

Contact: KU, School of Biomedical Engineering Cell: 82-10-2852-4857
 Homepage: <https://sites.google.com/view/theryugroup> email: rongxiang82@korea.ac.kr

Overview

- **Associate Professor** 2023.03~
 - School of Biomedical Engineering, Korea Univ. Seoul 02481, Republic of Korea
- **KU-KIST professor** 2021.03 ~2023.02
 - Department of Graduate School of Converging Science and Technology, Korea University, Seoul 02481, Republic of Korea
- **Principal Researcher** 2016.10 ~ 2023.02
 - Center for Brain Technology, Korea Institute of Science and Technology (KIST), Seoul 136-791, Republic of Korea
- **Postdoctoral researcher** 2013.10 ~ 2016.09
 - Department of Electrical and Computer Engineering, University of Minnesota, Twin Cities, U.S.A
- **Ph.D/MS/BS courses** 2003.03 ~ 2013. 08
 - Electrical Engineering, Seoul National University (SNU), Seoul, Korea.



Research topics

- Major experienced scientific research fields of Nanobio, NEMS/MEMS, Biophysics, Photonics, Optoelectronics, Electro-hydrodynamics
- **Detection/monitoring/analysis of Nanobio material** using optical/electrical instrument (optoelectronics, sensor, photonics including SW simulation & analysis) via **Nano/micro-chip design & fabrication** (NEMS/MEMS) technique
- ✓ Cross-disciplinary topics for NT-BT-ET-IT
 - **NT** (MEMS, NEMS, thin film manipulation for design of optoelectronic device, photonic chip)
 - **BT** (Biophysics and related reconstruction of biological phenomena via proteins & Extracellular vesicle, lipids)
 - **ET** (Hazardous nanoparticulate or gas such as ultrafine dust, micro/nano plastic, virus, Hydrogen gas)
 - **IT** (Electronics and photonics as analytical methods)

Education & Carrer

Course / Thesis title	
2013.10 ~2016.10	Postdoc. Dept of Electrical Engineering at Univ. of Minnesota-Twin Cities U.S.A - <i>"Lipid Raft Formation and Sensing by Surface Plasmon Resonance"</i>
2009.03 ~2013.08	Ph. D. Dept of Electrical Engineering at Seoul Natl. Univ., Seoul, Korea - <i>"Spatial manipulation of model membranes for lipid raft formation and protein localization"</i>
2007.03 ~2009.02	M.S. Dept of Electrical Engineering at Seoul Natl. Univ., Seoul, Korea - <i>"Two-dimensional control of charged fluorescence molecules by electric field in lipid bilayer membranes"</i>
2003.03 ~2007.02	B.S. Dept of Electrical Engineering at Seoul Natl. Univ., Seoul, Korea - <i>"Enhancing wide viewing characteristic of LCDs with UV curable polymer"</i>

