



Ju Hun Lee

Biomimetic Bionanoengineering Lab.
Department of Bionanoengineering, Hanyang University
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APPOINTMENTS

Hanyang University, Ansan

Department of Bionanoengineering & Bionanotechnology
Assistant Professor

Ansan, Republic of Korea (ROK)
2019.09-Current

University of California, Berkeley

Department of Bioengineering &
Lawrence Berkeley National Laboratory
Biological Systems and Engineering
Postdoctoral Fellow
Supervisor: Prof. Seung Wuk Lee

Berkeley CA USA
2014.04-2019.08

University of Colorado, Boulder

Department of Chemical and Biological Engineering
Postdoctoral Research Associate
Supervisor: Prof. Jennifer N. Cha

Boulder CO USA
2013.04-2014.03

EDUCATION

University of California, San Diego

Ph.D., Materials Science and Engineering and Nanoengineering
Dissertation: M13 bacteriophage Based Protein Sensors
Advisor: Prof. Jennifer N. Cha

San Diego CA USA
2008.09-2013.09

Korea University

M.E., Department of Materials Science and Engineering
Advisor: Prof. Young Keun Kim

Seoul Republic of Korea (ROK)
2006.03-2008.02

Korea University

B.E., Department of Materials Science and Engineering

Seoul ROK
1999.03-2006.02

PUBLICATIONS**In preparation**

34. **J. H. Lee**, S. W. Ji, J. -H. Lee, M. S. Desai, S. -W. Lee, 'Phage Based Hierarchical Structure formation by ice templating and their thermo-insulating properties', *In Preparation*. (**First Author**).
33. **J. H. Lee**, H. Jin, S. -W. Lee, 'Biomolecule self-assembly', *In preparation*. (**First Author**).
32. **J. H. Lee**, S. W. Ji, M. S. Desai, J. -H Lee, S. -W. Lee, 'Switchable Depletion Force Inducing Double Transition of Elastin Like Peptide (ELP) phage and ELP systems and Their Helical Hierarchical Structural Formations', *In Preparation*. (**First Author**)
31. **J. H. Lee**, S. W. Ji, M. S. Desai, J. -H Lee, S. -W. Lee, 'Inverse Thermotropic Liquid Crystal', *In Preparation*. (**First Author**)

Submitted

30. M. S. Desai, Julio Hong, **J. H. Lee**, S. -W. Lee, 'Catechol Functionalized Elastin-like Polypeptides as Tissue Adhesives', *Submitted*. (*ACS Appl. BioMater.*) (IF: New journal, but expect more than 6) (**Co-Author**)

