

# Jinhyung Lee

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U.S. Permanent Resident; no visa sponsorship required

## Education

### **University of Connecticut**

**09/2019–05/2024**

Ph.D., Biomedical Engineering | Advisor: Yupeng Chen

Dissertation: DNA-Inspired Nanopieces of Drug Delivery in Biomedical Applications

### **University of California, San Diego**

**09/2015–06/2017**

M.S., Bioengineering | Advisor: Yi Chen

Thesis: Self-Assembly DNA Nanogel with Embedded Functional Proteins for Nanomedicine Platform

### **Konkuk University, Seoul, Republic of Korea**

**03/2009–02/2015**

B.S., Convergence Biotechnology, College of Bioscience and Biotechnology

Republic of Korea Air Force, mandatory military service, 2010–2012

## Research appointments and experience

### **University of Connecticut, Biomedical Engineering**

**09/2024–present**

*Postdoctoral Research Associate | Advisor: Yupeng Chen*

- Developing Janus base nanopieces for Atsttrin mRNA delivery and a cartilage-on-a-chip platform for osteoarthritis; preliminary work includes a fabricated prototype and molecular-response studies.
- Co-first author, Journal of Controlled Release (2025): conceptualization, methodology, investigation, visualization, and original-draft writing for computation-aided rod-shaped carriers.
- Co-corresponding author, Materials Today Advances (2026): methodology, investigation, and manuscript revision for doxorubicin and siRNA co-delivery.
- Coordinating investigator for a multi-institutional International Space Station spatial-omics collaboration involving UConn, UC Davis, Easra Biotechnologies, Axiom Space, the ISS National Laboratory, and NASA.

### **University of Connecticut, doctoral research**

**09/2019–05/2024**

*Advisor: Yupeng Chen*

- Developed Janus base nanopieces for intracellular RNA delivery; first-author PNAS study (2021) with roles in research design, experiments, analysis, and writing.
- Established nucleic-acid delivery protocols and helped build synthesis and characterization infrastructure for the laboratory.

### **Korea Institute of Science and Technology, Seoul**

**09/2017–12/2018**

*Researcher, Brain Science Institute*

- Developed GPCR-based FRET biosensors for neurotransmitter detection; co-inventor on Korean Patent KR 10-2176538.

### **University of California, San Diego, graduate research**

**01/2016–06/2017**

*Advisor: Yi Chen*

- Developed a self-assembling DNA nanogel with embedded functional proteins for intracellular delivery.

## Awarded research funding

### **ORS/Bethel Fellowship Grant, Orthopaedic Research Society**

**10/2026–09/2027**

Principal Investigator | \$20,000 | Awarded; start date October 2026

Cosponsor: Orland Bethel Family Musculoskeletal Research Center

Project: Dual-Action Atsttrin mRNA Therapy via Janus Base Nanoparticle for Osteoarthritis in a Human Cartilage-on-a-Chip Model

Co-investigators: Yupeng Chen (UConn) and Chuan-Ju Liu (Yale School of Medicine)

## **Peer reviewed publications**

7 publications: 6 original research articles and 1 review; 4 as first, co-first, or co-corresponding author. † Equal contribution. \* Corresponding author.

### **Original research**

1. †Zhai J, †Surian A, Cote T, Zhang W, Dang BT, Wang Y, Chen Q, Hoshino K, \*Lee J, \*Chen Y. Enhanced endosomal escape for nanoparticle-enabled co-delivery of doxorubicin and siRNA to overcome multidrug resistance. *Materials Today Advances*. 2026;30:100845. doi:10.1016/j.mtadv.2026.100845.
2. †Lee J, †Zhang W, Nguyen D, Zhou L, Amengual J, Zhai J, Cote T, Landolina M, Ahmadi E, Sands I, Mishra N, Yu H, Nieh MP, \*Wang K, \*Li Y, \*Chen Y. Computation-aided design of rod-shaped nanoparticles for tumoral targeting. *Journal of Controlled Release*. 2025;387:114169. doi:10.1016/j.jconrel.2025.114169.
3. Zhou L, Zhang W, Lee J, Kuhn L, \*Chen Y. Controlled self-assembly of DNA-mimicking nanotubes to form a layer-by-layer scaffold for homeostatic tissue constructs. *ACS Applied Materials & Interfaces*. 2021;13(43):51321–51332. Cover article. doi:10.1021/acsami.1c13345.
4. Lee J, Sands I, Zhang W, Zhou L, \*Chen Y. DNA-inspired nanomaterials for enhanced endosomal escape. *Proceedings of the National Academy of Sciences USA*. 2021;118(19):e2104511118. doi:10.1073/pnas.2104511118.
5. Sun M, Lee J, Chen Y, Hoshino K. Studies of nanoparticle delivery with in vitro bio-engineered microtissues. *Bioactive Materials*. 2020;5(4):924–937. doi:10.1016/j.bioactmat.2020.06.016.
6. Sands I, Lee J, Zhang W, \*Chen Y. RNA delivery via DNA-inspired Janus base nanotubes for extracellular matrix penetration. *MRS Advances*. 2020;5(16):815–823. doi:10.1557/adv.2020.47.