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Selected Papers

Corresponding Author

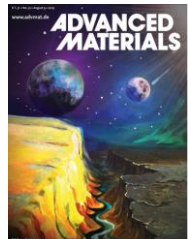
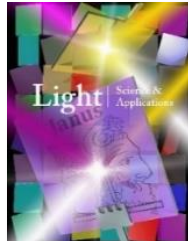
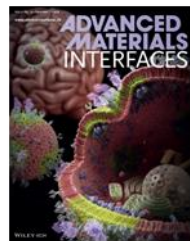
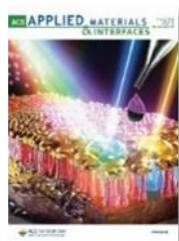
- J. Lee, J. Lee, G. Lee, D.-S. Kim, **Y.-S. Ryu***, and M. Seo*, Advancements of Intense Terahertz Field Focusing on Metallic Nanoarchitectures for Monitoring Hidden Interatomic Gas-Matter Interactions, *Advanced Materials*. 2024, 36, 2308975 (IF=29.4)
- J. Lee, E.-S. Yu, T. Kim, I. S. Kim, J. Kwak, S. Chung, S. J. Kwak, W. B. Lee, Y. Pak*, and **Y.-S. Ryu***, "Naked-Eye Observation of Water-forming Reaction on Palladium Etalon: Transduction of gas-matter reaction into light-matter interaction", *Photonix*, 4, 20, (2023) (IF = 19.85)
- T. Kim[†], J. Lee[†], E.-S. Yu, S. Chung, S. I. Choi*, and **Y.-S. Ryu***, "Fabry-Perot cavity control for tunable Raman scattering" (*Small*, 2023, 2207003) (IF = 15.15),. Selected as # Inside front cover image (IF=17.52)
- E.-S. Yu, E.T. Jeong, I.S. Kim, S. Chung, S. Han, S. Lee, I. Choi, and **Y.-S. Ryu*** "Real-Time Underwater Nanoplastic Detection beyond the Diffusion Limit and Low Raman Scattering Cross-Section via Electro-Photonic Tweezers", (*ACS Nano*, 2023, 17, 3, 2114–2123) and selected as **#Cover image**, <https://pubs.acs.org/doi/abs/10.1021/acsnano.2c07933> (IF=18.03)
- J. M. Baek, W. H. Jung, E.-S. Yu, D. J. Ahn*, **Y.-S. Ryu*** "In-vitro membrane platform for the visualization of water impermeability across the liquid-ordered phase under hypertonic conditions conditions", (*JACS*, 144 (48), 21887–21896) and selected as **#Cover image** (IF=16.38)
- E.-S. Yu, K. Chae, T. Kim, J. Lee, J. Seo, I. S. Kim, A. J. Chung, S.-D. Lee, and **Y.-S. Ryu***, "Development of a Photonic Switch via Electro-capillarity-Induced Water Penetration across a 10-nm Gap ", *Small*, 2107060, (2022) (IF = 15.15)
- D. Lee, S. W. K. Jung, E.-S. Yu, T. Lee, J. H. Kim, H. S. Song, K. H. Lee, S. Lee, S.-K. Han, M. C. Choi, D. J. Ahn*, **Y.-S. Ryu***, and C. Kim*, "Ionic contrast across a lipid membrane for Debye length extension: towards an ultimate bioelectronic transducer", *Nat. Communications*, 12, 3741 (2021) (IF=17.69)
- E.-S. Yu, S.-H. Lee, G. Lee, Q.-H. Park, A.J. Chung, M. Seo*, and **Y.-S. Ryu***, "Nanoscale terahertz monitoring on multi-phase dynamic assembly of nanoparticles under aqueous environment", *Advanced Science*, 2004826 (2021). Selected as # Front Cover image (IF=17.52)
- T. Kim, E.-S. Yu, Y.-G. Bae, J. Lee, I. S. Kim, S. Chung, S.-Y. Lee*, and **Y.-S. Ryu***, "Asymmetric Optical Camouflage: Tunable coloration accompanied by optical Janus effect", *NPG Light: Science and application*, 9, 175 (2020) (IF=20.26).
- E.-S. Yu, H. Lee, S.-M. Lee, J. Kim, T. Kim, J. Lee, C. Kim, M. Seo, J. H. Kim, Y. T. Byun, S.-C. Park, S. -Y. Lee, S.-D. Lee*, and **Y.-S. Ryu***, "Precise capture and dynamic relocation of nanoparticulate biomolecules through the dielectrophoretic enhancement by vertical nanogap", *Nat. Communications*, 11, 1, 1-9 (2020) (IF=17.69)

First Author

- **Y.-S. Ryu**, H. Yun, T. Chung, J. -H. Suh, S. Kim, K. Lee, N. J. Wittenberg, S.-H. Oh, B. Lee, and S.-D. Lee, "Kinetics of Lipid Raft Formation at Lipid Monolayer-bilayer Junctions Determined by Surface Plasmon Resonance", *Biosensors and Bioelectronics*, 142, 111568 (2019) (IF=12.54)
- **Y.-S. Ryu**, D. Yoo, N. J. Wittenberg, L. R. Jordan, S.-D. Lee, A.N. Parikh, and S.-H. Oh "Lipid membrane deformation accompanied by disk-to-ring shape transition of cholesterol-rich domains" *Journal of the American Chemical Society (JACS)*, 137, 27, 8692–8695 (2015) (IF=16.38)
- **Y.-S. Ryu**, I.-H. Lee, J.-H. Suh, S.C. Park, S. Oh, L. R. Jordan, N. J. Wittenberg, S.-H. Oh, B. Lee, N.L. Jeon, B. Lee, A.N. Parikh, and S.-D. Lee "Reconstituting ring-rafts in bud-mimicking topography of model membranes" *Nat. Communications*, 5, 1, 1-8, (2014) (IF=17.69)

