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### Education and Training

2007- 2009	<b>Postdoctoral Associate, Massachusetts Institute of Technology (MIT)</b> Advisor: Dr. Darrell Irvine Materials Science & Engineering and Biological Engineering, MIT/HHMI, Cambridge, MA
2006- 2007	<b>Ph.D.</b> , Biological Engineering, <b>Cornell University</b> , NY, USA Advisor: Prof. Dr. Dan Luo Dissertation: DNA engineered materials and their applications
2003- 2006	<b>M.S.</b> , Biological Engineering, <b>Cornell University</b> , NY, USA Advisor: Prof. Dr. Dan Luo Dissertation: DNA engineered materials
1997- 2001	<b>M.S.</b> , Chemical Engineering, Sogang Univ., Seoul, KR Advisor: Prof. Dr. Kyung Byung Yoon Dissertation: Self-assembly of zeolite nanocrystal via an avidin-biotin linkage
1993- 1997	<b>B.Sc.</b> , Chemical Engineering, Sogang Univ., Seoul, KR

### Positions and Honors

#### **Positions**

2023- present	<b>FRSC</b> , Royal Society of Chemistry
2022- present	<b>National Advisory Committee</b> on the Development of Core Technology for Next Generation Vaccine Basis of Infectious Disease
2021- present	<b>Professor</b> , Department of Chemical Engineering, College of Engineering, Sungkyunkwan University, Suwon, Gyeonggi-do, KR
2020- present	<b>CTO</b> , Progeneer Corporation Ltd.
2019- present	An Evaluation Committee Member for Korea Government Technology Development Support Project for Small and Medium Enterprises
2019- 2021	A member of Seocho Middle School Violence Committee
2019- 2020	Outside director, DNANO Corporation Ltd.
2019- present	<b>Adjunct Professor</b> , Institute of Quantum Biophysics, Sungkyunkwan University
2019- present	<b>Adjunct Professor</b> , Biomedical Institute for Convergence at SKKU (BICS), Sungkyunkwan University
2018- 2020	<b>Associate Editor</b> , Nano Convergence
2017- 2018	Visiting Scholar, Department of Biological and Environmental Engineering, Cornell University, Ithaca, NY, USA
2016- 2021	<b>Associate Professor (Early Tenured)</b> , Department of Chemical Engineering, College of Engineering, Sungkyunkwan University, Suwon, Gyeonggi-do, KR
2012- 2021	Member, BK21 Graduate Program in Chemical Engineering, Sungkyunkwan University
2011- present	<b>Adjunct Professor</b> , SKKU Advanced Institute of Nanotechnology (SAINT), Sungkyunkwan University
2015- 2015	Visiting Scholar, Département de Physique, Université François Rabelais à Tours, FR
2013- 2016	<b>Associate Professor</b> , Department of Chemical Engineering, College of Engineering, Sungkyunkwan University, Suwon, Gyeonggi-do, KR
2011- 2013	<b>Assistant Professor</b> , Department of Chemical Engineering, College of Engineering, Sungkyunkwan University, Suwon, Gyeonggi-do, KR
2010- 2010	Visiting Scholar, Virginia Polytechnic Institute and State University, VA, USA
2009- 2011	<b>Assistant Professor</b> , Department of Materials Science and Engineering, Gwangju Institute of Science and Technology (GIST), Gwangju, KR
2002	Research intern, Institute of Applied Science and Technology (AST) in Sogang Univ., Seoul, KR

#### **Honors and Distinctions**

2023	<b>Newcomer's Literary Award</b> , Changjak-Sanmaek
2020	<b>Heath and Welfare Minister's Award for Science Excellence</b> , Korean Ministry of Health and Welfare
2019	<b>Best Teacher Award</b> (Sungkyunkwan University Engineering School)
2016	<b>Milton Van Dyke Award</b> (American Physical Society)
2013	<b>Marquis Who's Who Award</b> for distinguished engineer
2013	<b>Outstanding Young Scholar Award</b> (Korean Biotechnology Society)
2006	<b>MRS Graduate Student Award</b> (Materials Research Society)
2004-2006	Cornell Graduate Student Conference Grant Award
2006	Third Place Award for Annual Bioengineering EXPO in Cornell University
2003-2004	Cornell Graduate Student Fellowship Award

**PEER REVIEWED PUBLICATIONS in Last Years (> 7,311 total citations, *H-index* = 34, *i10-index* = 79)**

1. Hyun J, Yun DW, **Um SH**, Bhang SH, Hypoxia potentiated pro-angiogenic and anti-fibrotic effect of nanovesicles derived from human mesenchymal stem cells, In press, **Journal of Industrial and Engineering Chemistry**. <https://doi.org/10.1016/j.jiec.2024.03.038>
2. Hyun J, Eom J, Im J, Kim Y-J, Seo I, Kim S-W, Im G-B, Kim YH, Lee D-H, Park HS, Yun DW, Kim D-I, Yoon J-K, **Um SH**, Yang DH, Bhang SH, Fibroblast function recovery through rejuvenation effect of nanovesicles extracted from human adipose-derived stem cells irradiated with red light, 368, 453-465, 2024, **Journal of Controlled Release** (IF = 11.467). <https://doi.org/10.1016/j.jconrel.2024.02.047>
3. Eom J, Sarwar A, Lee EC, Im G-B, Kim S-W, Nguyen LT, Moon J-B, Um SH, Yi G-R, Lee EY, Bhang SH, Cytotoxic effect and mechanism of nano-sized polystyrene degraded by *Rhodococcus ruber* C208, 473, 145094, 2023, **Chemical Engineering Journal** (IF = 16.744). <https://doi.org/10.1016/j.cej.2023.145094>
4. Kim Y-J, Song J, Lee D-H, **Um SH**, Bhang SH, Suppressing cancer by damaging cancer cell DNA using LED irradiation, 243, 112714-112726, 2023, **Journal of Photochemistry and Photobiology B: Biology** (IF = 6.814). <https://doi.org/10.1016/j.jphotobiol.2023.112714>
5. Kim S-W, Seo I, Hyun J, Eom J, **Um SH**, Bhang SH, Fibronectin-enriched interface using a spheroid-converged cell sheet for effective wound healing, 15(9), 11536-11548, 2023, **ACS Applied Materials & Interfaces** (IF = 10.383).
6. Park JH, Choe H-S, Kim S-W, Im G-B, **Um SH**, Kim J-H, Bhang SH, Silica-capped and gold-decorated silica nanoparticles for enhancing effect of gold nanoparticle-based photothermal therapy, 19, 1161-1168, 2022, **Tissue Engineering and Regenerative Medicine** (IF = 4.323).
7. Amornkitbamrung L, Leungpuangkaew S, Panklang T, Jubsilp C, Ekgasit S, **Um SH**, Rimdusit S, Effects of glutaric anhydride functionalization on filler-free benzoxazine/epoxy copolymers with shape memory and self-healing properties under near-infrared light actuation, 7(3), 100446, 2022, **Journal of Science Advanced Materials and Devices** (IF = 7.382).
8. Mitta SB, Harpalsinh R, Kim J, Park HS, **Um SH**, Flexible supercapacitor with a pure DNA gel electrolyte, Early view in press, 2022, **Advanced Materials Interfaces** (IF = 6.147). It is presented as a back cover and linked below; <https://onlinelibrary.wiley.com/doi/10.1002/adma.202200133>
9. Ahn SY, Kim J, Vellampatti S, Oh S, Lim YT, Park SH, Luo D, Chung J, **Um SH**, Protein-encoding free-standing RNA hydrogel for sub-compartmentalized translation, Early view in press, 2022, **Advanced Materials** (IF = 30.849). It is presented as a back cover and linked below; <https://onlinelibrary.wiley.com/doi/10.1002/adma.202270138>
10. Kim Y-J, Kim S-W, Lee J-R, **Um SH**, Joung YK, Bhang SH, Comparing the cytotoxic effect of light-emitting and organic light-emitting diodes based light therapy on human adipose-derived stem cells, 103, 239-246, 2021, **Journal of Industrial and Engineering Chemistry** (IF = 5.278).
11. Kim YH, Im G-B, Kim S-W, Kim Y-J, Yu T, Lee J-R, **Um SH**, Joung YK, Bhang SH, Anti-senescence ion-delivering nanocarrier for recovering therapeutic properties of long-term-cultured human adipose-derived stem cells, Just accepted, 2021, **Journal of Nanobiotechnology** (IF = 10.435)
12. Kim JH, Ahn SY, **Um SH**, Empirical and theoretical evaluation of a tree-shaped DNA nanostructure with looped arm (L-DNA), 13(8), 1452-1457, 2021, **Science of Advanced Materials** (IF = 1.117)
13. Kim JH, Ahn SY, **Um SH**, Light-induced heat conversion of gold nanorods as a local temperature probe for chemical species transformation in aqueous solution, 13(8), 1437-1444, 2021, **Science of Advanced Materials** (IF = 1.117)
14. Hyun J, Eom J, Song J, Seo I, **Um SH**, Park KM, Bhang SH, Poly(amino ester)-based polymers for gene and drug delivery systems and further application toward cell culture system, 21(8), 2100106, 2021, **Macromolecular Bioscience** (IF = 3.85)
15. Kim JH, Ahn SY, **Um SH**, Bead-immobilized multimodal beacon-equipped DNA machinery for specific RNA target detection: a prototypical molecular nanobiosensor, 11(6), 1617, 2021, **Nanomaterials** (IF = 5.4).
16. Jin SM, **Um SH**, Lim YT, Overcoming chemoimmunotherapy-induced immunosuppression by assemblable and depot forming immune modulating nanosuspension, 8(19), 2102043, 2021, **Advanced Science** (IF = 15.84)
17. Ahn SY, Liu J, Vellampatti S, Wu Y, **Um SH**, DNA transformations for diagnosis and therapy, 31(12), 2008279, 2020, **Advanced Functional Materials** (IF = 16.836)
18. Kim J, Moon JH, **Um SH**, Short RNA universal coding for topological transformation nanobarcoding application, 22(2), 392-397, 2020, **ChemBioChem** (IF = 2.593). It is presented as a front cover and linked below; <https://chemistry-europe.onlinelibrary.wiley.com/doi/pdf/10.1002/cbic.202000860>
19. Amornkitbamrung L, Sprisaard S, Jubsilp C, Bielawski C, **Um SH**, Rimdusit S, Near-infrared light responsive shape memory polymers from bio-based benzoazine/epoxy copolymers produced without using a photothermal filler, 209, 122986, 2020, **Polymer** (IF = 4.231).
20. Shin SW, Min J, Luo D, **Um SH**, Development of optimal probe sequences for directed microRNAs profile recognition and breast cancer classification, *Submitted* 2023.
21. Kim J, Yoo C, Moon JH, **Um SH**, EGFR fragmentation for topological transformation nanobarcoding, 21(17), 2533-2539, 2020, **ChemBioChem** (IF = 2.593). It is linked below; <https://doi.org/10.1002/cbic.202000179>