Published

29. R. Sugimoto, **J. H. Lee**, J. -H. Lee, H. -E. Jin, S. Y. Yoo, S. -W. Lee, 'Bacteriophage nanofiber fabrication using near field electrospinning', *RSC Adv.*, 9, 39111-39118 (2019) (IF: 3.049) (2019.11.28)
28. J. -H. Lee, * **J. H. Lee**,* J. Xiao, M. S. Desai, X. Zhang, S. -W. Lee, 'Vertical Self-Assembly of Polarized Phage Nanostructure for Energy Harvesting', *Nano Lett.*, 19, 2661-2667 (2019) (IF: 12.080) (2019.04.10) (* Equal contribution) (**Co-First Author**)
27. K. Heo, H.-E. Jin, H. Kim, **J. H. Lee**, E. Wang, S. -W. Lee, 'Transient Self-Templating Assembly of M13 Bacteriophage for Enhanced Biopiezoelectric Devices', *Nano Energy*, 56, 716-723 (2019) (IF: 13.12) (2019.02.01) (**Co-Author**)
26. H. -L. Liu, J.-H. Wu, J. H. Min, **J. H. Lee**, Y. K. Kim, 'Synthesis and Characterization of Magnetic-Luminescent Fe₃O₄-CdSe Core-Shell Nanocrystals', *Electron. Mater. Lett.*, 15, 102-110 (2019) (IF: 2.882) (2019.01.01) (**Co-Author**)
25. J. -H. Lee, K. Heo, K. Schulz-Schönhagen, **J. H. Lee**, M. S. Desai, H. -E. Jin, S. -W. Lee, 'Diphenylalanine Peptide Nanotube Piezoelectric Energy Harvesters', *ACS Nano*, 12, 8138-8144 (2018) (IF: 13.709) (2018.08.28) (**Co-Author**)
24. **J. H. Lee**,* C. M. Warner,* H. -E. Jin,* E. V. Barnes, A. R. Poda, E. J. Perkins, Seung-Wuk Lee, 'Production of Tunable Nanomaterials Using Hierarchically Assembled Bacteriophages', *Nature Protocols*, 12, 1999-2013 (2017) (* Equal contribution) (IF: 12.423) (2017.09.01) (**First Author**)
23. **J. H. Lee**, B. Fan, T. D. Samdin, D. Monteiro, M. S. Desai, O. scheidler, H. -E. Jin, S. Kim, S. -W. Lee, 'Phage-Based Structural Color Sensors and their Pattern Recognition Sensing System', *ACS Nano*, 11, 3632-3641 (2017) (IF: 13.709) (2017.04.25) (**First Author**)
22. Q. Zeng, M. Desai, H. Jin, **J. H. Lee**, J. Chang, S. -W. Lee, 'Self-healing Elastin-bioglass Hydrogels', *Biomacromolecules*, 17, 2619-2625 (2016) (IF: 5.738) (2016.08.08) (**Co-Author**)
21. **J. H. Lee**,* H. Jin,* M. Desai, S Ren, S. Kim, S. -W. Lee, 'Biomimetic Sensor Design', *Nanoscale*, 7, 18379-18391 (2015) (IF: 7.233) (2015.11.28) (* Equal contribution) (**First Author**)
20. M. Brasino, **J. H. Lee**, J. N. Cha, 'Creating Highly Amplified ELISA Signals from Genetically Engineered Bacteriophage', *Anal. Biochem.*, 470, 7-13 (2015) (IF: 2.275) (2015.02.01) (**Co-Author**)
19. **J. H. Lee**,* D. W. Domaille,* H. Noh, T. Oh, C. Choi, S. Jin, J. N. Cha, 'High-Yielding and Photolabile Approaches for Covalent Attachment of Biomolecules to Surfaces via Hydrazone Chemistry', *Langmuir*, 30, 8452-8460 (2014) (IF: 3.789) (2014.07.22) (* Equal contribution) (**First**)