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Research Papers

- [1] Taehyun Kim, Hyeonbin Woo, Ji Min Baek, Hyejeong Seong, Seok Chung, and Yong-Sang Ryu *, " Colorimetric printing by plasmonic photothermal effect-assisted Fabry-Perot cavity tuning: Nanoparticle sinking, and geometrical deformation accompanied by polymer shrinkage " *ACS NANO*, Under review.
- [2] SY Choi+, S. Lee+, M.-K. Kim*, E.-S. Yu*, and Y.-S. Ryu* "Challenges and Recent Analytical Advances in Micro/Nanoplastics Detection " , *Anal. Chem.* [invited review paper, Under review
- [3] J. Lee+, J. Lee+, G. Lee+, D.-S. Kim, **Y.-S. Ryu***, and M. Seo* , "Advancements of Intense Terahertz Field Focusing on Metallic Nanoarchitectures for Monitoring Hidden Interatomic Gas-Matter Interactions" , *Advanced Materials*. 2024, 36, 2308975 (IF=29.4) **Selected as Frontispiece Inside cover**
<https://onlinelibrary.wiley.com/doi/10.1002/adma.202308975>
- [4] G. Lee, Y. Roh, E. Y. Rho, **Y.-S. Ryu**, and Minah Seo* , "Sensitive Detection and Evaluation of Ultrafine Dust Particles with Resonant Terahertz Metasurfaces", *Optical Materials Express*, 13, 9, 2563-2571 (2023)
- [5] Song, Seung Ho ; Choi, Changsoon ; Ahn, Jongtae ; Lee, Je-Jun ; Jang, Jisu; Yu, Byoung-Soo ; Hong, Jung Pyo ; **Ryu, Yong-Sang** ; Kim, Yong-Hoon; Hwang, Do Kyung Hwang*, "Artificial optoelectronic synapse based on spatiotemporal irradiation to source-sharing circuitry of synaptic phototransistors", *INFOMAT*,2023,e124.
<https://doi.org/10.1002/inf2.12479>
- [6] J.Lee, E.-S. Yu, T. Kim, I. S. Kim, J. Kwak, S. Chung, S. J. Kwak, W. B. Lee, Y. Pak*, and **Y.-S. Ryu***, "Naked-Eye Observation of Water-forming Reaction on Palladium Etalon: Transduction of gas-matter reaction into light-matter interaction", *Photonix*, 4, 20, (2023) (IF = 19.85)
- [7] H. Cho†, D. Jang†, J. Yoon, **Y.-S. Ryu**, B. Lee, B. Lee*, S. Chung*, and Y. Hong*, „Milliwatt-scale body-heat harvesting using stretchable thermoelectric generators for fully untethered, self-sustainable wearables“, *ACS Energy Letters*, 2023, 8, 6, 2585–2594 (IF = 23.99)
- [8] B. Lee, H. Cho, S. Moon, Y. Ko, **Y.-S. Ryu**, H. Kim, J. Jeong and S Chung*, "Omnidirectional printing of elastic conductors for three-dimensional stretchable electronics " *Nature Electronics*, 6, 307–318 (2023) (IF = 33.26)
- [9] T. Kim†, J.Lee†, E.-S. Yu, S. Chung, S. I. Choi*, and **Y.-S. Ryu***, "Fabry-Perot cavity control for tunable Raman scattering" (*Small*, 2023, 2207003) **Selected as # Inside front cover image** (IF = 15.15)
- [10] E.-S. Yu, E.T.Jeong, I.S. Kim, S. Chung, S. Han, S. Lee, I. Choi, and **Y.-S. Ryu*** " Real-Time Underwater Nanoplastic Detection beyond the Diffusion Limit and Low Raman Scattering Cross-Section via Electro-Photonic Tweezers", (*ACS Nano*, 2023, 17, 3, 2114–2123) and selected as **#Cover image**, <https://pubs.acs.org/doi/abs/10.1021/acsnano.2c07933> (IF=18.03)