22. Kim J, Chun SH, Amornkitbamrung L, Song C, Yuk JS, Ahn SY, Kim BW, Lim YT, Oh B-K, **Um SH**, Gold nanoparticle clusters for the investigation of therapeutic efficiency against prostate cancer under near-infrared irradiation, 7(5), 1-9, 2020, **Nano Convergence** (IF = 3.324)
23. Shin SW, Ahn SY, Lim YT, **Um SH**, Improved sensitivity of intramolecular strand displacement based on localization of probes, 91, 14808-14811, 2019, **Analytical Chemistry** (IF = 6.350)
24. Shin SW, Yuk JS, Chun SH, Lim YT, **Um SH**, Hybrid material of structural DNA with inorganic compound: synthesis, applications, and perspective, 7(2), 1-12, 2020, **Nano Convergence** (IF = 3.324)
25. Song C, Phuengkham H, Kim YS, Dinh VV, Lee I, Shin IW, Shin HS, Jin SM, **Um SH**, Lee H, Hong KW, Jin S-M, Lee E, Kang TH, Park Y-M, Lim YT, Syringeable immunotherapeutic nanogel reshapes tumor microenvironment and prevents tumor metastasis and recurrence, 10(3745), 1-15, 2019, **Nat. Commun.** (IF = 11.880)
26. Yuk JS, Shin SW, Chun SH, Ku BM, Choi YJ, Lim YT, Luo D, Ahn M-J, **Um SH**, Topological Transformation-Based Nanobarcoding for Detection and Enumeration of MicroRNAs and Single Nucleotide Polymorphism, 3(7), 1900013, 2019, **Advanced Biosystems** (IF = 3.57); presented as a back cover.
27. Roh YG, Shin SW, Kim S-Y, Kim S, Lim YT, Oh B-K, **Um SH**, Protein nanoparticle fabrication for optimized reticuloendothelial system evasion and tumor accumulation, 35(11), 3992-3998, 2019, **Langmuir** (IF = 3.789) .
28. Jang M, Kim JS, Kim J-H, Bae DH, Kim MJ, Song D, Kim Y-T, **Um SH**, Kim YH, Kim J, Surface-controlled molecular self-alignment in polymer actuators for flexible microrobot applications, 11, 736-744, 2019, **Polymers** (IF = 3.164).
29. Yang G, Koo JE, Lee HE, Shin SW, **Um SH**, Lee JY, Immunostimulatory activity of Y-shaped DNA nanostructures mediated through the activation of TLR9, 112, 108657-6, 2019, **Biomedicine & Pharmacotherapy** (IF = 3.457).
30. Jang M, Kim JS, Um SH, Yang S, Kim J, Ultra-high curvature sensors for multi-bend structures using fiber Bragg gratings, 27(3), 2074-2084, 2019, **Optics Express** (IF = 3.910).
31. Lee B, Ahn SY, Lee JH, Luo D, **Um SH**, Shin SW, Revealing the presence of symbolic sequence representing multiple nucleotides: based on K-means clustering of oligonucleotides, 24(2), 348, 2019, **Molecules** (IF = 3.060).
32. Chun SH, Shin SW, Amornkitbamrung L, Ahn SY, Yuk JS, Sim SJ, Luo D, **Um SH**, Polymeric nanocomplex encapsulating iron oxide nanoparticles in constant size for controllable magnetic field reactivity, 34(43), 12827-12833, 2018, **Langmuir** (IF = 3.833).
33. Chun SH, Yuk JS, Um SH, Regulation of cellular gene expression by nanomaterials, 5(34), 1-12, 2018, **Nano Convergence** (IF = 3.324).
34. Shin SW, Ahn SY, Yoon S, Wee HS, Bae JW, Lee JH, Lee WB, **Um SH**, Differences in DNA Probe-Mediated Aggregation Behavior of Gold Nanomaterials Based on Their Geometric Appearance, 34(49), 14869-14874, 2018, **Langmuir** (IF = 3.833).
35. Yang G, Lee HE, Shin SW, **Um SH**, Lee JD, Kim K-B, Kang HC, Cho Y-Y, Lee HS, Lee JY, Efficient transdermal delivery of DNA nanostructures alleviates atopic dermatitis symptoms in NC/Nga mice, 28(40), 1801918, 2018, **Advanced Functional Materials** (IF = 12.124).
36. Choi Y, Kim H, Yang J, Shin SW, **Um SH**, Lee S, Kang MS, Cho JH, Proton-Conductor-Gated MoS<sub>2</sub> Transistors with Room Temperature Electron Mobility of  $>100 \text{ cm}^2 \text{ V}^{-1} \text{ s}^{-1}$ , 30(14), 4527-4535, 2018, **Chemistry of Materials** (IF = 10.159).
37. Phuengkham H, Song C, **Um SH**, Lim YT, Implantable synthetic immune niche for spatiotemporal modulation of tumor-derived immunosuppression and systemic antitumor immunity: postoperative immunotherapy, 30, 1706719, 2018, **Adv. Mater.** (IF = 19.791).
38. Amornkitbamrung L, Kim J, Roh Y, Chun SH, Yuk JS, Shin SW, Kim B-W, Oh B-K, **Um SH**, Cationic surfactant-induced formation of uniform gold nanoparticle clusters with high efficiency of photothermal conversion under near-infrared irradiation, 34(8), 2774-2783, 2018, **Langmuir** (IF = 3.833).
39. Shin SW, Lee BS, Yang K, Amornkitbamrung L, Jang MS, Ku BM, Cho S-W, Lee JH, Bae H, Oh B-K, Ahn M-J, Lim YT, **Um SH**, Fluorescence-coded DNA nanostructure probe system to enable discrimination of tumor heterogeneity via a screening of dual intracellular microRNA signatures in situ, 7(1), 13499, 2017, **Scientific Reports** (IF = 4.259).
40. Park DJ, Choi JH, Lee WJ, **Um SH**, Oh BK, Selective electrochemical detection of dopamine using reduced graphene oxide sheets-gold nanoparticles modified electrode, 17(11), 8012-8018, 2017, **J. Nanosci. Nanotech.** (IF = 1.354).
41. Lee EJ, Choi JH, **Um SH**, Oh BK, Electrochemical sensor for selective detection of norepinephrine using graphene sheets-gold nanoparticle complex modified electrode, 34(4), 1129-1132, 2017, **Kor. J. Chem. Eng.** (IF = 2.476).
42. Kim SY, Noh YW, Kang TH, Kim JE, Kim S, **Um SH**, Oh DB, Park YM, Lim YT. Synthetic vaccine nanoparticles target to lymph node triggering enhanced innate and adaptive antitumor immunity, 130, 56-66, 2017, **Biomaterials** (IF = 8.420).
43. Son SY, **Um SH**, Jang HS, Jeon SK, Nahm SH, Kim HW, Yeon YH, Bae J, Lee DH. Effective disentangling method of bundled multi-walled carbon nanotubes into individual multi-walled carbon nanotubes by magnetic-field induction, 46, 28-34, 2017, **Journal of Industrial and Engineering Chemistry** (IF = 1.151).
44. Kim M, Shin SW, Lim CW, Kim J, **Um SH**, Kim D. Polyaspartamide-based graft copolymers encapsulating iron oxide nanoparticles for imaging and fluorescence labelling of immune cells, 5, 305-312, 2017, **Biomaterials Science** (IF=3.614).
45. Noh Y, Kim S, Kim J, Kim S, Ryu J, Kim I, Lee E, **Um SH**, Lim YT. Multifaceted immunomodulatory nanoliposomes:

- reshaping tumors into vaccines for enhanced cancer immunotherapy, 27, 1605398 2017, **Advanced Functional Materials** (IF = 12.124).
46. Lee R, Kumaresan Y, Yoon SY, **Um SH**, Kwon IK, Jung GY. Design of gold nanoparticle-decorated SiO<sub>2</sub>@TiO<sub>2</sub> core/shell nanostructures for visible light-activated photocatalysis, 7(13), 7469-7475, 2017, **RSC Advances** (IF = 3.049).
  47. Shin WJ, Shin SW, Yuk JS, Amornkitbamrung L, Jang MS, Song IH, Choi SW, Kang I, Lee JY, Bae H, Kang K, **Um SH\***. Cell surface nano-modulation for non-invasive in vivo near-IR stem cell monitoring, 12(1), 28-32, 2016, **ChemMedChem** (IF = 3.016).
  48. Kim S, Phuengkham H, Noh Y, Lee H, **Um SH**, Lim YT. Immune complexes mimicking synthetic vaccine nanoparticles for enhanced migration and cross-presentation of dendritic cells, 26, 8072-8082, 2016, **Advanced Functional Materials** (IF = 12.124).
  49. Park KS, Kim JH, Park SH, Moon DJ, Roh H, Chung C, **Um SH**, Choi J, Bae JW. Direct activation of CH<sub>4</sub> to oxygenates and unsaturated hydrocarbons using N<sub>2</sub>O on Fe-modified zeolites, 426, 130-140, 2017, **J. Mol. Catal. A Chem.** (IF = 4.397).
  50. Kim SJ, Jung S, Jang M, **Um SH**. An emerging string of fluid pearls, 1(5), 050502, 2016, **Physical Review Fluids** (IF = 2.021).
  51. Shin WJ, Noh HJ, Noh Y-W, Kim S, **Um SH**, Lim YT. Hyaluronic acid-supported combination of water insoluble immunostimulatory compounds for anti-cancer immunotherapy, 155, 1-10, 2017, **Carbohydrate Polymers** (IF = 5.158).
  52. Shin SW, Park KS, Song IH, Shin WJ, Kim BW, Kim D-I, **Um SH\***. Multiplexed labeling system for high-throughput cell sorting, 508, 124-128, 2016, **Anal. Biochem.** (IF = 2.220).
  53. Ahn C-I, Lee YJ, **Um SH**, Bae JW. Ordered mesoporous CoMO<sub>x</sub> (M=Al or Zr) mixed oxides for Fischer-Tropsch synthesis, 52, 4820-4823, 2016, **Chem. Comm.** (IF = 6.290).
  54. Lee JB, Kim JE, Bae MS, Park SA, Balikov DA, Sung H-J, Jeon HB, Park HK, **Um SH**, Lee KS, Kwon IK. Development of poly( $\epsilon$ -caprolactone) scaffold loaded with simvastatin and beta-cyclodextrin modified hydroxyapatite inclusion complex for bone tissue engineering, 8(2), 49-58, 2016, **Polymers** (IF = 3.164).
  55. Heo DN, Ko W-K, Lee HR, Lee JS, Lee D, **Um SH**, Lee JH, Woo Y-H, Zhang LG, Lee D-W, Kwon IK. Titanium dental implants surface-immobilized with gold nanoparticles as osteoinductive agents for rapid osseointegration, 469, 129-137, 2016, **J. Colloid Interf. Sci.** (IF = 5.091).
  56. Kim A-K, Kim M-H, Kim D-H, Go H-N, Cho S-W, **Um SH**, Kim D-I. Inhibitory effects of mesenchymal stem cells in intimal hyperplasia after balloon angioplasty, 63(2), 510-517, 2016, **J. Vasc.Surg.** (IF = 3.243).
  57. Park KS, Shin SW, Jang MS, Shin W, Yang K, Min J, Cho S-W, Oh B-K, Bae JW, Jung S, Choi J-W, **Um SH\***. A fluorescent tile DNA diagncode system for in situ rapid and selective diagnosis of cytosolic RNA cancer markers, 5, 18497, 2016, **Sci. Rep.** (IF = 5.578).
  58. Song IH, Shin SW, Park KS, Lansac Y, Jang YH, **Um SH\***. Enzyme-guided DNA sewing architecture, 5, 17722, 2016, **Sci. Rep.** (IF = 5.578).
  59. Ahn C-I, Jeong D-W, Cho JM, Na H-S, Jang W-J, Roh H-S, Choi J-H, **Um SH**, Bae JW. Water gas shift reaction on the Mn-modified ordered mesoporous Co<sub>3</sub>O<sub>4</sub>, 221, 204-211, 2016, **Microporous and Mesoporous Materials** (IF = 3.649).
  60. Shin SW, Park KS, Shin WJ, **Um SH\***. mRNA-producing pseudo-nucleus system, 11(41), 5515-5519, 2015, **Small** (IF = 8.368).
  61. Shin SW, Song IH, **Um SH\***. Role of physicochemical properties in nanoparticle toxicity, 5, 1351-1365, 2015, **Nanomaterials** (IF = 2.076).
  62. Ahmed FR, Shoaib MH, Azhar M, **Um SH**, Yousuf RI, Hashmi S, Dar A. In-vitro assessment of cytotoxicity of halloysite nanotubes against HepG2, HCT116 and human peripheral blood lymphocytes, 135, 50-55, 2015, **Col. Surf.B: Biointer.** (IF = 4.287).
  63. Shin SJ, Lee JS, Lee C, Park H-J, Yang K, Jin Y, Ryu JH, Hong KS, Moon S-H, Chung H-M, Yang HS, **Um SH**, Oh J-W, Kim D-I and Cho S-W. Tissue adhesive catechol-modified hyaluronic acid hydrogel for effective, minimally-invasive cell therapy, 25(25), 3814-3824, 2015, **Advanced Functional Materials** (IF = 11.805).
  64. Jang MS, Song WC, Shin SW, Park KS, Kim J, Kim D-I, Kim BW and **Um SH\***. A novel multigene cloning method for the production of a motile ATPase, 207, 1-7, 2015, **J. Biotech.** (IF = 2.880).
  65. Choi JH, Hwang H-J, Shin SW, Choi J-W, Oh BK\* and **Um SH\***. A novel albumin nanocomplex containing both small interfering RNA and gold nanorods for synergetic anticancer therapy, 7, 9229-9237, 2015, **Nanoscale** (IF = 6.740).
  66. Koo JE, Shin SW, **Um SH** and Lee JY. X-shaped DNA potentiates therapeutic efficacy in colitis-associated colon cancer through dual activation of TLR9 and inflammasomes, 14, 104, 2015, **Molecular Cancer** (IF = 5.40).
  67. Bui QT, Jeon Y-S, **Um SH**, Chung DJ, Kim J-H. Preparation of novel hybrid gels from polyaspartamides and natural alginate or hyaluronate by click reaction, 22, 27, 2015, **J. Polym. Res.** (IF = 1.530).
  68. Seo J-H, Park SJ, **Um SH**, Nam SW, Kim YJ, Kim J-H. Swelling and metal-ion adsorption properties of dopamine-conjugated polyaspartate hydrogel, 23(1), 90-96, 2015, **J. Polym. Environ.** (IF = 2.765).
  69. Shin SW, Park KS, Jang MS, Song WC, Kim J, Cho S-W, Lee JY, Cho JH, Jung S, Um SH. X-DNA origami-networked core-supported lipid stratum, 31, 912-916, 2015, **Langmuir** (IF = 4.186).

