

Curriculum Vitae

Sanghwa Jeong, Ph. D.
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Affiliation

Pusan National University, Pusan, South Korea
Assistant Professor, School of Biomedical Convergence Engineering, 2021.03 – present

Education

Ph.D., Chemistry 2015
POSTECH, Pohang, South Korea
Supervisor : Prof. Sungjee Kim
Dissertation: *Near Infrared Luminescent Nanoparticles for Bioimaging*

B.S., Chemistry (Major) and Physics (Minor), 2009
POSTECH, Pohang, South Korea
Supervisor : Prof. Moonhor Ree

Research Experience

Postdoctoral Fellow, 2017 - 2020

Department of Chemical and Biomolecular Engineering, University of California, Berkeley, Berkeley, United States

Supervisor : Prof. Markita Landry

- Development of high-throughput selection platform for universal optical nanosensors for neuromodulators via synthetic molecular recognition of carbon nanotube constructs
- Investigation of noncovalent adsorption of biopolymers on graphene quantum dot

Postdoctoral Fellow, 2015 – 2016

Department of Chemistry, POSTECH, Pohang, South Korea

Supervisor : Prof. Sungjee Kim

- Development of multispectral fluorescent quantum dots in the second near-infrared region for *in vivo* bioapplication
- Development of photostable near-infrared photoluminescent QD-clay-glass matrix

Graduate Researcher, 2009 - 2015

Department of Chemistry, POSTECH

Supervisor : Prof. Sungjee Kim

- Development of protease-sensitive “turn-on” second-near-infrared quantum dot probe for tumor-microenvironment detection
- Study of in-situ stepwise self-assembly of cadmium chalcogenide quantum dots into superstructure
- Study of imaging performance of second-near-infrared light in biological tissue
- Development of in situ and high-loaded CdSe quantum dot-silica composite

Skills

- Thermolysis-based synthesis, surface-engineering and characterization of inorganic nanocrystals including semiconductor quantum dot, and lanthanide-doped nanoparticle.
- Research-based programming tools of MATLAB, Mathematica, and Python.
- Basic biological techniques such as cell culture, small animal handling, sanger sequencing, illumina sequencing.

Publications

1. Jackson, C. T.; **Jeong, S.**; Dorlhiac, G. F.; Landry, M. P., Advances in engineering near-infrared luminescent materials. *iScience* **2021**, 24 (3), 102156.
2. **Jeong, S.**; Grandio, E. G.; Navarro, N.; Pinals, R. L.; Ledesma, F.; Yang, D.; Landry, M. P., Extraction of Viral Nucleic Acids with Carbon Nanotubes Increases SARS-CoV-2 RT-qPCR Detection Sensitivity. *medRxiv* **2021**, 2021.01.22.20224675.
3. Pinals, R. L.; Ledesma, F.; Yang, D.; Navarro, N.; **Jeong, S.**; Pak, J.E.; Kuo, L.; Chuang, Y.C.; Cheng Y.W.; Sun, H.Y.; Landry, M.P. Rapid SARS-CoV-2 Detection by Carbon Nanotube-Based Near-Infrared Nanosensors. *medRxiv* **2020** DOI: 10.1002/anie.202008175
4. **Jeong, S.**; Doh, H.; Kim, S., Colloidal Second Near-Infrared-Emitting Mn-Doped Ag₂S Quantum Dots. *ChemNanoMat* **2020**, 6, 538-541.
5. **Jeong, S.**†; Pinals, R.†; Dharmadhikari, B.; Song, H.; Kalluri, A.; Debnath, D.; Qi, W.; Ham, M.; Patra, P.; Landry, M.P., Graphene Quantum Dot Oxidation Governs Noncovalent Biopolymer Adsorption, *Sci. Rep.* **2020**, 10, 7074.
6. **Jeong, S.**; Yang, D.; Beyene, A.G.; O'Donnell, T.; Gest, A.; Navarro, N.; Sun, X.; Landry, M.P., High Throughput Evolution of Near Infrared Serotonin Nanosensors, *Sci. Adv.* **2019**, 5, 12, eaay3771.
7. Del Bonis-O'Donnell, J.T., Pinals, R., **Jeong, S.**, Thakrar, A., Wolfringer, R., Landry, M.P., Chemometric Approaches for Developing Infrared Nanosensors to Image Anthracyclines., *Biochemistry* **2018**, 58, 54-64.
8. Park, J.; Hwang, S.; **Jeong, S.**; Kim, S.; Bang, J.; Cho, S., Heterojunction area-controlled inorganic nanocrystal solar cells fabricated using supra-quantum dots, *ACS Appl. Mater. Interfaces* **2018**, 10, 50, 43768-43773.
9. **Jeong, S.**†; Jung, Y.†; Bok, S.; Ryu, Y.-M.; Lee, S.; Kim, Y.-E.; Song, J.; Kim, M.; Kim, S.-Y.; Ahn, G.-O.; Kim, S., Multiplexed In Vivo Imaging Using Size-Controlled Quantum Dots in the Second Near-infrared Window, *Adv. Healthcare Mater.* **2018**, 7, 1800695. (†equal contribution)
10. Han, S.; Beack, S.; **Jeong, S.**; Hwang, B. W.; Shin, M. H.; Kim, H.; Kim, S.; Hahn, S. K., Hyaluronate modified upconversion nanoparticles for near infrared light-triggered on-off tattoo systems, *RSC Adv.* **2017**, 7, 14805-14808.
11. **Jeong, S.**; Song, J.; Lee, W.; Ryu, Y. M.; Jung, Y.; Kim, S.-Y.; Kim, K.; Hong, S. C.; Myung, S. J.; Kim, S., Cancer-Microenvironment-Sensitive Activatable Quantum Dot Probe in the Second Near-Infrared Window, *Nano Lett.* **2017**, 17, 1378-1386.
12. Park, Y.†; **Jeong, S.**†; Kim, S., Medically Translatable Quantum Dots for Biosensing and Imaging, *J. Photochem. Photobiol. C* **2017**, 30, 51-70. (†equal contribution)
13. **Jeong, S.**; Nguyen, H. N.; Hwang, S.; Kim, B.; Heo, J.; Kim, S., Preparation of Photostable Near Infrared Luminescent Glass with Quantum Dot-Layered Double Hydroxide Composites, *J. Mater. Chem. C* **2016**, 4, 8624-8627.
14. Park, J.†; **Jeong, S.**†; Bang, J.†; Kim, B.; Doh, H.; Cho, S.; Hwang, S.; Kim, S., Formation and Stepwise Self-assembly of Cadmium Chalcogenide Nanocrystals to Colloidal Supra-Quantum Dots and the Superlattices, *Chem. Mater.* **2016**, 28, 5329-5335. (†equal contribution)
15. Song, J.; Kim, J.; Hwang, S.; Jeon, M.; **Jeong, S.**; Kim, C.; Kim, S., "Smart" gold nanoparticles for

