Blenek, Mihir Dass, Seungwoo Lee, Ian D. Sharp, and Tim Liedl* "Diamond photonic crystals assembled from DNA origami," **Science**, vol. 384, p. 781, 2024.

106. YongDeok Cho", Sung Hun Park", Min Kwon, Hyeon Ho Kim, Ji-Hyeok Huh, and Seungwoo Lee* "Van der Waals colloidal crystals," **Advanced Materials**, vol. 36, p. 2312748, 2024.

105. Jaepil Jo", Dongjae Baek", Herve Hugonnet, Kwangjin Kim, Hyungu Ji, Yongjun Lim, Seungwoo Lee*, and YongKeun Park*, "Three-dimensional measurements and characterization of refractive index distributions of volume holographic gratings using low-coherence holotomography," **Advanced Optical Materials**, vol. 12, p. 2302048, 2024.

104. Juheon Lee", Heeju Son", Seung Jae Hong, Herve Hugonnet, Joona Bang, Seungwoo Lee*, and YongKeun Park*, "Three-dimensional visualizations of molecular directors in polarization holographic optical elements," **Advanced Optical Materials**, vol. 12, p. 2302346, 2024.

103. Haedong Park*, Sang Soon Oh*, and Seungwoo Lee*, "Surface potential-adjusted photonic surface states in 3D crystals," **Scientific Reports**, vol. 14, p. 7173, 2024.

102. Seungwoo Lee*, "Holographic recording and holographic lithography," **Current Optics and Photonics**, vol. 7, p. 608, 2023.

101. Hakseok Ko, Junghoon Kim, Jin-Hee Hong, Junyeob Cheon, Seungwoo Lee, Mooseok Jang*, and Wonshik Choi* "Acousto-optic volumetric gating for reflection-mode deep optical imaging within a scattering medium," **ACS Photonics**, vol. 10, p. 3664, 2023.

100. Jaewon Lee, Seungwoo Lee*, "Colloidal optics and photonics: photonic crystals, plasmonics, and metamaterials," **Current Optics and Photonics**, vol. 7, p. 638, 2023.

99. Sungwook Choi", Sang Won Im", Ji-Hyeok Huh, Sungwon Kim, Jaeseung Kim, Yae-Chan Lim, Ryeong Myeong Kim, Jeong Hyun Han, Hyeohn Kim, Michael Sprung, Su Yong Lee, Wonsuk Cha, Ross Harder, Seungwoo Lee, Ki Tae Nam*, Hyunjung Kim* "Strain and crystallographic identification of the helically conceived surfaces of nanoparticles," **Nature Communications**, vol. 14, p. 3615, 2023.

98. Hyeohn Kim", Eunji Im", Ryeong Myeong Kim, Nam Heon Cho, Jeonghyun Han, Hyo-Yong Ahn, Ji-Hyeok Huh, SeokJae Yoo, Seungwoo Lee*, and Ki Tae Nam* "Capacitive enhancement of the chiroptical response in plasmonic helicoids," **Advanced Optical Materials**, vol. 11, p. 2300205, 2023.

97. Sung Hun Park", Haedong Park", Jwa-Min Nam, Yonggang Ke, Tim Liedl, Ye Tian, and Seungwoo Lee* "DNA origami-designed 3D phononic crystals," **Nanophotonics**, vol. 12, p. 2611, 2023.

96. Hui Il Jeon, Seunghyun Jo, Seungbae Jeon, Taesuk Jun, Jungwoo Moon, Jeong Ho Cho, Hyungju Ahn, Seungwoo Lee, Du Yeol Ryu*, and Thomas Russell*, "Repairable macroscopic monodomain arrays from block copolymers enabled by photoplastic and photodielectric effects," **ACS Nano**, vol. 17, p. 8367, 2023.

95. Minh Thang Nguyen", YongDeok Cho", Ji-Hyeok Huh", Hayun Ahn", NaYeoun Kim", Kyung Hun Rho, Jaewon Lee, Min Kwon, Sung Hun Park, ChaeEon Kim, Kwangjin Kim, Young-Seok Kim*, and Seungwoo Lee*, "Ultra-low-loss substrate for nanophotonic dark-field microscopy," **Nano Letters**, vol. 23, p. 1546, 2023.

94. Shin Hyung Lee", Dongjae Baek", Whibeom Cho, Nohyun Lee, Kwangjin Kim, Jae-Hun Kim, Han-Jun Kim, Hyeon Ho Kim, Kyo Jin Kim*, Seungwoo Lee*, and Sung-Min Lee,*, "Tailoring luminescent solar concentrators for high-performance flexible double-junction III-V photovoltaics," **Advanced Functional Materials**, vol. 33, p. 2210357, 2023.