70. Shin SW, Park KS, **Um SH\***. Evaluation of the formation of a junctional DNA nanostructure through annealing curve analysis, 457, 542-546, 2015, **Biochem. Biophys. Res. Comm.** (IF = 2.280).
71. Song WC, Shin SW, Park KS, Jang MS, Choi J-H, Oh B-K, **Um SH\***. Self-illuminative cascade-reaction-driven anticancer therapeutic cassettes made of cooperatively interactive nanocomplexes, 126, 580-584, 2015, **Col. Surf. B. Biointer.** (IF = 3.550).
72. Choi J-H, Jang H-M, Mo K, **Um SH**, Min J, Oh B-K. Signal enhancement for ultrasensitive detection of versatile biomaterials using specific aptamer modified Au nano-complex, 6(11), 2547-2553, 2014, **Sci. Adv. Mater.** (IF = 2.510).
73. Shin SW, Lim YT, **Um SH\***. A novel immune stimulant made of synthetic bacteria, 6(11), 2543-2546, 2014, **Sci. Adv. Mater.** (IF = 2.510).
74. Shin SW, **Um SH\***. A polymer-drug complex-supported lipid nanoparticulate synthesized via emulsion solvent evaporation, 6(11), 2540-2542, 2014, **Sci. Adv. Mater.** (IF = 2.510).
75. Song H, Jeong H, **Um SH**, Lee H, Jung GY. A simple combustion synthesis of ZnO/TiO<sub>2</sub> core-shell nanowires as a photoanode in dye-sensitized solar cells, 6(11), 2517-2521, 2014, **Sci. Adv. Mater.** (IF = 2.510).
76. Lee R, Jeong H, Park Y, **Um SH**, Lee S, Jung S-Y, Jung G-Y. Fabrication of Zinc oxide hemispheres array and its application into solid state LEDs, 6(11), 2465-2469, 2014, **Sci. Adv. Mater.** (IF = 2.510).
77. Kim AK, Kim M-H, Kim D-H, Go H-N, Cho S-W, **Um SH**, Kim D-I. Inhibitory effects of mesenchymal stem cells in intimal hyperplasia after balloon angioplasty, 63(2), 510-517, 2014, **J. Vasc. Surg.** (IF = 3.243).
78. Shin SW, Park KS, Baek C, Min J, Cho S-W, Choi J-W, Kim D-I, **Um SH\***. A fluorescence color-encoded lipid-supported polymeric particle, 122, 840-845, 2014, **Col. Surf. B. Biointer.** (IF = 3.550).
79. Park KS, Shin SW, Choi J-H, Oh B-K, Choi JW, **Um SH\***. Predictive evaluation for the preparation of a synthetic Y-shaped DNA nanostructure, 19, 262-268, 2014, **Biotech. Bioproc. Eng.** (IF = 1.278).
80. Shin SW, Song WC, Kim AR, Cho S-W, Kim D-I, **Um SH\***. Novel stem-loop RNA and drug-bearing DNA hybrid nanostructures specific to LNCaP prostate carcinoma, 2, 76-83, 2014, **Biomater. Sci.** (IF = 3.614).
81. Song WC, Sung H-J, Park KS, Choi J-W, Cho J-Y, **Um SH\***. Novel functional Renilla luciferase mutant provides long-term serum stability and high luminescence activity, 91, 215-220, 2013, **Protein Exp. Purif.** (IF = 1.695).
82. Bae SJ, Song H, Jung GY, Cho S-W, Bae JW, **Um SH\***. A superhydrophobic layer formed by fluoro-derivative-treated gold sheets on grown-up zinc oxide nanoparticles for a spherical DNA hydrogel, 111, 342-345, 2013, **Col. Surf. B. Biointer.** (IF = 3.550).
83. Hanif Z, Ahmed FR, Shin SW, Kim Y-K, **Um SH\***. Size- and dose-dependent toxicity of cellulose nanocrystals (CNC) on human fibroblasts and colon adenocarcinoma, 119, 162-165, 2014, **Col. Surf. B. Biointer.** (IF = 3.550).
84. Kim S-M, Baek JH, Hwang N, Kim Y-S, Wi S-K, **Um SH**, Jung GY. Efficiency enhancement of white light-emitting diodes via nano-textured silicone encapsulant, 13, 7112-7115, 2013, **J. Nanosci. Nanotech.** (IF = 1.354).
85. Lee WH, Hwang H, Moon K, Shin K, Ham JH, **Um SH**, Park J, Cho JH. Increased environmental stability of a tungsten bronze NIR-absorbing window, 14(12), 2077-2082, 2013, **Fibers and Polymers** (IF = 1.439).
86. Gart S, Chang B, Slama B, Goodnight R, **Um SH**, Jung S. Dynamics of squeezing fluids: clapping wet hands, 88, 023007, 2013, **Phys. Rev. E.** (IF = 2.353).
87. Kim M-J, Lee B, Yang K, Park J, Jeon S, **Um SH**, Kim D-I, Im SG, Cho S-W. BMP-2 peptide-functionalized nanopatterned substrates for enhanced osteogenic differentiation of human mesenchymal stem cells, 34, 7236-3246, 2013, **Biomaterials** (IF = 7.604).
88. Park KS, Shin SW, Choi J-W, **Um SH\***. Specific protein markers for stem cell cross-talk with neighboring cells in the environment, 6(2), 75-86, 2013, **Int. J. Stem. Cell.** (IF = NA).
89. Park YD, Anabuki K, Kim S, Park K-W, Lee DH, **Um SH**, Kim J, Cho JH. Fabrication of stable electrospun TiO<sub>2</sub> nanorods for high-performance dye-sensitized solar cells, 21(6), 636-640, 2013, **Macromol. Res.** (IF = 3.742).
90. Lee JS, Lee K, Moon S-H, Chung H-M, Lee JH, **Um SH**, Kim D-I, Cho S-W. Mussel-inspired cell-adhesion peptide modification for enhanced endothelialization of decellularized blood vessels, 14(8), 1181-1189, 2014, **Macromol. Biosci.** (IF = 1.767).
91. Kim BJ, **Um SH**, Song WC, Kim YH, Kang MS, Cho JH. Water-gel for gating graphene transistors, 14(5), 2610-2616, 2014, **Nano Lett.** (IF = 13.03).
92. Kim AR, Ahmed FR, Jung GY, Cho S-W, Kim D-I, **Um SH\***. Hepatocyte cytotoxicity evaluation with zinc oxide nanoparticles, 9, 926-929, 2013, **J. Biomed. Nanotech.** (IF = 4.220).
93. Baek C, Hanif Z, Cho S-W, Kim D-I, **Um SH\***. Shape control of cellulose nanocrystals via compositional acid hydrolysis, 9, 1293-1298, 2013, **J. Biomed. Nanotech.** (IF = 4.220).
94. Kim AR, Shin SW, Cho S-W, Lee JY, Kim D-I, **Um SH\***. A light-driven anti-cancer dual-therapeutic cassette enhances solid tumour regression, 2(9), 1252-1258, 2013, **Adv. Health. Mater.** (IF = 4.880).
95. **Um SH\***. Gel electrophoretic mobility evaluation of a necklace-like DNA nanostructure, 18, 218-221, 2013, **Biotech. Bioproc. Eng.** (IF = 1.278).
96. **Um SH\***. Synthesis and self-assembly of a DNA-conjugated poly(propylene glycol) derivative, 17, 1190-1195, 2012, **Biotech. Bioproc. Eng.** (IF = 1.278).
97. **Um SH\***. Observation of a mouse sperm motility in a natural uterine tube-inspired microfluidic channel, 7(1), 46-50, 2013, **Biochip. J.** (IF = 1.950).