- photoacoustic imaging: an imaging contrast agent responsive to the cancer microenvironment and signal amplification via pH-induced aggregation, *Chem. Commun.* **2016**, 52, 8287-8290.
16. Cao, T. H.; Heo, J.; Kwon, Y. K.; **Jeong, S.**; Kim, S., Photoluminescence from PbS quantum dots and PbS/CdS core/shell quantum dots mixed with As₂S₃ glass, *J. Non-Cryst. Solids* **2016**, 431, 76-78.
 17. Jung, Y.; **Jeong, S.**; Nayoun, W.; Ahn, B.; Kwag, J.; Geol Kim, S.; Kim, S., Quantum dot imaging in the second near-infrared optical window: studies on reflectance fluorescence imaging depths by effective fluence rate and multiple image acquisition, *Journal of Biomedical Optics* **2015**, 20 (4), 046012-046012.
 18. Yoo, J.; **Jeong, S.**; Kim, S.; Je, J. H., High performance stretchable nanowire UV-visible-NIR photodetector, *Adv. Mater.* **2015**, 27, 1712-1717.
 19. Cho, S.; Jang, J.-W.; Park, J.; Jung, S.; **Jeong, S.**; Kwag, J.; Lee, J. S.; Kim, S., Facile fabrication of two-dimensional inorganic nanostructures and their conjugation to nanocrystals, *J. Mater. Chem. C* **2013**, 1, 4497-4504.
 20. Cho, S.; Kwag, J.; **Jeong, S.**; Baek, Y.; Kim, S., Highly Fluorescent and Stable Quantum Dot-Polymer-Layered Double Hydroxide Composites, *Chem. Mater.* **2013**, 25 1071-1077.
 21. Cho, S.[†]; Jung, S.[†]; **Jeong, S.**; Bang, J.; Park, J.; Park, Y.; Kim, S., Strategy for Synthesizing Quantum Dot-Layered Double Hydroxide Nanocomposites and Their Enhanced Photoluminescence and Photostability, *Langmuir* **2013**, 29 (1) 441-447. (†equally contributed)
 22. Nam, J.; Won, N.; Bang, J.; Jin, H.; Park, J.; Jung, S.; **Jeong, S.**; Park, Y.; Kim, S., Surface engineering of inorganic nanoparticles for imaging and therapy, *Adv. Drug Del. Rev.* **2013**, 65 (5) 622-648.
 23. Won, N.; **Jeong, S.**; Kim, K.; Kwag, J.; Park, J.; Kim, S. G.; Kim, S., Imaging Depths of Near-Infrared Quantum Dots in First and Second Optical Windows, *Mol. Imaging* **2012**, 11 (4) 338-52.
 24. **Jeong, S.**; Won, N.; Lee, J.; Bang, J.; Yoo, J.; Kim, S. G.; Chang, J. A.; Kim, J.; Kim, S., Multiplexed near-infrared in vivo imaging complementarily using quantum dots and upconverting NaYF₄:Yb³⁺,Tm³⁺ nanoparticles, *Chem. Commun.* **2011**, 47, 8022-8024.
 25. **Jeong, S.**; Lee, J.; Nam, J.; Im, K.; Hur, J.; Park, J.-J.; Kim, J.-M.; Chon, B.; Joo, T.; Kim, S., One-Step Preparation of Strongly Luminescent and Highly Loaded CdSe Quantum Dot-Silica Films, *J. Phys. Chem. C* **2010**, 114(34), 14362-14367.