93. YongDeok Cho, Sung Hun Park, Ji-Hyeok Huh, Ashwin Gopinath*, and Seungwoo Lee* "DNA as grabbers and steerers of quantum emitters," **Nanophotonics**, vol. 12, p. 399, 2023.

92. Jaewon Lee, and Seungwoo Lee*, "Non-invasive, reliable, and fast quantifying of DNA loading on gold nanoparticles by one-step optical measurement," **Analytical Chemistry**, vol. 95, p. 1856, 2023.

91. Ryeong Myeong Kim", Ji-Hyeok Huh", Seokjae Yoo", Tae Gyun Kim, Hyeohn Kim, Changwon Kim, Jeong Hyun Han, Nam Heon Cho, Yae-Chan Lim, Sang Won Im, Eunji Im, Jae Ryeol Jeong, Min Hyung Lee, Tae-Young Yoon, Ho-Young Lee, Q-Han Park*, Seungwoo Lee*, and Ki Tae Nam*, "Enantioselective sensing by collective circular dichroism," **Nature**, vol. 612, p. 470, 2022.

90. Hyeon Ho Kim, YongDeok Cho, Dongjae Baek, Sung Hun Park, and Seungwoo Lee*, "High-throughput droplet microfluidics for ultraviscous fluids," **Small**, vol. 18, p. 2205001, 2022.

89. Kwangjin Kim", Yongjun Lim", Heeju Son", Seung Jae Hong", Chang-Won Shin", Dongjae Baek, Hyeon Ho Kim, Nam Kim*, Joona Bang", and Seungwoo Lee*, "Optical Fourier volumes: a revisiting of holographic photopolymers and photoaddressable polymers," **Advanced Optical Materials**, vol. 10, p. 2201421, 2022.

88. Haedong Park", Seungyun Jo", Byungsoo Kang", Kahyun Hur*, Sang Soon Oh*, Du Yeol Ryu*, and Seungwoo Lee*, "Block copolymer gyroids for nanophotonics: significance lattice transformations," **Nanophotonics**, vol. 11, p. 2583, 2022.

87. Seungwoo Lee*, "Nanoparticle-on-mirror cavities: a historical view across nanophotonics and nanochemistry," **Journal of the Korean Physical Society**, vol. 81, p. 502, 2022.

86. Seungyun Jo, Taesuk Jun, Hui Il Jeon, Seunggi Seo, Hyungjun Kim, Seungwoo Lee, and Du Yeol Ryu*, Optical reflection from unforbidden diffraction of block copolymer templated gyroid film, "Block copolymer gyroids for nanophotonics: significance lattice transformations," **ACS Macro Letters**, vol. 10, p. 1609, 2021.

85. Yongjun Lim", Byungsoo Kang", Seung Jae Hong", Heeju Son", Eunji Im, Joona Bang*, and Seungwoo Lee*, "A field guide to azopolymeric optical Fourier surfaces and augmented reality," **Advanced Functional Materials**, vol. 31, p. 2104105, 2021.

84. Yongjun Lim", Haedong Park", Byungsoo Kang", Kwangjin Kim", Daegyum Yang", and Seungwoo Lee*, "Holography, Fourier optics, and beyond photonic crystals: Holographic fabrications for Weyl points, bound states in the continuum, and exceptional points" **Advanced Photonics Research**, vol. 2, p. 2100061, 2021.

83. Yongjun Lim, Byungsoo Kang, and Seungwoo Lee*, "Photo-transformable gratings for augmented reality," **Advanced Functional Materials**, vol. 31, p. 2100839, 2021.

82. Bo-Young Lee", Jaewon Lee", Dong June Ahn, Seungwoo Lee*, and Min-Kyu Oh*, "Optimizing protein V untranslated region sequence in M13 phage for increased production of single-stranded DNA for origami," **Nucleic Acids Research**, vol. 49, p. 6596, 2021.

81. Seungyun Jo", Haedong Park", Taesuk Jun, Kwangjin Kim, Hyunsoo Jung, Sungmin Park, Seunggi Seo, Hyungjun Kim, Byeongdu Lee*, Seungwoo Lee*, and Du Yeol Ryu*, "Symmetry-breaking in double gyroid block copolymer films by non-affine distortion," **Applied Materials Today**, vol. 23, p. 101006, 2021.