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- [11] J. M. Baek, W. H. Jung, E.-S. Yu, D. J. Ahn*, **Y.-S. Ryu*** "In-vitro membrane platform for the visualization of water impermeability across the liquid-ordered phase under hypertonic conditions conditions (*JACS*, 144 (48), 21887–21896) and selected as **#Cover image**, unvolumed) (*IF*=16.38)
- [12] E.-S. Yu, K. Chae, T. Kim, J. Lee, J. Seo, I. S. Kim, A. J. Chung, S.-D. Lee, and **Y.-S. Ryu***, "Development of a Photonic Switch via Electro-capillarity-Induced Water Penetration across a 10-nm Gap", *Small*, 2107060, (2022) (*IF* = 15.15)
- [13] G. Lee, E.-S. Yu, **Y.-S. Ryu***, and M. Seo*, "The perspectives of broadband metasurfaces and electro-photonics tweezer applications" *Nanophotonics*, 11, 9, 1783 (2022) (*IF*=7.92)
<https://www.degruyter.com/document/doi/10.1515/nanoph-2021-0711/html>
- [14] D. Lee, S. W. K. Jung, E.-S. Yu, T. Lee, J. H. Kim, H. S. Song, K. H. Lee, S. Lee, S.-K. Han, M. C. Choi, D. J. Ahn*, **Y.-S. Ryu***, and C. Kim*, "Ionic contrast across a lipid membrane for Debye length extension: towards an ultimate bioelectronic transducer", *Nat. Communications*, 12, 3741 (2021) (*IF*=17.69)
- [15] E.-S. Yu, S.-H. Lee, G. Lee, Q.-H. Park, A.J. Chung, M. Seo*, and **Y.-S. Ryu***, "Nanoscale terahertz monitoring on multi-phase dynamic assembly of nanoparticles under aqueous environment", *Adv. Sci.*, 2004826, (2021) Selected as # Front Cover image (*IF*=17.52)
- [16] S.H. Lee, Y. Roh, S.-H. Lee, **Y.-S. Ryu**, B.-K. Ju, and M. Seo*, "Direct Comparison with Terahertz Metamaterials and Surface-Enhanced Raman Scattering in Molecular-Specific Sensing Performance", *Optics Express*, 29, 1, 12-23, (2021) (*IF*=3.83)
- [17] I. R. Suhito, Y. J. Han, **Y.-S. Ryu**, H. Son*, T. -H. Kim*, "Autofluorescence-Raman Mapping Integration Analysis for Ultra-fast Label-free Monitoring of Adipogenic Differentiation of Stem Cells", *Biosensors and Bioelectronics*, 178, 113018 (2021) (*IF*=12.54)
- [18] H. Jeong, E.-S. Yu, T. Kim, I. S. Kim, S.-D. Lee, **Y.-S. Ryu*** and S.-Y. Lee*, Physicochemical Modulation of Nanometer-Thick Etalon Films for Liquid-Sensitive Color Display with Full-Color Spectrum Generation, (*ACS Applied Nano Materials*, 4, 1, 389–395 (2021) Selected as # cover image (*IF*=6.14)
- [19] S.-H. Lee, S. Shin, Y. Roh, S. J. Oh, S. H. Lee, H. S. Song, **Y.-S. Ryu**, Y. K. Yun, and M. Seo*. "Label-free brain tissue imaging using large-area terahertz metamaterials" *Biosensors and Bioelectronics*, 170, 112663 (2020) (*IF*=12.54)