Patents

1. Ju Taek Nam, Na Youn Won, **Sanghwa Jeong**, Hyo Kyun Chung, Sungjee Kim, pH sensitive metal nanoparticle and preparation method, Patent No. WO2010002217 A3
2. Sungjee Kim, Seung ho Cho, Jung Heon Kwag, **Sanghwa Jeong**, Synthesis of quantum dot/polymer/layered-structure ceramic composite, Patent No. WO2014073814 A1
3. Kyu-hyun Im, No-kyoung Park, Jae-hyun Hur, Sung-Jee Kim, Ju-taek Nam, Seong-Ho Park, **Sanghwa Jeong**, Hydrogen peroxide sensitive metal nanoparticles, method for producing the same and hydrogen peroxide detection system comprising the same, Patent No. US20140065718 A1
4. Sung Jee Kim, **Sang Hwa Jeong**, Hyo Kyun Chung, Ju Taek Nam, Na Youn Won, pH Sensitive Metal Nanoparticle and Preparation Method, Patent No. US20110269170 A1

5. Sung Jee Kim, **Sang Hwa Jeong**, Hyo Kyun Chung, Ju Taek Nam, Na Youn Won, pH sensitive metal nanoparticle and preparation method, Patent No. EP2308799 A2
6. 김성지, 정상화, 송재중, 이원석, 발광 조절이 가능한 반도체 양자점 복합체 및 그 제조 방법, Patent No. KR101945114B1
7. 김성지, 정상화, 송재중, 이원석, 발광 조절이 가능한 반도체 양자점 복합체 및 그 제조 방법, Patent No. 1020115660000
8. **Sanghwa Jeong**, Eduardo González Grandío, Markita Landry, Method for extracting viral nucleic acid using carbon nanotube. (invention disclosure)

Awards & Scholarships

Hanhwa Travel Award at AIChE 2018	2018.10
QD2016-JACS Best Poster Award at QD2016	2016.05
Presidential Fellowship, Pohang University of Science and Technology	2011-2014
Best Teaching Assistant Award, Experimental Analytical Chemistry	2009.09
The Presidential Science Scholarship, Korea Student Aid Foundation	2009-2011
Bong-Whan Kim and Young-Soon Hong Scholarship	2009.03
National Science and Technology Scholarship	2005-2009

Academic Activities

1. 2020 ACS Fall Meeting, 2020, Oral Presentation (virtual)
2. The 125th General Meeting of the Korean Chemical Society, 2020, Oral Presentation
3. Maryland DNA Nanotechnology Conference, 2019, Oral Presentation
4. 2019 MRS Fall Meeting, 2019, Oral Presentation
5. 16th US-Korea Nanotechnology Forum, 2019, Poster Presentation
6. 2018 AIChE Annual Meeting, 2018, Oral Presentation
7. The 118th General Meeting of the Korean Chemical Society, 2016, Poster Presentation
8. 2016 IBS Conference on Supramolecular Chemistry, Poster Presentation
9. QD2016, 2016, Poster Presentation
10. The 116th General Meeting of the Korean Chemical Society, 2015, Oral Presentation
11. Pioneer NanoSeoul Forum, 2014, Poster Presentation
12. World Molecular Imaging Congress, 2014, Poster Presentation
13. Colloidal Semiconductor Nanocrystals, Gordon Conference, 2014, Poster Presentation
14. Nano Korea, 2012, Poster Presentation
15. Pioneer NanoSeoul Forum, 2011, Poster Presentation

16. SPIE Photonics West, 2011, Oral Presentation
17. The 106th General Meeting of the Korean Chemical Society, 2011, Poster Presentation
18. Materials Research Society Fall Meeting, 2009, Poster Presentation
19. The 103rd General Meeting of the Korean Chemical Society, 2009, Poster Presentation

Teaching Experience

2015.03 ~ 2015.06	Head Teaching Assitant, Department of Chemistry, Physical Chemistry II: Thermodynamics and kinetics, Pohang University of Science and Technology
2012.03 ~ 2012.12	Teaching Assistant, Research & Education Program, Daegu Science High School
2011.09 ~ 2011.12	Head Teaching Assistant, Department of Chemistry, Experimental Physical Chemistry, Pohang University of Science and Technology
2011.03 ~ 2011.12	Teaching Assistant, Research & Education Program, Daegu Science High School
2009.09 ~ 2009.12	Teaching Assistant, Department of Chemistry, Experimental Physical Chemistry, Pohang University of Science and Technology
2009.03 ~ 2009.07	Teaching Assistant, Department of Chemistry, Experimental Analytical Chemistry, Pohang University of Science and Technology