80. Pengfei Wang", Ji-Hyeok Huh", Haedong Park, Donglei Yang, Yingwei Zhang, Yunlong Zhang, Jaewon Lee, Seungwoo Lee*, and Yonggang Ke*, "DNA Origami Guided Self-Assembly of Plasmonic Polymers with Robust Long-Range Plasmonic Resonance" **Nano Letters**, vol. 20, p. 8926, 2020.

79. Shelley FJ Wickham", Alexander Auer", Jianghong Min, Nandhini Ponnuswamy, Johannes B Woehrstein, Florian Schueder, Maximilian T Strauss, Jörg Schnitzbauer, Bhavik Nathwani, Zhao Zhao, Steven D Perrault, Jaeseung Hahn,

Seungwoo Lee, Maartje M Bastings, Sarah W Helmig, Anne Louise Kodal, Peng Yin, Ralf Jungmann*, and William M Shih*, "Complex Multicomponent Patterns Rendered on a 3D DNA-Barrel Pegboard," **Nature Communications**, vol. 11, p. 5768, 2020.

78. Seongjun Jo, Seungbae Jeon, Hwiesoo Kim, Chang Y Ryu, Seungwoo Lee, and Du Yeol Ryu*, "Balanced Interfacial Interactions for Fluoroacrylic Block Copolymer Films and Fast Electric Field Directed Assembly," **Chemistry of Materials**, vol. 32, p. 9633, 2020.

77. Ji-Hyeok Huh", Kwangjin Kim", Eunji Im", Jaewon Lee, YongDeok Cho, and Seungwoo Lee*, "Exploiting colloidal metamaterials for achieving unnatural optical refractions," **Advanced Materials**, vol. 32, p. 2001806, 2020.

76. Ji-Hyeok Huh, Jaewon Lee, and Seungwoo Lee*, "Soft plasmonic assemblies exhibiting unnaturally high refractive index," **Nano Letters**, vol. 20, p. 4768, 2020.

75. Haedong Park, and Seungwoo Lee*, "Double gyroids for frequency-isolated Weyl points in the visible regime and interference lithographic design," **ACS Photonics**, vol. 7, p. 1577, 2020.

74. Hyeon Ho Kim, Eunji Im, and Seungwoo Lee*, "Colloidal photonic assemblies for colorful radiative cooling," **Langmuir**, vol. 36, p. 6589, 2020.

73. Jaewon Lee, Ji-Hyeok Huh, and Seungwoo Lee*, "DNA base pair stacking crystallization of gold colloids," **Langmuir**, vol. 36, p. 5118, 2020.

72. Joong Hoon Lee, Hanseop Kim, Ji-Young Hwang, Jinmook Chung, Tae-Min Jang, Dong Gyu Seo, Yuyan Gao, Junhyun Lee, Haedong Park, Seungwoo Lee, Hong Chul Moon, Huanyu Cheng, Sang-Hoon Lee, and Sukwon Hwang*, "3D Printed, customizable, and multifunctional smart electronic eyeglasses for wearable healthcare systems and human-machine interfaces," **ACS Applied Materials & Interfaces**, vol. 12, p. 21424, 2020.

71. Kangmin Lee, Namwoo Kim, Kwangjin Kim", Han-Don Um, Wonjoo Jin, Deokjae Choi, Jeonghwan Park, Kyung Jin Park, Seungwoo Lee*, and Kwanyong Seo*, "Neutral-colour transparent crystalline silicon for photovoltaic application," **Joule**, vol. 4, p. 235, 2020.

70. Sung Hun Park", Haedong Park", Kahyun Hur, and Seungwoo Lee*, "Design of DNA origami diamond photonic crystals," **ACS Applied Bio Materials**, vol. 3, p. 747, 2020.

69. Jaewon Lee", SangYup Lee", Dong-Kwon Lim, Dong June Ahn*, and Seungwoo Lee*, "Antifreezing gold colloids," **Journal of the American Chemical Society (JACS)**, vol. 141, p. 18682, 2019.

68. Hyo-Yong Ahn", Seokjae Yoo", Nam Heon Cho, Ryeong-Myeong Kim, Ji-Hyeok Huh, Seungwoo Lee*, and Ki Tae Nam*, "Bioinspired toolkit based on intermolecular encoder toward evolutionary 4D chiral plasmonic materials," **Accounts of Chemical Research**, vol. 52, p. 2768, 2019.

67. Seungbae Jeon", Taesuk Jun", Seungjun Jo, Hyungju Ahn, Seungwoo Lee, Byeongdu Lee, and Du Yeol Ryu*, "Frank-Kasper phases indentified in PDMS-b-PTFEA copolymers with high conformational asymmetry," **Macromolecular Rapid Communications**, vol. 40, p. 1900259, 2019.