- Author). **Highlighted** in ACS Select Virtual Issue: **Creating and Controlling Biointerfaces** (2015.10.01).
18. S. Kwon, Z. C. Y. Chen, H. Noh, **J. H. Lee**, H. Liu, J. N. Cha, J. Xiang, 'Selective Functionalization and Loading of Biomolecules in Crystalline Silicon Nanotube Field-Effect Transistors', *Nanoscale*, 6, 7847-7852 (2014) (IF: 7.233) (2014.07.21) **(Co-Author)**
 17. **J. H. Lee**, P. F. Xu, D. W. Domaille, C. M. Choi, S. Jin, J. N. Cha, 'M13 Bacteriophage as Materials for Amplified Surface Enhanced Raman Scattering Protein Sensing', *Adv. Funct. Mater.*, 24, 2079-2084 (2014) (IF: 13.325) (2014.04.09) **(First Author)**
 16. P. F. Xu, **J. H. Lee**, K. Ma, C. Choi, S. Jin, J. Wang, J. N. Cha, 'Enhanced Raman Signals from Switchable Nanoparticle Probes', *Chem. Comm.*, 49, 8994-8996 (2013) (IF: 6.290) (2013.10.11) **(Co-Author)**
 15. P. F. Xu, H. Noh, **J. H. Lee**, D. W. Domaille, M. A. Nakatsuka, A. P. Goodwin, J. N. Cha, 'Imparting the Unique Properties of DNA into Complex Material Architecture and Function', *Mater. Today*, 16, 290-296 (2013) (IF: 24.537) (2013.07.01) **(Co-Author)**
 14. D. W. Domaille, **J. H. Lee**, J. N. Cha, 'High Density DNA Loading on M13 bacteriophage Provides Access to Colorimetric and Fluorescent Protein Microarray Biosensors', *Chem. Comm.*, 49, 1759-1761 (2013) (IF: 6.290) (2013.02.28) **(Co-Author)**
 13. **J. H. Lee**, D. W. Domaille, J. N. Cha, 'Amplified Protein Detection and Identification through DNA-Conjugated M13 Bacteriophage', *ACS Nano*, 6, 5621-5626 (2012) (IF: 13.709) (2012.06.26) **(First Author)**
 12. **J. H. Lee**, J. N. Cha, 'Amplified Protein Detection through Visible Plasmon Shifts in Gold Nanocrystal Solutions from Bacteriophage Platforms', *Anal. Chem.*, 83, 3516-3519 (2011) (IF: 6.042) (2011.05.01) (Top 4.3% journal in analytical chemistry) **(First Author)**
 11. P. Xu, H. Noh, **J. H. Lee**, J. N. Cha, 'DNA Mediated Assembly of Single Walled Carbon Nanotubes: Role of DNA Linkers and Annealing', *Phys. Chem. Chem. Phys.*, 13, 10004-10008 (2011) (IF: 3.906) (2011.06.07) **(Co-Author)**
 10. H. Noh, A. Hung, C. M. Choi, **J. H. Lee**, J. Y. Kim, S. H. Jin, J. N. Cha, '50 nm DNA Nanoarrays Generated from Uniform Oligonucleotide Films', *ACS Nano*, 3, 2376-2382 (2009) (IF: 13.709) (2009.08.25) **(Co-Author)**
 9. J. H. Min, H. L. Liu, **J. H. Lee**, J. H. Wu, Y. K. Kim, 'Fabrication of Multifunctional Au Doped CoPt Nanowires', *IEEE Trans. Magn.*, 45, 2471-2474 (2009) (IF:1.467) (2009.06.01) **(Co-Author)**
 8. H. L. Liu, J. H. Wu, J. H. Min, **J. H. Lee**, Y. K. Kim, 'Monosized Core-Shell Fe₃O₄(Fe)/Au Multifunctional Nanocrystals', *J. Nanosci. Nanotechnol.*, 9, 754-758 (2009) (IF: 1.354) (2009.02.01) **(Co-Author)**
 7. **J. H. Lee**, J. H. Wu, J. S. Lee, K. S. Jeon, H. R. Kim, J. H. Lee, Y. D. Suh, Y. K. Kim, 'Synthesis and Characterization of Fe/FeO_x Core/Shell Nanowires', *IEEE Trans. Magn.*, 44, 3950-3953 (2008) (IF: 1.467) (2008.12.17) **(First Author)**
 6. J. H. Wu, S. P. Ko, H.-L. Liu, M. H. Jung, **J. H. Lee**, J. S. Ju, Y. K. Kim, 'Sub 5nm Fe₃O₄ Nanocrystals via Coprecipitation Method', *Colloid. Surface. A*, 313, 268-272 (2008) (IF: 2.829) (2008.02.01) **(Co-Author)**
 5. J. H. Min, J. H. Wu, J. U. Cho, **J. H. Lee**, Y. D. Ko, S. P. Ko, H. L. Liu, J. S. Chung, Y. K. Kim, 'Electrochemical Preparation of Co₃Pt Nanowires', *Phys. Stat. Sol. (a)*, 204, 4158-4161 (2007) (IF: 1.795) (2007.12.10) **(Co-Author)**
 4. **J. H. Lee**, J. H. Wu, H. L. Liu, J. U. Cho, M. K. Cho, B. H. An, J. H. Min, S. J. Noh, and Y. K. Kim, 'Iron-Gold Barcode Nanowires', *Angew. Chem. Int. Edit.*, 46, 3663-3667 (2007) (IF: 12.102) (2007.05.11) **(First Author)**
 3. J. U. Cho, J. H. Wu, J. H. Min, **J. H. Lee**, H. L. Liu, Y. K. Kim, 'Effect of Field Deposition and Pore Size on Co/Cu Barcode Nanowires by Electrodeposition', *J. Magn. Magn. Mater.*, 310, 2420-2422 (2007) (IF: 3.046) (2007.03.01) **(Co-Author)**
 2. H. L. Liu, S. P. Ko, J. H. Wu, M. H. Jung, J. H. Min, **J. H. Lee**, B. H. An, Y. K. Kim, 'One-pot Polyol Synthesis of Monosize PVP-coated Sub-5 nm Fe₃O₄ Nanoparticles for Biomedical