- [20] T. Kim, E.-S. Yu, Y.-G. Bae, J. Lee, I. S. Kim, S. Chung, S.-Y. Lee*, and **Y.-S. Ryu***, "Asymmetric Optical Camouflage: Tunable coloration accompanied by optical Janus effect", *NPG Light: Science and application*, 9, 175, (2020) (*IF*=20.26)
- [21] Y.K. Lee, E.-S. Yu, D.J. A.*, and **Y.-S. Ryu***, "Elasticity-driven membrane budding through cholesterol concentration on supported lipid monolayer-bilayer junction", *Adv. Mater. Interfaces*, 2000937 (2020) (*IF*=6.39)
- [22] P. Pendyala, H. N. Kim*, **Y.-S. Ryu**, and E.-S. Yoon*, "Time-Dependent Wetting Scenarios of a Water Droplet on Surface-Energy-Controlled Microcavity Structures with Functional Nanocoatings", *ACS Appl. Mater. Interfaces*, 12, 35, 39881–39891 (2020) (*IF*=9.29)
- [23] E.-S. Yu, H. Lee, S.-M. Lee, J. Kim, T. Kim, J. Lee, C. Kim, M. Seo, J. H. Kim, Y. T. Byun, S.-C. Park, S. -Y. Lee, S.-D. Lee*, and **Y.-S. Ryu***, "Precise capture and dynamic relocation of nanoparticulate biomolecules through the dielectrophoretic enhancement by vertical nanogap", *Nat. Communications*, 11, 1, 1-9 (2020) (*IF*=17.69)
- [24] J. Lee, C. Seol, L. V. Nam, S. Jang, J. Kim, I. Kim, **Y.-S. Ryu***, & S. M. Kim*, "Investigation of Structural Stability for Monolithic Nano Bridges on Micro apertures", *Appl. Sci.*, 10, 8, 2922 (2020) (*IF*=2.83)
- [25] J.M. Baek and **Y.-S. Ryu***, "Surface Sensitive Analysis Device using Model Membrane and Challenges for Biosensor-chip", *BioChip Journal*, 14, 1, 110-123 (2020) (*IF*=4.23)
- [26] **Y.-S. Ryu**, H. Yun, T. Chung, J. -H. Suh, S. Kim, K. Lee, N. J. Wittenberg, S.-H. Oh, B. Lee, and S.-D. Lee*, "Kinetics of Lipid Raft Formation at Lipid Monolayer-bilayer Junctions Determined by Surface Plasmon Resonance", *Biosensors and Bioelectronics*, 142, 111568 (2019) (*IF*=12.54)
- [27] S.-W. Moon, H.-D. Jeong, S. Lee, B. Lee, **Y.-S. Ryu**, and S.-Y. Lee* "Compensation of spin-orbit interaction using the geometric phase of distributed nanoslits for polarization-independent plasmonic vortex generation" *Optics Express* 27, 14, 19119-19129 (2019) (*IF*=3.83)
- [28] H. Lee, B. Shin, D. Shin, J. Park, **Y.-S. Ryu**, D. H. Woo, and T. Lee*, "Surface Correlation-Based Fingerprinting Method Using LTE Signal for Localization in Urban Canyon", *Sensors*, 19, 3325, (2019) (*IF*=3.85)