66. Kwangjin Kim, and Seungwoo Lee*, "Detailed balance analysis of plasmonic metamaterial perovskite solar cells," **Optics Express**, vol. 27, p. A1241, 2019.

65. Pengfei Wang", Ji-Hyeok Huh", Jaewon Lee, Kwangjin Kim, Kyung Jin Park, Seungwoo Lee*, and Yonggang Ke*, "Magnetic plasmon networks programmed by molecular self-assembly," **Advanced Materials**, vol. 31, p. 1901364, 2019.

64. Jun Hyuk Lee", Gwan H. Choi", Kyung Jin Park, Dongjae Kim, Juhyun Park, Seungwoo Lee, Hyunmin Yi, and Pil J. Yoo*, "Dual-color generation from layered colloidal photonic crystals harnessing "core hatching" in double emulsions," **Journal of Materials Chemistry C**, vol. 7, p. 6924, 2019.

63. Kwangjin Kim", Haedong Park", Kyung Jin Park, Sung Hun Park, Hyeon Ho Kim, and Seungwoo Lee*, "Light-directed soft mass migration for micro/nanophotonics," **Advanced Optical Materials**, vol. 7, p. 1900074, 2019.
62. Bharti Yadav, Jan Domurath, Kwangjin Kim, Seungwoo Lee, and Marina Saphiannikova*, "Orientation approach to directional photodeformations in glassy side-chain azopolymers," **Journal of Physical Chemistry B**, vol. 123, p. 3337, 2019.
61. YongDeok Cho", Ji-Hyeok Huh", Kwangjin Kim, and Seungwoo Lee*, "Scalable, highly uniform, and robust colloidal Mie resonators for all-dielectric soft meta-optics," **Advanced Optical Materials**, vol. 7, p. 1801167, 2019.
60. Kwangjin Kim", Ji-Hyeok Huh", Doyoung Yu", and Seungwoo Lee*, "Fundamental and Practical limits of achieving artificial magnetism and effective optical medium by using self-assembly of metallic colloidal clusters," **Macromolecular Research**, vol. 26, p. 1103, 2018
59. Seon Ju Yeo", Min Jun Oh", Hyun Min Jun, Minhwan Lee, Jung Gun Bae, Yeseul Kim, Kwang Jin Park, Seungwoo Lee, Daeyeon Lee, Byung Mook Weon, Won Bo Lee, S. Joon Kwon*, and Pil J. Yoo*, "Plesiohedral cellulair network of graphene bubbles for ultralight, strong, and superelastic materials," **Advanced Materials**, vol. 30, p. 1802997, 2018.
58. Sekhar Babu Mitta, Maddaka Reddeppa, Srivithya Vellampatti, Sreekantha Reddy Dugasani, Sanghyun Yoo, Seungwoo Lee, Moon-Deock Kim*, and Sung Ha Park*, "Gold nanoparticle-embedded DNA thin films for ultraviolet photodetectors," **Sensor and Actuator B**, vol. 275, p. 137, 2018.
57. Dae-Woong Jung, Kwang Jin Park, Seungwoo Lee, Jaeyun Kim, Gaehang Lee, and Gi-Ra Yi*, "Scalable synthesis of carbon-embedded ordered microporous titania spheres with structural colors," **Korean Journal of Chemical Engineering**, vol. 35, p. 2138, 2018.
56. Yu Jin Jeong, Kwang Jin Park, Kwangjin Kim, Seungwoo Lee*, and Pil J. Yoo*, "Uniaxial alignment ZnO nanowires in microparticle via light-induced migration of azopolymer," **Polymer**, vol. 138, p. 180, 2018.
55. Jaewon Lee", Ji-Hyeok Huh", Kwangjin Kim, and Seungwoo Lee*, "DNA origami-guided assembly of the roundest 60~100 nm gold nanospheres into plasmonic metamolecules," **Advanced Functional Materials**, vol. 28, p. 1707309, 2018.
54. Ji-Hyeok Huh", Jaewon Lee", and Seungwoo Lee*, "Comparative study of plasmonic resonances between the roundest and randomly faceted Au nanoparticles-on-mirror cavities," **ACS Photonics**, vol. 5, p. 413, 2018.
53. Mathias Kolle* and Seungwoo Lee*, "Progress and opportunities in soft photonics and bioinspired optics," **Advanced Materials**, vol. 30, p. 1702269, 2018.
52. Kwangjin Kim", SeokJae Yoo"*, Ji-Hyeok Huh", Q-Han Park, and Seungwoo Lee*, "Limitations and opportunities for optical metafluids to achieve an unnatural refractive index," **ACS Photonics**, vol. 4, p. 2298, 2017.
51. Minwoo Kim", Ji-Hyeok Huh", Joohyun Lee", Hwi Je Woo, Kwangjin Kim, Dae-Woong Jung, Gi-Ra Yi, Mun Seok Jeong, Seungwoo Lee*, and Young Jae Song*, "Photofluidic near-field mapping of electric field resonance in plasmonic metasurface assembled with gold nano particles," **Journal of Physical Chemistry Letters**, vol. 8, p. 3745, 2017.
50. Young Hyun No", Nam Hyeong Kim", Bramaramba Gnapareddy, Bumjoon Choi, Yong-Tae Kim, Sreekantha Reddy Dugasani, One-Sun Lee, Kook-Han Kim, Young-Seon Ko, Seungwoo Lee, Sang Woo Lee, Sung Ha Park*, Kilho Kim*, and Yong-Ho Kim*, "Nature-inspired construction of two-dimensionally self-assembled peptide on pristine graphene," **Journal of Physical Chemistry Letters**, vol. 8, p. 3734, 2017.
49. Kwang Jin Park", Ji-Hyeok Huh", Dae-Woong Jung, Jin-Sung Park, Gwan H. Choi, Gaehang Lee, Pil J. Yoo, Hong-Gyu Park, and Seungwoo Lee*, "Assembly of "3D" plasmonic metamolecules by "2D" AFM nanomanipulation of highly uniform and smooth gold nanoparticles," **Scientific Reports**, vol. 7, p. 6045, 2017.