Applications', *J. Magn. Magn. Mater.*, 310, e815-e817 (2007) (IF: 3.046) (2007.03.01) (**Co-Author**)

1. J. H. Min, J. -H. Wu, J. U. Cho, Q. X. Liu, **J. H. Lee**, Y. D. Ko, J. S. Chung, Y. K. Kim, 'The pH and Current Density Dependence of dc Electrodeposited CoCu Thin Films', *J. Magn. Magn. Mater.*, 304, e100 (2006) (IF: 3.046) (2006.09.01) (**Co-Author**)

CONFERENCE PRESENTATIONS

1. 'Phage Nanofiber Based Structural Color Biosensor and Their Pattern Recognition Sensing Network System', **J. H. Lee**, S-W Lee, MRS Spring Meeting 2017, Apr. 20, Phoenix, USA (2017) (**Presentation Author: Oral**)
2. 'Scalable Self-Assembled Diphenylalanine Nanotube Bio-piezoelectric Energy Harvesters', J-H. Lee, K. Heo, **J. H. Lee**, S-W. Lee, MRS Spring Meeting 2017, Apr. 20, Phoenix, USA (2017)
3. 'Protein-based Bio-lasers', M. S. Desai, **J. H. Lee**, S-W Lee, MRS Spring Meeting 2017, Apr. 19, Phoenix, USA (2017)
4. 'DOPA-Engineered M13 Bacteriophage Based Conductive Porous 3D Architectures Templated by Ice Crystals', **J. H. Lee**, S-W Lee, MRS Spring Meeting 2017, Apr. 18, Phoenix, USA (2017) (**Presentation Author: Poster**)
5. 'Unidirectional Polarization Alignment of Self-Assembled M13 bacteriophage for Piezoelectric Energy Harvesters', J-H. Lee, **J. H. Lee**, M. Desai, S-W. Lee, MRS Spring Meeting 2017, Apr. 18, Phoenix, USA (2017)
6. 'Rubber-Like Hydrogel Adhesives', M. Desai, E. Wang, **J. H. Lee**, S-W Lee, MRS Spring Meeting 2017, Apr. 18, Phoenix, USA (2017)
7. 'Bioinspired M13 Bactriophage Colorimetric Sensing System by Pattern Recognition', **J. H. Lee**, T. D. Samdin, S-W Lee, MRS Spring Meeting 2016, Mar. 31, Phoenix, USA (2016) (**Presentation Author: Oral**)
8. 'Biomimetic Bacteriophage Based Colorimetric Gas Sensors', **J. H. Lee**, S-W Lee, MRS Fall Meeting 2015, Dec. 2, Boston, USA (2015) (**Presentation Author: Oral**)
9. 'Quantitative SERS Protein Detection Systems *via* Layer-by-Layer Assembly of SERS Active Nanoparticles on DNA-conjugated M13 Bacteriophage Platform', **J. H. Lee**, J. N. Cha, 9th World Congress of Chemical Engineering Incorporating 15th Asian Pacific Confederation of Chemical Engineering Congress, Aug. 20, Seoul, Korea (2013). (**Presentation Author: Poster**)
10. 'SERS Detection of Analytes using switchable Nanodumbbell Probes', P. Xu, **J. H. Lee**, C. Choi, S. Jin, J. Wang, J. N. Cha, MRS Spring Meeting 2013, Apr. 2, San Francisco, USA (2013).
11. 'SERS Based Protein Detection from Bacteriophage Systems', **J. H. Lee**, J. N. Cha, MRS Spring Meeting 2013, Apr. 4, San Francisco, USA (2013). (**Presentation Author: Oral**)
12. 'Colorimetric Protein Detection: Plasmonic Shift *via* DNA-Au Nanoparticle Flocculation based on Chemically Engineered DNA-M13 Bacteriophage Platform', **J. H. Lee**, J. N. Cha, MRS Spring Meeting 2012, Apr. 10, San Francisco, USA (2012). (**Presentation Author: Poster**)
13. 'Synthesis, Characterization, and Applications of an M13 Phage-DNAzyme Bioconjugate', D. W. Domaille, **J. H. Lee**, J. N. Cha, 243rd ACS Meeting, Mar. 26, San Diego, USA (2012)
14. 'Chemically Modified M-13 Bacteriophages Amplifiable Colorimetric Antigen Detection', **J. H. Lee**, J. N. Cha, MRS Spring Meeting 2011, Apr. 27, San Francisco, USA (2011). (**presentation Author: Oral**)
15. 'Synthesis and Characterization of Fe/FeO_x Core/Shell Nanowires', **J. H. Lee**, J. H. Wu, J. S. Lee, K. S. Jeon, H. R. Kim, J. H. Lee, Y. D. Suh, Y. K. Kim, IEEE International Magnetics Conference 2008, May, 7, Madrid, Spain (2008). (**Presentation Author: Oral**)
16. 'Synthesis and Characterization of Phase Changeable Ag₂Se Nanowires', H. M. Ji, B. H. An, J. H. Min, **J. H. Lee**, M. K. Cho, Y. K. Kim, Materials Today ASIA, Sep. 4, Beijing, China (2007).