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- [29] **Y.-S. Ryu**, L.-R. Jordan, N. J. Wittenberg, X. Xu, S. M. Kim, D. Yoo, C. Jeong, A. E. Warrington, M. Rodriguez, S.-H. Oh, and S.-D. Lee "Curvature Elasticity-Driven Leaflet Asymmetry and Interleaflet Raft Coupling in Supported Membranes" *Adv. Mater. Interfaces*, 5, 1801290 (2018) Selected as # cover image (IF=6.39)
- [30] E.-S. Yu, S.-H. Lee, Y.-G. Bae, J. Choi, D. Lee, C. Kim, T. Lee, S.-Y. Lee, S.-D. Lee*, and **Y.-S. Ryu*** "Highly Sensitive Color-Tunability by Scalable Nanomorphology of Dielectric Layer in Liquid Permeable Metal-Insulator-Metal Structure", *ACS Appl. Mater. Interfaces*, 10, 44, 38581-38587 (2018) Selected as # inside cover image (IF=9.29)
- [31] B. Park, H. Yang, T. H. Ha, H. S. Park, S. J. Oh, **Y.-S. Ryu**, Y. Cho, H.-S. Kim, J. Oh, D. K. Lee, C. Kim, T. Lee, M. Seo, J. Choi, Y. M. Jhon, D. H. Woo, S. Lee, S. H. Kim, H.-J. Lee, S. C. Jun, H. S. Song,* T. H. Park,* and J. H. Kim*, "Artificial Rod and Cone Photoreceptors with Human-Like Spectral Sensitivities", *Adv. Mater.*, 1706764 (2018) (IF=32.09)
- [32] **Y.-S. Ryu**, D.-K. Lee, J.-H. Kang, S.-H. Lee, E.-S. Yu and M. Seo "Ultrasensitive Terahertz sensing of gold nanoparticles inside nano slot antennas", *Optics Express*, 25, 24, 30591-30597 (2017) (IF=3.83)
- [33] **Y.-S. Ryu**, M.-H. Kim, "Model membrane-mediated cell alignment through surface hydrophobicity" *Mol. Cryst. Liq. Cryst.* 636, 1, 149-154 (2016) (IF=0.67)
- [34] **Y.-S. Ryu**, J.-H. Suh, S.-W. Lee, Y. Sohn, N. J. Wittenberg, S.-H. Oh, A. N. Parikh, and S.-D. Lee "Continuity of Monolayer-Bilayer Junctions for Localization of Lipid Raft Microdomains in Model Membranes", *Scientific Reports*, 6, 26823 (2016) (IF=4.99)
- [35] **Y.-S. Ryu**, J.-H. Suh, M.-H. Kim, Y. Sohn, and S.-D. Lee "Dynamic manipulation of charged lipids in model membrane for bio-microarrays", *J. Nanosci. Nanotechnol.* 16, 6355-6359 (2016) (IF=1.13)
- [36] **Y.-S. Ryu**, D. Yoo, N. J. Wittenberg, L. R. Jordan, S.-D. Lee, A.N. Parikh, and S.-H. Oh "Lipid membrane deformation accompanied by disk-to-ring shape transition of cholesterol-rich domains" *Journal of the American Chemical Society (JACS)*, 137, 27, 8692-8695 (2015) (IF=16.38)
- [37] J.-H. Suh, J Kim, **Y.-S. Ryu**, Y Sohn, and S.-D. Lee "Control of surface anchoring properties of liquid crystal by thermo-transfer printing of siloxane oligomers" *Liquid Crystals*, 1-7, (2015) Selected as # cover image (IF=2.68)
- [38] **Y.-S. Ryu**, I.-H. Lee, J.-H. Suh, S.C. Park, S. Oh, L. R. Jordan, N. J. Wittenberg, S.-H. Oh, B. Lee, N.L. Jeon, B. Lee, A.N. Parikh, and S.-D. Lee "Reconstituting ring-rafts in bud-mimicking topography of model membranes" *Nat. Communications*, 5, 1, 1-8, (2014) (IF=17.69)
- [39] J.-H. Suh, S.-W. Lee, **Y.-S. Ryu**, Y. Sohn, and S.-D. Lee "Coarsening Nature of Liquid-Ordered Domain in Model Membrane" *Mol. Cryst. Liq. Cryst.* 600, 81-87, (2014) (IF=0.67)
- [40] S. Kim, **Y.-S. Ryu**, J.-H. Suh, C.-M. Keum, Y. Sohn and S.-D. Lee, "Biocompatible Patterning of Proteins on Wettability Gradient Surface by Thermo-Transfer Printing", *J. Nanosci. Nanotechnol.* 14, 1-3, (2014) (IF=1.13)
- [41] **Y.-S. Ryu**, S.-W. Lee, B. Lee and S.-D. Lee, "Field-directed diffusion of charged lipids in supported membranes for spatially addressed microarrays", *Mol. Cryst. Liq. Cryst.* 559, 1-8, (2012) (IF=0.67)