98. Bae SJ, Song WC, Jung SH, Cho S-W, Kim D-I, **Um SH\***. A gene-networked gel matrix-supported lipid bilayer as a synthetic nucleus system, 28, 17036-17042, 2012, **Langmuir** (IF = 4.186).
99. Choi J-H, Kim H, Kim H-S, **Um SH**, Choi J-W, Oh B-K. MMP-2 detectable silicon nanowire biosensor using enzymatic cleavage reaction, 9, 732-735, 2013, **J. Biomed. Nanotech.** (IF = 5.068).
100. Choi J-H, Kang S-R, Kim H, **Um SH**, Shin K, Choi J-W, Oh B-K. Dye-doped silica nanoparticle with HIV-1 TAT peptide for bioimaging, 9, 291-294, 2013, **J. Biomed. Nanotech.** (IF = 5.068).
101. Won JY, Song SJ, **Um SH**, Choi J-W, Min J. The simple and fast isolation of Escherichia coli O157:H7 using magnet nanoparticle embedded silica nanotube for the nucleic acid based detection, 9, 886-890, 2013, **J. Biomed. Nanotech.** (IF = 5.068).
102. Tran TB, Nguyen PD, **Um SH**, Son SJ, Min J. Real-time monitoring in vitro cellular cytotoxicity of silica nanotubes using electric cell-substrate impedance sensing (ECIS), 9, 286-290, 2013, **J. Biomed. Nanotech.** (IF = 5.068).
103. Song H, Lee K-H, Jeong H, **Um SH**, Han G-S, Jung HS, Jung GY. A simple self-assembly route to single crystalline SnO<sub>2</sub> nanorod growth by oriented attachment for dye sensitized solar cells, 5, 1188-1194, 2013, **Nanoscale** (IF = 7.233).
104. Jang IH, **Um SH**, Lim B, Woo MH, Jun K-W, Lee J-B, Bae JW. Effects of surface modification with zirconium phosphate on Ru/Co/SiO<sub>2</sub> fischer-tropsch catalysts analyzed by XPS and TEM analyses, 450, 88-95, 2013, **Appl. Catal. A: General.** (IF = 3.674).
105. Lee C, Shin J, Lee JS, Byun E, Ryu JH, **Um SH**, Kim D-I, Lee H, Cho S-W. Bioinspired, calcium-free alginate hydrogels with tunable physical and mechanical properties and improved biocompatibility, 14, 2004-2013, 2013, **Biomacromolecules** (IF = 5.788).
106. Jeong JW, Ahn C-I, Lee DH, **Um SH**, Bae JW. Effects of Cu-ZnO content on reaction rate for direct synthesis of DME from syngas with bifunctional Cu-ZnO/γ-Al<sub>2</sub>O<sub>3</sub> catalyst, 143, 666-672, 2013, **Catal. Lett.** (IF = 2.291).
107. Park S, **Um SH**, Kim Y-K. Fabrication process for an electrochemical microfluidic chip containing a microvalve system, 6(4), 373-379, 2012, **BioChip J.** (IF = 1.950).
108. Lee HS, Kang MS, Kang SK, Kim BJ, Yoo Y, Lim HS, **Um SH**, Ryu DY, Lee DY, Cho JH. Surface viscoelasticity of an organic interlayer affects the crystalline nanostructure of an organic semiconductor and its electrical performance, 116, 21673-21678, 2012, **J. Phys. Chem. C.** (IF = 4.484).
109. Yang K, Lee JS, Kim J, Lee YB, Shin H, **Um SH**, Kim JB, Park KI, Lee H, Cho S-W. Polydopamine-mediated surface modification of scaffold materials for human neural stem cell engineering, 33, 6952-6964, 2012, **Biomaterials** (IF = 7.604).
110. Park H-J, Lee J, Kim M-J, Kang TJ, Jeong Y, **Um SH**, Cho S-W. Sonic hedgehog intradermal gene therapy using a biodegradable poly(β-amino esters) nanoparticle to enhance wound healing, 33, 9148-9156, 2012, **Biomaterials** (IF = 7.604).
111. Jung JW, Lee YJ, **Um SH**, Yoo PJ, Lee DH, Jun K-W, Bae JW. Effect of copper surface area and acidic sites to intrinsic catalytic activity for dimethyl ether synthesis from biomass-derived syngas, 126, 1-8, 2012, **Appl. Catal. B: Environ.** (IF = 5.825).
112. Lee B, Jang IH, Bae JW, **Um SH**, Yoo PJ, Park M-J, Lee YC, Jun K-W. Catalytic performance and kinetic models on zirconium phosphate modified Ru/Co/SiO<sub>2</sub> fischer-tropsch catalyst, 16, 121-137, 2012, **Catal. Surv. Asia.** (IF = 1.897).
113. Jana S, **Um SH**, Jung S. Paramecium swimming in capillary tube. 24, 041901, 2012, **Phys. Fluids.** (IF = 1.942).
114. **Um SH\***. Delivering factors for reprogramming a somatic cell to pluripotency, 5(1), 6-11, 2012, **Int. J. Stem Cells.** (IF = NA).
115. Lee K-B, Kang E-S, Kim A-K, Kim M-H, Do Y-S, Park K-B, Park H-S, **Um SH**, Cho S-W, Kim D-I. Stem cell therapy in patients with thromboangiitis obliterans: assessment of the long-term clinical outcome and analysis of the prognostic factors, 4(2), 88-98, 2011, **Int. J. Stem Cells.** (IF = NA).
116. Moon JJ, Suh H, Bershteyn A, Stephan MT, Liu H, Huang B, Sohail M, Luo S, **Um SH**, Khant H, Goodwin JT, Ramos J, Chiu W, Irvine DJ. Interbilayer-crosslinked multilamellar vesicles as synthetic vaccines for potent humoral and cellular immune responses, 10, 243-251, 2011, **Nat. Mater.** (IF = 36.425).
117. Bae SJ, Jung S, **Um SH\***. Budding dynamics of the lipid membrane, 11, 6172-6176, 2011, **J. Nanosci. Nanotech.** (IF = 1.563).
118. Roh YH, Lee JB, Kiatwuthinon P, Hartman MR, Cha JJ, **Um SH**, Muller DA, Luo D. DNAsomes: multifunctional DNA-based nanocarriers, 7(1), 74-78, 2011, **Small.**
119. Stephan MT, Moon JJ, **Um SH**, Bershteyn A, Irvine DJ. Therapeutic cell engineering with surface-conjugated synthetic nanoparticles, 16(9), 1035-1042, 2010, **Nat. Med.** (IF = 28.054).
120. Park N, Kahn JS, Rice EJ, Hartman MR, Funabashi H, Xu J, **Um SH**, Luo D. High-yield cell-free protein production from P-gel, 4(12), 1759-1770, 2009, **Nat. Prot.** (IF = 12.423).
121. Park N\*, **Um SH\***, Funabashi H, Xu J, Luo D. A cell-free protein-producing gel, 8, 432-437, 2009, **Nat. Mater.** (IF = 28.054): \*These authors contributed equally to this work.
122. Lee J, Roh YH, **Um SH**, Funabashi H, Cheng W, Cha JJ, Kiatwuthinon P, Muller DA, Luo D. Multifunctional nanoarchitectures from DNA-based ABC monomers, 4, 430-436, 2009, **Nat. Nanotech.** (IF = 34.048).