17. 'Synthesis and Characterization of Fe₃O₄/Au/Fe₃O₄ Nano-onions', J. H. Wu, H. L. Liu, J. H. Min, **J. H. Lee**, M. H. Jung, Y. K. Kim, International Conference on Nanoscience and Technology, Jun. 4, Beijing, China (2007).
18. 'Monosized Core-Shell Fe₃O₄(Fe)/Au Multifunctional Nanocrystals', H. L. Liu, J. H. Wu, J. H. Min, **J. H. Lee**, Y. K. Kim, International Conference on Nanoscience and Technology, Jun. 4, Beijing, China (2007).
19. 'Multifunctional Magnetic-luminescent CoPt-CdSe Core-Shell Nano-particles', H. L. Liu, J. H. Wu, **J. H. Lee**, B. H. An, J. H. Min, D. K. Kim, Y. K. Kim, The 1st International Symposium on Advanced Magnetic Materials and Applications (ISAMMA), PA02, May 28, Jeju, Korea (2007).
20. 'Electrochemical Preparation of Co₃Pt Nanowires', J. H. Min, J. H. Wu, J. U. Cho, **J. H. Lee**, Y. D. Ko, S. P. Ko, H. L. Liu, J. S. Chung, Y. K. Kim, The 1st International Symposium on Advanced Magnetic Materials and Applications (ISAMMA), UB09, May 28, Jeju, Korea (2007). **(Best Poster Award)**
21. 'Synthesis and Magnetic Properties of Multilayered Fe/Au Nanowires', **J. H. Lee**, J. U. Cho, J. H. Min, B. H. An, M. K. Cho, S. J. No, Y. K. Kim, H. L. Liu, and J. H. Wu, The 10th Joint MMM/Intermag Conference, AT-13, Jan. 7~11, Baltimore, USA (2007). **(Presentation Author)**
(Best poster Award)
22. 'Synthesis of Magnetic-luminescent Fe₃O₄@CdTe Core-Shell Nanoparticles', B. H. An, J. U. Cho, J. H. Min, **J. H. Lee**, Y. K. Kim, H. L. Liu, and J. H. Wu, The 10th joint MMM/Intermag Conference, DR-08, Jan. 7~11, Baltimore, USA (2007).
23. 'Sub 5 nm Magnetite Nanoparticles Synthesis, Microstructure, and Magnetic Properties', J. Wu, S. Ko, H. Liu, M. Jung, **J. H. Lee**, J. Ju, Y. K. Kim, The 2006 Asian Conference on Nanoscience and Nanotechnology, Nov. 1, Busan, Korea (2006). **(Presentation Author)**
24. 'One-pot Polyol Synthesis of Monosize PVP-coated Sub-5 nm Fe₃O₄ Nanoparticles for Biomedical Applications', H. L. Liu, S. P. Ko, J. H. Wu, M. H. Jung, J. H. Min, **J. H. Lee**, B. H. An and Y. K. Kim, International Conference on Magnetism, PSTh-L-405, Aug. 20, Kyoto, Japan (2006).
25. 'Electrochemical Growth of Copper Nanowires *via* Anodic Aluminum Oxide Templates', J. H. Min, **J. H. Lee**, J. U. Cho, S. P. Ko, Y. K. Kim, The 3rd International Nanotech Symposium (NANO KOREA), 36, Aug. 24-26 KINTEX Ilsan, Korea (2005). **(Presentation Author)**