Research experiences

Principal Research Scientist, Korea Institute of Science and Technology (KIST)

(2016. 10. - Current)

[NT/ET/BT Particle manipulation + Surface-sensitive device]

- NEMS/MEMS manufacturing for High-throughput, scalable sensor chip design for optical/biological applications
- Design and optimization nanochip for Bio/Nano/Environmental material concentration and detection
- Analysis of electro-hydrodynamics, local field imaging for Bio/Nano/Environmental material detection
- Optoelectronic sensors for ultra-low density Bio/Nano particle concentration (THz/SERS/RAMAN spectra)
- Nanophotonic device for microwave (= THz wavespectrum) & Visible wavespectrum (colormetric) sensor
- Thin film fabrication for gas sensor (e.g., Hydrogen sensor) using colormetric display
- Reconstruction of artificial vision using photoreceptor-revival
- Field-Effect Transistor-mediated molecular detection under physiological conditions

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Post-Doctoral Fellow, University of Minnesota, Twin Cities, U.S.A**2013 – 2016***Advisor- Prof. Sang-Hyun Oh, Dept. of Electrical and Computer Engineering***[Biofilm + Particle concentration]**

- Development of nano to micro-scaled structured devices
- Design and optimization of silica-based substrates for Supported lipid bilayer (SLB) membrane -approach
- Phase-separation of model membrane induced by physical factors in microfluidic system
- Surface modification for implication for optical and biological studies (Major topic: Lipid raft & Vesicle manipulation)
- Fabricating and generating of supported lipid membrane on the gold surface and detection
- Vesicle trapping and formation of stack lipid bilayer through dielectrophoresis.
- Nanovesicle sorting (e.x. extra-cellular vesicle)/detection and vesicle fusion for compositional hybridization

Graduate Researcher,**2009 – 2013***Advisor- Prof. Sin-Doo Lee, Dept. of Electrical and Computer Engineering***[Biophysics & Analysis of surface interface: lipid film]**

- Development array to study lipid/solid substrate interaction in supported lipid bilayers (SLBs) induced curvature, hydrophobicity-driven lipid interactions, surface free energy effect.
- Examination of plasma-modified oxidation on PDMS surface
- Fabrication of bio-mimicking substrate induced by thermal softening, and photolithography process
- Surface modification (hydrophilic → hydrophobic) by easy stamping method which is crucial for formation of contiguous bilayer-monolayer junction topographic membrane.
- Development of array for investigating the layer-by layer interaction (interbilayer effects) of bilayer membrane
- Groundwork for membrane detaching from the substrate by controlling the surface properties

Post-graduate Researcher**2007 – 2009***Advisor- Prof. Sin-Doo Lee, Dept. of Electrical and Computer Engineering***[Biophysics & Analysis of surface interface: lipid film]**

- Examination of dynamic behavior on the curvature-driven surface, electric-field driven redistribution on the in vitro
- Manipulation of charged lipid on the SLB covered micro-arrayed surface
- Learning of simulation tools, drawing illustration tools, and experimental devices

Undergraduate Researcher**2003 - 2007***Advisor- Prof. Sin-Doo Lee, Dept. of Electrical and Computer Engineering*

- Investigation of polymer-driven geometrical structure for multi-domain LCD display

Fellowships and Award

• Rookie of the year of the Korean Biochip conference	2020.11
• KIST Young Fellow	Jan. 2019 – DEC. 2021
• Lecture & research fellowship	Sept. 2012 – Feb. 2013
• Electronics and telecommunications research Foundation	Mar. 2011 – Sep. 2011
• The Dean's list fellowship	Sept. 2009 – Feb. 2010
• Ministry of education & human resources development national fellowship	Sept. 2003 – Feb. 2007

Academic Service & Professional Society Memberships

-
- Royal Society of Chemistry (RSC), IEEE

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- Expert in Technology level evaluation at Minister Ministry of Science and ICT (2018-2022)
- KIST Sharing Committee & Convergence Research Fellow
- 정보통신기획평가 위원(IICT)
- 한국 고분자학회 분자전자위원회 정회원
- 한국기계학회 정회원
- 한국물리학회 정회원
- 한국생체재료학회 정회원
- 한국 마이크로나노공정학회 정회원
- 한국바이오칩학회 정회원 (2018 -) 및 평의원 (2020 -), 임원단 (2023-)
- Biochip Journal (SCI) editor 및 편집위원 (2021-2023)