123. Hu Y, Atukorale PU, Lu JJ, Moon JJ, **Um SH**, Cho EC, Wang Y, Chen J, Irvine DJ. Cytosolic delivery mediated via electrostatic surface binding of protein, virus, or siRNA cargos to p-responsive core-shell gel particles, 10(4), 756-765, 2009, **Biomacromolecules** (IF = 5.750).
124. Swiston AJ, Cheng C, Um SH, Irvine DJ, Cohen RE, Rubner MF. Surface functionalization of living cells with multilayer patches, 8(12), 4446-4453, 2008, **Nano Lett.** (IF = 13.779).
125. Um SH, Lee J, Park N, Kwon SY, Umbach CC, Luo D. Enzyme-catalyzed assembly of DNA hydrogel, 5, 797-801, 2006, **Nat. Mater.** (IF = 28.054).
126. Um SH, Lee J, Kwon SY, Li Y, Luo D. Dendrimer-like DNA-based fluorescence nanobarcodes, 1(2), 995-1000, 2006, **Nat. Prot.** (IF = 12.423).
127. **Um SH**, Park N, Luo D. DNA hydrogels, 950, 0950-D09-03, 2006, MRS Proceedings.
128. Luo D, Li Y, **Um SH**, Cu Y. A dendrimer-like DNA-based vector for DNA delivery: a viral and nonviral hybrid approach, 115-125, 2006, DNA vaccines: Methods and Protocols.
129. Luo D, **Um SH**, Li Y, Kwon SY, Lee J. Nucleic-acid engineering materials, 93, 2005, Polymeric Materials Science and Engineering.
130. **Um SH**, Kwon SY, Lee J, Luo D. Self-assembly of nanobuckyballs from dendrimer-like-DNA-polystyrene amphiphiles, 93, 2005, Polymeric Materials Science and Engineering.
131. Lee J, **Um SH**, Choi JW, Koo KK. Surface modification of a self-assembled ferredoxin monolayer on a gold substrate by CHAPS, 19(21), 8744-8748, 2003, **Langmuir** (IF = 2.89).
132. Lee J, **Um SH**, Choi JW, Koo KK. Elimination of aggregates of ferredoxin from its self-assembled monolayer on silicon substrate, 30(4), 307-314, 2003, **Colloids and Surfaces B: Biointerfaces** (IF = 2.78).
133. **Um SH**, Lee J, Choi JW, Koo KK. Removal of aggregates of protein from its self-assembled monolayer on metal substrates, 9(3), 243-247, 2003, **Journal of Industrial and Engineering Chemistry** (IF = 2.149).
134. **Um SH**, Lee GS, Lee YJ, Koo KK, Lee C, Yoon KB. Self-assembly of avidin and D-biotin-tethering zeolite microcrystals into fibrous aggregates, 18(11), 4455-4459, 2002, **Langmuir** (IF = 2.89).

#### **PATENTS AND INTELLECTUAL PROPERTY FILINGS (SELECTED, TOTAL: >60)**

1. **Um SH**, Ahn SY, Vellampatti SR, Oh S, Shin SW, Programmed DNA-driven Self-assembled RNA hydrogel. US Patent 2021/0130864A1, Filed on May 6, 2021.
2. **Um SH**, Shin SW, Yuk JS, Ahn MJ, 핵산 검출용 형광 핵산 나노구조체-그래핀 바이오 센서. KR Patent 10-2026096, Filed on September 25, 2019; Entry of each country (2020.7.12.)
3. **Um SH**, Kim J, 핵산 검출 시스템. KR Patent 10-2019-0122875, applied on October 4, 2019.
4. **Um SH**, 다중 바이오마커 검출 방법. KR Patent 10-2019-0127635, applied on October 15, 2019.
5. **Um SH**, Shin SW, 다중 핵산 바이오마커에 결합하기 위한 인공 염기서열 설계 방법과 이를 이용한 다중 핵산 프로브. KR Patent 10-2084684, Filed on February 7, 2020; Entry of each country (2020.11.15.)
6. **Um SH**, Ahn SY, 핵산 검출용 핵산 나노구조체. KR Patent 10-2019-0062639, applied on May 28, 2019; Priority reappliance (2020. 5. 28.)
7. **Um SH**, Ahn SY, Shin SW, 핵산 또는 펩타이드 합성 시스템. KR Patent 10-2019-0062639, applied on October 30, 2019.
8. **Um SH** and Shin SW, Core-shell nanoparticulate containing DNA hydrogel matrix and method thereof. US Patent 9,579,282, Filed on February 28, 2017.
9. **Um SH** and Song IH, Method for verifying and improving diagnosis efficiency of fluorescence-labeled nucleic acid-liposome nano-particle for diagnosis of tumor using three-dimensional simulating human tissue system. KR Patent 10-1726063, Filed on April 4, 2017.
10. **Um SH** and Kim AR, Multi-functional nucleic acid-based anti-cancer drug capable of targeting and therapy, method for preparing same and anti-cancer composition comprising same. US Patent 9163048 B2, Filed on November 6, 2015.
11. Shin SW and **Um SH**, Core-shell nanoparticulate containing DNA hydrogel matrix and method thereof. KR Patent 10-1587343, Filed on January 14, 2016.
12. Song WC and **Um SH**, Higher efficient self-illuminative nanocomplex and method thereof. KR Patent 10-1537474, Filed on July 10, 2015.
13. Jang MS and **Um SH**. A novel multigene cloning method for the production of a motile ATPase, KR Patent 10-1494139, Filed on February 10, 2015.
14. Shin SW, **Um SH**. Lipid-supported polymeric functional particles and method thereof. KR Patent 10-1465365, Filed on December 2, 2014.
15. Park KS, Choi J-W, **Um SH**. Fusion nano liposome-fluorescence labeled nucleic acid for in vivo application, uses thereof and preparation method thereof. KR Patent 10-1464100, Filed on November 25, 2014.
16. Song IH, **Um SH**. Method for modeling 5'-cohesive end nucleic acid sequence of branched DNA nanostructure with enhanced yield and minimizing error. KR Patent 10-1465394, Filed on November 25, 2014.