48. Jae Hoon Park", Kyung Jin Park", Tao Jiang, Qijun Sun, Ji-Hyeok Huh, Zhong Lin Wang, Seungwoo Lee*, and Jeong Ho Cho*, "Light-transformable and -healable triboelectric nanogenerators," **Nano Energy**, vol. 38, p. 412, 2017.

47. YongDeok Cho", Ji-Hyeok Huh", Kyung Jin Park, Kwangjin Kim, Jaewon Lee, and Seungwoo Lee*, "Using highly uniform and smooth selenium colloids as low-loss magnetodielectric building blocks of optical metafluids," **Optics Express**, vol. 25, no. 12, p. 13822, 2017.

46. Kyung Jin Park", Jae Hoon Park", Ji-Hyeok Huh", Chan Ho Kim, Dong Hae Ho, Gwan H. Choi, Pil J. Yoo, Sung Min Cho, Jeong Ho Cho*, and Seungwoo Lee*, "Petal-inspired diffractive gratings on a wavy surface: deterministic fabrications and applications to structural colorization and LED devices," **ACS Applied Materials & Interfaces**, vol. 9, no. 11, p. 9935, 2017.

45. Pengfei Wang, Stravros Gaitanaros, Seungwoo Lee, Mark Bathe, William M. Shih and Yonggang Ke*, "Programming self-assembly of DNA origami honeycomb lattices and plasmonic metamaterials," **Journal of the American Chemical Society (JACS)**, vol. 138, no. 24, p. 7733, 2016.

44. Hyungseok Kang, Han Kim, Seongsu Kim, Hyeon Jin Shin, Siuk Cheon, Ji-Hyeok Huh, Dong Yun Lee, Seungwoo Lee, Sang-Woo Kim*, and Jeong Ho Cho*, "Mechanically robust silver nanowires network for triboelectric nanogenerators," **Advanced Functional Materials**, vol. 26, no. 42, p. 7717, 2016.

43. Dain Lee, Euyheon Hwang, Youngbin Lee, Yongsuk Choi, Jong Su Kim, Seungwoo Lee, and Jeong Ho Cho*, "Multibit MoS₂ photoelectronic memory with ultrahigh sensitivity," **Advanced Materials**, vol. 28, no. 41, p. 9196, 2016.

42. Jae Hoon Park, Qijun Sun, Yong Suk Choi, Seungwoo Lee, Dong Yun Lee, Yong-Hoon Kim, and Jeong Ho Cho*, "Wafer-scale microwire transistor array fabricated via evaporative assembly," **ACS Applied Materials & Interfaces**, vol. 8, no. 24, p. 15543, 2016.

41. Seunghyun Lee, Andry Ongko, Hoyoung Kim, Sang-Gu Yim, Geumhye Jeon, Seungwoo Lee, Minseok Kwak*, and Seung Yun Yang*, "Sub 100 nm gold nanohole-enhanced Raman scattering on flexible PDMS sheets," **Nanotechnology**, vol. 27, no. 31, p. 315301, 2016.