INVITED TALKS

1. *Invited* speaker, School of Materials Science and Engineering, Gwangju Institute of Science and Technology (GIST), Gwangju, Korea, May. 2018
2. *Invited* speaker, Department of Materials Science and Engineering, Sungkyunkwan University (SKKU), Suwon, Korea, Jan. 2018.
3. *Invited* speaker, Department of Materials Science and Engineering, Pohang University of Science and Technology (Postech), Pohang, Korea, Dec. 2017
4. *Invited* speaker, 18th Joint Interlaboratory Workshop on Nano-Magnetics (Japan-Korea), Seoul, Korea, Aug. 2013.
5. *Invited* speaker, Department of Chemistry, Gwangju Institute of science and Technology (GIST), Gwangju, Korea, Aug. 2013.
6. *Invited* speaker, Korea Research Institute of Chemical Technology, Daejeon, Korea, Aug. 2013

PATENTS

1. 'Iron-gold Barcode Nanowire and Manufacturing Method thereof', Y. K. Kim, **J. H. Lee**, J. H. Wu, H. L. Liu, J. U. Cho, J. H. Min, B. H. An, M. K. Cho, S. J. No, KR Registration 10-0848689 (2008.07.21); JP Registration 4847429 (2011.10.21); EU Registration 1925696 (2012.12.19); US Registration US9175412 B2 (2015.11.03). **(Main Inventor)**

2. ‘Bifunctional Magnetic Core-Semiconductor Shell Nanoparticles and Manufacturing Method thereof’, Y. K. Kim, H. L. Liu, J. H. Wu, J. H. Min, **J. H. Lee**, KR Registration 10-0759716 (2007.9.12); JP Registration 4745306 (2011.5.20); US Registration 7,910,164 (2011.03.22). (**Co-Inventor**)
3. ‘Method of Manufacturing Uniform Bifunctional Nanoparticles’, Y. K. Kim, J. H. Wu, H. L. Liu, S. P. Ko, J. H. Min, J. U. Cho, **J. H. Lee**, B. H. An, S. Y. Han, KR Registration 10-0759715 (2007.9.12). (**Co-Inventor**)
4. ‘Method of Manufacturing Hexagonal Nanoplate Diamond’, Y. K. Kim, **J. H. Lee**, J. H. Wu, H. L. Liu, J. U. Cho, J. H. Min, KR Registration 10-0791790 (2007.12.27); JP Registration 4663668 (2011.01.14); EU Registration EP1867758B1 (2018.10.31); US Pending 11/678,828 (2007). (**Main Inventor**)

RESEARCH EXPERIENCES

University of California, Berkeley

Department of Bioengineering &

Lawrence Berkeley National Lab, California, USA

Biological Systems and Engineering

Postdoctoral Fellow (Supervisor: Prof. Seung-Wuk Lee)

Berkeley CA USA

2014.04–Current

- **Design of genetically and chemically engineered M13 bacteriophage (Programmable Biopolymer).**
- **Design of biomimetic self-assembled hierarchical M13 bacteriophage structure (nano, micro, and macro scale)**
- **Liquid crystal behavior of M13 bacteriophage.**
- Design of inspired transformative colorimetric E-nose for mobile phone-based biosensor for biological, environmental, and national defense applications. (IoT platform)
- Transformable depletion force inducing self-assembled systems (Helical and hierarchical structure).
- Ice templated nano/micro porous structure with M13 bacteriophage to biomineralization
- Virus laser (with unique chiral structure of M13 bacteriophage)
- Near Field Electrospinning and 4D printing based polarization controlled M13 bacteriophage structure and their optical, electrical and mechanical properties

University of Colorado, Boulder

Department of chemical and biological engineering

Postdoctoral Research Associate (Supervisor: Prof. Jennifer Cha)

Boulder CO USA

2013.09-2014.03

- Photolabile chemical surface modification for bio-applications including bio-molecule detection.