17. Baek C, **Um SH**. In vivo imaging system based on nucleic acid nano-barcode, preparation method thereof, and uses thereof. KR Patent 10-1373898, Filed on March 6, 2014.
18. Bae SJ, **Um SH**. Nucleus mimic, gene-networked gel matrix for in vitro protein production, and preparation method thereof. KR Patent 10-1343744, Filed on December 13, 2013.
19. Kim AR, **Um SH**. Multi-functional nucleic acid-based anticancer agent for targeted delivery and therapy, preparation method thereof, and anticancer composition comprising the same. KR Patent 10-1337684, Filed on November 29, 2013 and US Patent No. 9,163,048 issued on October 20, 2015.
20. **Um SH**, Luo D. Nucleic acid-based matrixes. US Patent 8486621 B2, Filed on July 16, 2013.

#### **BOOKS (OR BOOK CHAPTERS)**

1. **Um SH**. 유전자 군상(群像)의 피비우스. 창작산맥 출판부, Mar. 1<sup>st</sup>. 2023 (ISBN: 2287-4119).
2. **Um SH**. 인투 더 쿨: 에너지 흐름, 열역학, 그리고 생명. 성균관대학교 출판부, Aug. 19<sup>th</sup>. 2019 (ISBN: 979-11-5550-335-5); 원작: Schneider ED, Sagan D. Into the cool: Energy flows, Thermodynamics, and Life. Georges Borchardt, Inc., New York, 2005.
3. **Um SH**. The fourth language: Whisper of the insider. 사람의 무늬 출판, Apr. 20<sup>th</sup> 2019 (ISBN: 979-11-5550-315-7).
4. **Um SH**, Shin SW, Park KS. Functional DNA building blocks and their hydrogel scaffolds for biomedical application. Chapter 7 in Encyclopedia of Nanoscience and Nanotechnology, Vol 15, edited by Hari Singh Nalwa, March 2017 (ISBN: 1-58883-001-2).
5. **Um SH**, Shin SW, Song IH. Role of physicochemical properties in nanoparticle toxicity, 2015.
6. Luo D, Cheng W, Ding L, Funabashi H, Park N, **Um SH**, Xu J. Nucleic acid engineering towards synthetic biology in systems biology and synthetic biology, Chapter 17, edited by Fu P, Latterich M, Panke S, Wiley, March 2009.
7. Luo D, Li Y, **Um SH**, Cu Y. A dendrimer-like DNA-based vector for DNA delivery: a viral and non-viral hybrid approach in DNA vaccines: methods and protocols, Chapter 10, p115-125 (Methods in Molecular Medicine series no. 127) 2<sup>nd</sup> Ed. Edited by Saltzman MW, Shen H, Brandsma JL, Humana Press, August 2006.

#### **CONFERENCE PROCEEDINGS AND PRESENTATIONS AT SCIENTIFIC MEETINGS (SELECTED)**

1. Improved sensitivity of intramolecular strand displacement based on localization of probes. MRA-J, Kyoto, Japan, 2023.
2. Empirical and theoretical evaluation of a looped DNA (L-DNA) Nanostructure. 8th International Congress on Ceramics, Virtual, Korea, 2021.
3. Light-driven localized heating processor using a gold nanorod. 8th International Congress on Ceramics, Virtual, Korea, 2021.
4. Synthesis of polymer-iron oxide nanocomplex with controllable magnetization in suitable size for biomedical applications. 2019 KSBB Spring Meeting and International Symposium, Jeju, KR, 2019.
5. Cell surface decoration with polymeric nanoparticle for non-invasive stem cell tracking. 2019 KSBB Spring Meeting and International Symposium, Jeju, KR, 2019.
6. Fabrication of gold nanoclusters that can be fabricated without control processes that can be efficiently functionalized with oligonucleotides. AsiaTIDES: Oligonucleotide& Peptide Therapeutics, Tokyo, Japan, 2019.
7. Sensitivity control of nucleic acid biomarker detection based on the geometric appearance of the gold nanomaterial. AsiaTIDES: Oligonucleotide& Peptide Therapeutics, Tokyo, Japan, 2019.
8. A fluorescent DNA nanotechnology-based system for rapid and selective diagnosis of cytosolic RNA cancer markers. VIB conference: Medical Biotechnology (hosted by Royal Society of Chemistry), Belgium, 2018.
9. Dual intracellular microRNA detection system based on fluorescence labeled DNA nanostructure for tumor heterogeneity discrimination. KSBB Meeting and International Conference, Yeosu, KR, 2018.
10. Fabrication of gold nanoparticle cluster for efficient near-infrared photothermal therapy. KSBB Meeting and International Conference, Yeosu, KR, 2018.
11. Magnetic field reactivity controllable polymeric nanocomplex encapsulating iron oxide nanoparticles. KSBB Meeting and International Conference, Yeosu, KR, 2018.
12. Construction of a Polymer-enveloped Superparamagnetic Nanocomplex. KSBB Meeting and International Conference, Busan, KR, 2017.
13. PLGA Nanoparticles Encapsulated by Lipid for a Drug Internalization. KSBB Meeting and International Conference, Busan, KR, 2017.
14. Non-invasive Stem Cell Tracking using a Near-infrared (Nir) Dye Labeled Lipid-supported PLGA Nanoparticles. KSBB Meeting and International Conference, Busan, KR, 2017.
15. Multiplexed labeling system for a high-throughput cell sorting. 2017 International Conference on Genomic Medicine, The DoubleTree by Hilton Baltimore BWI Airport Hotel, Baltimore, MD, USA, 2017.
16. Multicore iron oxide nano particle to increasing magnetic force. 2017 International Conference on Genomic Medicine, The DoubleTree by Hilton Baltimore BWI Airport Hotel, Baltimore, MD, USA, 2017.



17. A DNA origami-based fluorescent system for rapid and selective diagnosis of cytosolic RNA cancer markers. 2016 Annual Fall Meeting of the International Biotechnology Society, Melbourne Conventional Centre, Melbourne, Australia, 2016.
18. A DNA origami-based fluorescent system for rapid and selective diagnosis of cytosolic RNA cancer markers. 2016 Annual Spring Meeting of the Korean BioChip Society, Resom Spa Castle, Ye-san, Chungchung-namdo, KR, 2016.
19. DNA hydrogel-based pseudo-nucleus system for mRNA synthesis and cellular delivery. 2016 KSIEC Spring Meeting, Yeosu Expo Convention Center, KR, 2016.
20. High-throughput fluorescence-activated cell sorting via DNA nanostructure-based labelling system. 2016 KSIEC Spring Meeting, Yeosu Expo Convention Center, KR, 2016.
21. mRNA producing synthetic nucleus. European Materials Research Society Spring Meeting, Lille, FR, 2015.

## **TEACHING**

**Sungkyunkwan University** Arranged in the order of Year, Size, Quality of Course

**Introductory Biochemistry (ECH2024-41)**, Spring 2014, 74, 85.00/100.00; Spring 2016, 76, 86.00/100.00; Spring 2017, 78, 85.00/100.00; Spring 2019, 92, 89.00/100.00; Spring 2020, 68, 78.00/100.00; Fall 2021, 21, 97/100.

**Principles of Engineered Drug Delivery (ECH5113-41)**, Spring 2013, 10; Spring 2015, 33; Spring 2016, 35; Spring 2017, 29; Fall 2021, 31, 100/100.

**Reaction Engineering (ECH2009-43)**, Fall 2013, 54, 87.00/100.00; Fall 2015, 50, 82.00/100.00; Fall 2016, 44, 85.00/100.00; Fall 2019, 57, 85.00/100.00.

**Introductory Chemical Thermodynamics (ECH2005-44)**, Fall 2012, 68, 87.00/100.00; Fall 2013, 59, 82.00/100.00; Fall 2014, 60, 81.00/100.00; Fall 2015, 61, 77.00/100.00; Fall 2016, 59, 77.00/100.00; Fall 2019, 65, 89.00/100.00; Fall 2020, 31, 89.00/100.00; Spring 2021, 41, 87.00/100.00.