40. Seungwoo Lee, Byungsoo Kang, Hohyun Keum, Numair Ahmed, John A. Rogers, Placid M. Ferreira, Seok Kim*, and Bumki Min*, "Heterogeneously assembled metamaterials and metadevices via 3D modular transfer printing," **Scientific Reports**, vol. 6, article no. 27621, 2016.

39. Dain Lee", Yongsuk Choi", Euyheon Hwang, Moon Sung Kang, Seungwoo Lee, and Jeong Ho Cho*, "Black phosphorus nonvolatile transistor memory" **Nanoscale**, vol. 8, no. 17, p. 9107, 2016.

38. Seon Ju Yeo", Kyung Jin Park", Kai Guo, Pil J. Yoo*, and Seungwoo Lee*, "Microfluidic generation of monodisperse and photoreconfigurable microspheres for floral iridescence-inspired structural colorization," **Advanced Materials**, vol. 28, no. 26, p. 5268, 2016.

37. Seungwoo Lee*, Kyung Eun Lee", Won Jun Lee, Byung Cheol Park, Byungsoo Kang, Euyheon Hwang*, and Sang-Ouk Kim*, "Two-terminal graphene oxide devices for electrical modulation of broadband terahertz waves," **Advanced Optical Materials**, vol. 4, no. 4, p. 548, 2016.

36. Jun Hyuk Heo, Kyung-Il Kim, Hui Hun Cho, Jin Woong Lee, Byoung Sang Lee, Seok Young Yoon, Kyung Jin Park, Seungwoo Lee, Jaeyun Kim, Dongmok Whang, and Jung Heon Lee*, "Ultrastable-stealth large gold nanoparticles with DNA directed biological functionality," **Langmuir**, vol. 31, no. 51, p. 13773, 2015.

35. Hong Suk Kang, Seungwoo Lee, Jaeho Choi, Hongkyung Lee, Jung-Ki Park*, and Hee-Tak Kim*, "Light-induced surface patterning of silica," **ACS Nano**, vol. 9, no. 10, p. 9837, 2015.

34. Seungwoo Lee*, "Colloidal superlattices for unnaturally high-index metamaterials at broadband optical frequencies," **Optics Express**, vol. 23, no. 22, p. 28170, 2015.