### **Review article**

7. †Yau A, †Lee J, \*Chen Y. Nanomaterials for protein delivery in anticancer applications. *Pharmaceutics*. 2021;13(2):155. doi:10.3390/pharmaceutics13020155.

### **Book chapters**

1. Sands I, Lee J, Chen Y. Nanotechnology for DNA and RNA delivery. In: *Nanomedicine: Technologies and Applications*. 2nd ed. Chapter 4. Elsevier; 2023:81–111. doi:10.1016/B978-0-12-818627-5.00008-7.
2. Lee J, Chen Y. Nucleic acid delivery systems for gene therapy. In: Zimmer V, ed. *Gene Delivery: Methods and Applications*. Chapter 2. Nova Science Publishers; 2019.

### **Patents and technology transfer**

1. Chen Y, Lee J, Zhang W. Therapeutic nanomaterials. U.S. Patent 12,214,043 B2; issued February 4, 2025. Assignee: University of Connecticut.
  2. Chen Y, Zhang W, Lee J. Nanomaterial delivery vehicle and method of use thereof. U.S. Patent Application Publication 2025/0302762 A1; published October 2, 2025. Application 18/852,925.
  3. Seong J, Lee J, Kim H, Choo H. Biosensor based on fluorescence resonance energy transfer for detecting of antipsychotic medicine and detection method for using same. Korean Patent KR 10-2176538 B1; granted November 9, 2020.
- U.S. Patent 12,214,043 B2 is licensed by UConn to Easra Biotechnologies. The licensed Janus base technology supports NASA-funded microgravity research aboard the International Space Station.

## **Teaching and mentoring**

### **Teaching Assistant, Foundations of Biomechanics (BENG 226)**

**04/2017–06/2017**

*Graduate course, Department of Bioengineering, University of California, San Diego*

- Led weekly discussion sections, prepared supplementary materials, and graded problem sets and examinations.

### **Laboratory mentoring | University of Connecticut**

- Mentored seven graduate and undergraduate researchers in nanoparticle synthesis, characterization, and RNA delivery.
- Co-authored conference presentations with trainees at BMES and SCCUR.
- Helped establish synthesis and characterization workflows as the founding graduate student in the doctoral laboratory and trained researchers who joined later.

## **Selected presentations**

Selected invited and podium presentations are listed below; accepted future presentations are identified explicitly.

### **Invited talks**

1. Lee J. DNA-inspired Janus base nanoparticles for drug delivery in biomedical applications. Chonnam National University Medical School Seminar, Republic of Korea, 2026.
2. Lee J. Computation-aided design of rod-shaped Janus base nanotubes for enhanced tumoral targeting. Biomaterials and Biofabrication Conference, USA, 2025.
3. Lee J. DNA-inspired nanopieces of drug delivery in biomedical applications. College of Medicine, Kyung Hee University Seminar, Republic of Korea, 2024.
4. Lee J, Chen Y. DNA-inspired nanomaterials for small molecule delivery to hard-to-penetrated solid tumors. Next-Generation Nanomedicine, USA, 2023. Short talk.

### **Podium presentations**

1. Lee J, Cote T, Zhai J, Dang BT, Chung EJ, Landolina M, Chen Y. Rod-shaped DNA-inspired Janus base nanoparticles enable in vivo kidney CRISPR editing. BMES Annual Meeting, Orlando, FL, October 2026. Accepted.
2. Lee J, Cote T, Davidson N, Zhai J, Zhang W, Morgan K, Liu C, Laurencin C, Chen Y. Janus base nanopieces delivered mRNA therapeutics against cartilage degradation and joint pain for osteoarthritis treatment. Orthopaedic Research Society Annual Meeting, 2024.

## **Awards and recognition**

- ORS/Bethel Fellowship Grant, Orthopaedic Research Society, 2026; \$20,000.
- Predoctoral Fellowship, University of Connecticut, 2023.
- RNATx Young Investigator Travel Award, UMass Chan Medical School, 2023.
- Graduate Travel Awards, University of Connecticut; four competitive awards, 2020–2022.
- Sung-jo Merit Scholarship (highest merit tier) and Shin-jo Merit Scholarship, Konkuk University, 2014–2015.

## **Professional service and memberships**

Reviewer, ASSAY and Drug Development Technologies, 2026.

Member, Orthopaedic Research Society; American College of Rheumatology; Biomedical Engineering Society.