**Biochemical Engineering (ECH2013-41)**, Fall 2012, 30, 85.00/100.00; Spring 2013, 53, 89.00/100.00.

**Genomic Engineering (ECH5010-41)**, Spring 2012, 4, Spring 2014, 11.

**Environmental Biochemical Engineering (ECH5059-41)**, Spring 2019, 14, 93/100.

## **LIST OF TRAINEES (Selected)**

### ***Postdoctoral Associates:***

**Lunjakorn Amornkitbamrung** (Chem PhD, Univ. Gratz in Austria), Fall 2016 to Spring 2018 (Present in AIT, Thailand)

**Seung Won Shin** (CheME PhD, Sungkyunkwan Univ.), Spring 2017 to Spring 2020 (Current: Postdoc, UC Berkeley, CA)

**Vellampatti Krishnamoorthy Srivithya** (Physics PhD, Sungkyunkwan Univ.), Aug. 2018 (Current: Postdoc, Ajou Univ. KR)

**Sekhar Babu Mitta** (Physics PhD, Sungkyunkwan Univ.), Aug. 2018 (Current: Researcher, Cosmos. KR)

**Kokkiligadda Samanth** (Physics PhD, Sungkyunkwan Univ.), Aug. 2023 (Current: Postdoc, SKKU ABMi lab. KR)

### ***Graduate Students (PhD):***

**Jin Ha Choi** (CheME PhD), Fall 2014 (Current: Assistant Professor, Jeon-buk University, Korea)

**Seung Won Shin** (CheME BS, MSc and PhD), Spring 2011-Spring 2017 (Current: Postdoc, UC Berkeley, CA)

**Min Su Jang** (CheME BS, MSc and PhD), Spring 2013-Spring 2019 (Current: Associate Researcher, KIST)

### ***Graduate Students (Coupled MSc & PhD):***

**Rajasekaran Beniel Jones** (CheME, MSc/PhD), Spring 2021~Spring 2023

### ***Graduate Students (Masters, CheMe):***

**In Hyun Song** (CheME BS and MSc), Spring 2015 (Current: Working in Samsung Semiconductor R&D Center)

**Woo Jung Shin** (CheME BS and MSc), Spring 2015 (Current: Assistant Professor, KAIST, Korea)

**Kyung Soo Park** (CheME MSc), Fall 2014 (Current: Postdoc, Harvard Univ. USA)

**Woo Chul Song** (CheME BS and MSc), Spring 2015 (Current: Assistant Professor, POSTECH, Korea)

**Ji Soo Yuk** (CheME BS and MSc), Fall 2018 (Current: PhD Candidate, Cornell Univ., NY)

**Younggon Noh** (CheME BS and MSc), Fall 2018 (Current: Patent lawyer in IPS PAT)

**Sang Hun Chun** (CheME BS and MSc), Fall 2018 (Current: Working in Samsung Semiconductor R&D Center)

**Seung Mo Jin** (CheME BS and MSc), Spring 2018-present (Current: Working in Prof. Lim, Yongtaik lab, SKKU)

**So Yeon Ahn** (CheME BS and MSc), Spring 2018-Fall 2019 (Current: PhD Candidate, Columbia Univ., NY)

**Jeonghun Kim** (CheME BS and MSc), Spring 2018-Spring 2020 (Current: Working in Progeneer Inc. & MBAing in SKKU)

**Sangwoo Kim** (CheME BS), Fall 2022 ~ present

**Taewan Kim** (CheME, BS), Spring 2024 ~ present

### ***Undergraduate Students incl'd visiting and rotation students:***

**Rachel Clarens** (CheME), Spring 2016 (Present in Malaysia)

## **PROFESSIONAL SOCIETIES AND SERVICES**

### **Professional Society Membership**

2019-present Member, American Association for the Advancement of Science (AAAS)  
2019-present Member, American Chemical Society (ACS)  
2017-present Member, Society of Mechanical Engineers in Hong Kong (HKSME)  
2015-present Editorial Board Member, Journal of Nanostructure in Chemistry  
2012-present RSC Member, Royal Society Chemistry Society  
2011-present A Life Member, Korean Applied Chemistry Society  
2010-present A Life Member and Contributing Editor, Korean Biochip Society  
2009-present A Life Member, Korean Chemistry Society  
2009-present A Life Member, Korean Chemical Engineering Society  
2004-present Member, Materials Science Society  
2004-present A Life Member and Director of Public Affairs (Member of Editing), Korean Biotechnology Society

### **Session/Meeting Organization/Chairing**

Associate Editor, Nanomaterials (MDPI Journal), 2019-present  
Associate Editor, Journal of Nanostructure in Chemistry (Springer), 2015-present  
Associate Editor, Nano Convergence (Elsevier Journal), 2018-2020  
Director, Public Information, The Korean Society for Biotechnology and Bioengineering, 2009-2019  
Organizing Committee Member, 2017 NanoKorea-Public Session, 2017  
Organizing Committee Member, International Conference on Organized Molecular Films, 2014  
Session Chair, Korean Biotechnology Society Annual Meeting  
Session Chair, Korean Applied Chemistry Society Annual Meeting, 2013  
Symposium Organizer, Korea-US Joint Workshop in Biomedical Engineering Society Annual Meeting, 2014

### **Member of Review Panels**

National Advisory Committee on the Development of Core Technology for Next Generation Vaccine Basis of Infectious Disease, 2022-present  
SMTECH, Technology Development Support Project for Small and Medium Enterprises, Evaluation Committee Member, 2019-present  
National Science Centre, Poland, ad hoc reviewer, 2016-present  
KHIDI, Center for Scientific Review, ad hoc reviewer, 2013-present  
NRF, Basic Science Research Program, ad hoc reviewer, 2013-present

### **Reviewer for Scientific Journals**

<i>ACS Sustainable Chem.</i>	<i>New Journal of Chemistry</i>
<i>Acta Biomaterialia</i>	<i>Small</i>
<i>Material Science and Engineering C</i>	<i>Advanced Materials</i>
<i>Materials Science and Engineering D</i>	<i>Advanced Healthcare Materials</i>
<i>Journal of Cardiovascular Surgery</i>	<i>DOVE Medical Press</i>
<i>Biotechnology and Bioprocess Engineering</i>	<i>Macromolecular Research</i>
<i>Korean Journal of Chemical Engineering</i>	<i>Science of Advanced Materials</i>
<i>Scientific Reports</i>	<i>Fiber</i>
<i>Journal of Biotechnology</i>	<i>Analytical Chemistry</i>
<i>Nanomaterials</i>	<i>Nano Convergence</i>
<i>Nanoscale</i>	<i>Biomaterials</i>
<i>Materials &amp; Design</i>	<i>Journal of Cellular Biochemistry</i>
<i>ACS Applied Materials &amp; Interfaces</i>	<i>Langmuir</i>
<i>Proteins and Proteomics</i>	<i>Carbohydrate Polymers</i>
<i>Biochemical and Biophysical Research Communications</i>	<i>Catalysis Today</i>
<i>Colloids and Surfaces B: Biointerfaces</i>	<i>Journal of Advanced Research</i>
<i>Journal of Controlled Release</i>	<i>Polymer</i>
<i>Methods</i>	<i>Protein Expression and Purification</i>
<i>Analytical Biochemistry: Methods in the Biological Sciences</i>	<i>ACS Applied Nano Materials</i>
<i>Colloids and Surface A: Physicochemical and Engineering Aspects</i>	<i>Archives of Pharmacal Research</i>
	<i>International Journal of Biological Macromolecules</i>

**DEPARTMENT AND UNIVERSITY SERVICES**

School of Chemical Engineering

Education Chairperson for School of Chemical Engineering, Mar 2019 – Present

Part-Dean for School of Chemical Engineering, Mar 2015 – Feb 2017

Faculty Development Committee, Fall 2013 – Present

Member for Department Course Development Committee, Fall 2013 – Present

Engineering School

Global Coordinator in Engineering Committee, March 2017 – December 2018