33. Dong-Kwan Kim, Yoon Jo Hwang, Cheol-Ho Yoon, Hye-On Yoon, Ki Soo Chang, Gaehang Lee*, Seungwoo Lee* and Gi-Ra Yi*, "Experimental approach to the fundamental limit on the extinction coefficients of the ultra-smooth and highly spherical gold nanoparticles," *Physical Chemistry Chemical Physics*, vol. 17, no. 32, p. 20786, 2015.
32. Seungwoo Lee* and Juyoung Kim, "Design of optical metamaterial mirror with metallic nanoparticles for floating-gate graphene optoelectronic devices," *Optics Express*, vol. 23, no. 17, p. 21809, 2015.
31. Minwoo Kim", Seungwoo Lee", Joohyun Lee, Dong Kwan Kim, Yoon Jo Hwang, Gaehang Lee, Gi-Ra Yi, and Young Jae Song*, "Deterministic assembly of metamolecules by atomic force microscope-enabled manipulation of ultra-smooth, super-spherical gold nanoparticles," *Optics Express*, vol. 23, no. 10, p. 12766, 2015.
30. Yongsuk Choi, Qijun Sun, Euyheon Hwang, Youngbin Lee, Seungwoo Lee, and Jeong Ho Cho*, "On-demand doping of graphene by stamping with a chemically functionalized rubber lens," *ACS Nano*, vol. 9, no. 4, p. 4354, 2015.
29. Sukjae Jang, Euyheon Hwang, Youngbin Lee, Seungwoo Lee, and Jeong Ho Cho*, "Multifunctional graphene optoelectronic devices capable of detecting and storing photonic signals," *Nano Letters*, vol. 15, no. 4, p. 2542, 2015.
28. Seungwoo Lee", Hong Suk Kang", Antonio Ambrosio", Jung-Ki Park, and Lorenzo Marrucci, "Directional superficial photofluidization for deterministic shaping of complex 3D architectures," *ACS Applied Materials & Interfaces*, vol. 7, no. 15, p. 8209, 2015.
27. Sol-Ah Lee, Hong Suk Kang, Jung-Ki Park, and Seungwoo Lee*, "Vertically-oriented, three-dimensionally tapered deep-subwavelength metallic nanohole array developed by photofluidization lithography," *Advanced Materials*, vol. 26, no. 44, p. 7521, 2014.
26. Hong Suk Kang, Hee-Tak Kim*, Jung-Ki Park*, and Seungwoo Lee*, "Light-powered healing of a wearable electrical conductor," *Advanced Functional Materials*, vol. 24, no. 46, p. 7273, 2014.
25. Indra Karnadi", Jaehyeon Son", Ju-Young Kim, Hoon Jang, Seungwoo Lee, Ki Soo Kim, Bumki Min*, and Yong-Hee Lee*, "A printed nanobeam laser on a SiO₂/Si substrate for low-threshold continuous-wave operation," *Optics Express*, vol. 22, no. 10, p. 12115, 2014.
24. Seungwoo Lee* and Juyoung Kim, "Efficient confinement of ultraviolet light into a self-assembled, dielectric colloidal monolayer on a flat aluminum film," *Applied Physics Express*, vol. 7, no. 11, p. 112002, 2014.
23. Hong Suk Kang", Seungwoo Lee", Sol-Ah Lee, and Jung-Ki Park*, "Multi-level micro/nanotexturing by three-dimensionally controlled photofluidization and its use in plasmonic applications," *Advanced Materials*, vol. 25, no. 38, p. 5490, 2013.
22. Yong-Cheol Jeong, Yongjoon Heo, Jihye Lee, Seungwoo Lee, Dowon Ahn, and Jung-Ki Park*, "Improved shelf-life of holographic photopolymer containing monomer stabilizer," *Optical Materials*, vol. 35, no. 3, p. 547, 2013.
21. Seung Hoon Lee", Muhan Choi", Teun-Teun Kim", Seungwoo Lee, Ming Liu, Xiaobo Yin, Hong-Kyw Choi, Seung S. Lee, Choon-Gi Choi, Sung-Yul Choi, Xiang Zhang, and Bumki Min*, "Switching terahertz waves with gate-controlled active graphene metamaterials," *Nature Materials*, vol. 11, no. 11, p. 936, 2012.
20. Seungwoo Lee, Seongnam Kim, Teun-Teun Kim, Yushin Kim, Muhan Choi, Seung Hoon Lee, Ju-Young Kim, and Bumki Min*, "Reversibly stretchable and tunable terahertz metamaterials with wrinkled layouts," *Advanced Materials*, vol. 24, no. 26, p. 3491, 2012.
19. Seok Kim, Andrew Carlson, Huanyu Cheng, Seungwoo Lee, Jung-Ki Park, Yonggang Huang, and John A. Rogers*, "Enhanced adhesion with pedestal-shaped elastomeric stamps for transfer printing," *Applied Physics Letters*, vol. 100, no. 17, p. 171909, 2012.

18. Seungwoo Lee*, Hong Suk Kang, and Jung-Ki Park*, "Directional photofluidization lithography: Micro/nanostructural evolution by photofluidic motions of azobenzene materials," **Advanced Materials**, vol. 24, no. 16, p. 2069, 2012.

17. Seok Kim, Yewang Su, Agustin Mihi, Seungwoo Lee, Zhuangjian Liu, Tanmay K. Bhandakkar, Jian Wu, Joseph B. Geddes III, Harley T. Johnson, Yongwei Zhang, Jung-Ki Park, Paul V. Braun, Yonggang Huang, and John A. Rogers*, "Imbricate scales as a design construct for microsystems technologies," **Small**, vol. 8, no. 6, p. 901, 2012.

16. Hong Suk Kang, Seungwoo Lee*, and Jung-Ki Park*, "Monolithic, hierarchical surface reliefs by holographic photofluidization of azopolymer arrays: Direct visualization of polymeric flows," **Advanced Functional Materials**, vol. 21, no. 23, p. 4412, 2011.

15. Seungwoo Lee*, Jonghwa Shin, Hong Suk Kang, Yong-Hee Lee, and Jung-Ki Park*, "Deterministic nanotexturing by directional photofluidization lithography," **Advanced Materials**, vol. 23, no. 29, p. 3244, 2011.

14. Seungwoo Lee*, Hong Suk Kang, and Jung-Ki Park*, "High resolution patterning of various large-area, highly ordered structural motifs by directional photofluidization lithography: Sub-30 nm line, ellipsoid, rectangle, and circle arrays," **Advanced Functional Materials**, vol. 21, no. 10, p. 1770, 2011.