University of California, San Diego

Materials Science and Engineering Program & Department of Nanoengineering

Research Assistant (Advisor: Prof. Jennifer Cha)

San Diego CA USA

2008.09-2013.08

- Design protein sensor based on chemically modified M13 bacteriophage and nanostructures. (Colorimetric, SPR, SERS, and plasmonic detection).
- **Phage display (*Nobel Prize Winning Tech. in 2018 Chemistry):** the key technology finding appropriate peptide sequenced M13 bacteriophage to target molecules such as protein including antigen, antibody, other biomolecules, and organic materials (metal, oxide-type molecules).
- Biochemistry: chemical modification of virus (MW:16.4 MDa) with different chemical moieties and oligonucleotide DNA.
- Assembly of nanostructures with biomolecules and substrate *via* DNA, peptide and biomolecules.

- Synthesis and characterization of biomolecules and inorganic nanoparticles (FeO_x, silica, Au, Ag, Pt, and their core/shell type).

Korea University

Department of Materials Science and Engineering

Korea Research Institute of Chemical Technology

Convergence Biotechnology Research Center

Researcher (Supervisor: Prof. Y. K. Kim and Dr. Y. D. Suh)

Seoul ROK

2003.03-2003.08

- Characterization of FeO_x nanostructure with Raman Spectroscopy

Korea University

Department of Materials Science and Engineering

Research Assistant (Advisor: Prof. Y. K. Kim)

Seoul ROK

2005.05-2008.02

- Fabrication of Fe/FeO_x core/shell nanowires, multilayered Fe/Au nanowires, and hybrid core/shell-Au nanowires by electrodeposition method.
- Characterization of nanowires by XRD, VSM, SQUID, TEM, SEM, ICP-AES, and etc.
- Synthesis of hexagonal diamond nanoplates and characterization by Raman Spectroscopy.

TEACHING EXPERIENCES**University of California, Berkeley**

Department of Bioengineering

Guest Lecturer

Berkeley CA USA

2019 spring, 2017 spring, and 2015 fall

- BioE150, Introduction of Bionanoscience and Bionanotechnology, instructed by Prof. SW Lee
- BioE111, Functional Biomaterials Development and Characterization, instructed by Prof. SW Lee
- Gave 1.5 h lecture on the basic concept of nano materials based biomimetic biosensor.

University of California, San Diego

Materials Science and Engineering Program & Department of Nanoengineering

Teaching Assistant

San Diego CA USA

2009 Spring

- Thermodynamics, instructed by Prof. J. Cha
- Weekly discussion and grading, review sessions.

Korea University

Department of Materials Science and Engineering.

Teaching Assistant

Seoul ROK

2006.09-2006.12, 2006.03-2006.06

- Experimental Course in Materials Engineering IV, instructed by Prof. Y. K. Kim.
- Emerging and Interdisciplinary Studies in Materials, instructed by Prof. Y. K. Kim.
- Weekly discussion and experiment sessions, grading, review sessions.

Awards and Honors**Jinchoon Kim Scholarship,**

Korean-American Scientists and Engineers Association San Diego Chapter (Nov. 10, 2012).

Excellent Paper Award,

Department of Materials Science and Engineering, Korea University, (Feb. 19, 2008). (The Department named one recipient for the 2007 Excellent Paper Award among 244 graduate students. The purpose of award is intended to encourage highly original and active research.)

Best Poster Award,

The 1st International Symposium on Advanced Magnetic Materials and Applications (ISAMMA), (May. 28, 2007).

Best Poster Award,

The 10th Joint Magnetism and Magnetic Materials/International Magnetism Conference, Co-organized by American Institute of Physics and IEEE Magnetism Society (Jan. 8, 2007).

Outstanding Students Scholarship,

College of Engineering, Korea University (Mar. 2005, Mar. 2004).

LEADERSHIP EXPERIENCE

President

Korean Graduate Student Association of University of California, San Diego

San Diego CA USA

2011.09-2012.08

President

Korea University

Graduate Student Association of Department of Materials Sciences and Engineering

Seoul ROK

2006.03-2007.02