13. Seungwoo Lee*, Jonghwa Shin, Yong-Hee Lee, and Jung-Ki Park*, "Fabrication of the funnel-shaped three-dimensional plasmonic tip arrays by directional photofluidization lithography," **ACS Nano**, vol. 4, no. 12, p. 7175, 2010.

12. Mi Ri Kim, Seungwoo Lee, Jung-Ki Park*, and Kuk Young Cho*, "Golf ball-shaped PLGA microparticles with internal pores fabricated by simple O/W emulsions," **Chemical Communications**, vol. 46, no. 39, p. 7433, 2010.

11. Dowon Ahn, Yong-Cheol Jeong, Seungwoo Lee, and Jung-Ki Park*, "UV-driven in-plane rotation of liquid crystal director in poly(vinyl cinnamate) films having micro-scale grooves," **Optics Letters**, vol. 35, no. 18, p. 3141, 2010.

10. Jun Young Lee, Seungwoo Lee, Jung-Ki Park, Yongseok Jun, Young-Gi Lee, Kwang Man Kim, Jin Ho Yun, and Kuk Young Cho*, "Simple approach for enhancement of light harvesting efficiency of dye sensitized solar cells by polymeric mirror," **Optics Express**, vol. 18, no. S4, p. A522, 2010.

9. Shi-Jun Sung, Jin-Ho Yoon, Seungwoo Lee, Jung-Ki Park, Dae-Wan Kim, and Kuk Young Cho*, "Poly(ϵ -caprolactone) diol functionalized with cinnamoyl group and its UV triggered in-plane alignment," **Reactive & Functional Polymers**, vol. 70, no. 9, p. 622, 2010.

8. Seungwoo Lee, Jonghwa Shin, Yong-Hee Lee, Shanhui Fan, and Jung-Ki Park*, "Directional photofluidization lithography for nanoarchitectures with controlled shapes and sizes," **Nano Letters**, vol. 10, no. 1, p. 296, 2010.

7. Jihye Lee, Seungwoo Lee, Yong-Cheol Jeong, Kuk Young Cho, and Jung-Ki Park*, "Generation of pretilt angles of liquid crystals on cinnamate-based photoalignment layer for a simple directional peel-off process," **Optics Express**, vol. 17, no. 26, p. 23565, 2009.

6. Seungwoo Lee, Yong-Cheol Jeong, Jihye Lee, and Jung-Ki Park*, "Multifunctional photoreactive inorganic cages for three-dimensional holographic data storage," **Optics Letters**, vol. 34, no. 20, p. 3095, 2009.

5. Dowon Ahn, Yong-Cheol Jeong, Seungwoo Lee, Jihye Lee, Yongjoon Heo, and Jung-Ki Park*, "Control of liquid crystal pretilt angles by using organic/inorganic hybrid interpenetrating networks," **Optics Express**, vol. 17, no. 19, p. 16603, 2009.

4. Seungwoo Lee, Yong-Cheol Jeong, Yongjoon Heo, Sun Il Kim, Yoon-Sun Choi, and Jung-Ki Park*, "Holographic photopolymers of organic/inorganic hybrid interpenetrating networks for reduced volume shrinkage," **Journal of Materials Chemistry**, vol. 19, no. 8, p. 1105, 2009.

3. Seungwoo Lee, Yong-Cheol Jeong, and Jung-Ki Park*, "Unusual surface reliefs from photoinduced creeping and aggregation behavior of azopolymer," **Applied Physics Letters**, vol. 93, no. 3, p. 031912/1, 2008.

2. Seungwoo Lee, Yong-Cheol Jeong, and Jung-Ki Park*, "Facile fabrication of close-packed microlens arrays using photoinduced surface relief structures as template," **Optics Express**, vol. 15, no. 22, p. 14550, 2007.

1. Yong-Cheol Jeong, Seungwoo Lee, and Jung-Ki Park*, "Holographic diffraction gratings with enhanced sensitivity based on epoxy-resin photopolymers," **Optics Express**, vol. 15, no. 4, p. 1497, 2007.

Bookchapter

* Corresponding author; "Equal contribution; _Group members of mine

1. Jaewon Lee", Sung Hun Park", Jangwon Kim", Kyung Hun Rho, Hoyoung Lee, Soyeon Kim, and Seungwoo Lee*, "DNA nanotechnology for superradiance", 2025. ([arXiv:2503.10791](https://arxiv.org/abs/2503.10791)), "Recent progresses in superradiance," edited by Kyungwon An, Susumu Kuma, and James Harries Chapter 8, DNA nanotechnology for superradiance, World Scientific Publishing Company