

DONGHEON LEE

RESEARCH INTERESTS

Synthetic Biology Process Modeling & Control Systems Biology Hybrid Modeling

PROFESSIONAL EXPERIENCE

Assistant Professor, Department of Chemical and Biomedical Engineering,
FAMU-FSU College of Engineering, Tallahassee, FL *2025-Present*

EDUCATION & TRAINING

Duke University, Durham, NC *2020-2025*
Postdoctoral Associate Advisor: Professor Lingchong You

Texas A&M University, College Station, TX *August 2020*
Ph.D. in Chemical Engineering Advisor: Professor Joseph S. Kwon

Rice University, Houston, TX *May 2015*
B.S. in Chemical & Biomolecular Engineering

AWARDS

Faculty Travel Grant, Florida State University 2025
Travel support for KSEA Scientists & Engineers Early Career Development Workshop 2019, 2023
Contributed Talk Prize, 2021 Society for Mathematical Biology (SMB) Annual Meeting 2021
2021 Korean American Society in Biotech and Pharmaceuticals Spring Symposium Fellowship 2021
3rd place in Poster Presentation Award, Applied BioMath QSP Summit 2020
Korean-American Scientists & Engineers Association (KSEA) Graduate Student Scholarship 2019
3rd Place in Best Poster Presentation Award, Texas A&M ChEGSA Research Symposium 2019
Texas A&M Graduate Student Research and Presentation Travel Grant 2018
Best Oral Presentation in Session 254, AIChE Annual Meeting 2017
KSEA West Gulf Coast Regional Conference Poster Award 2016, 2017
Selected Participant of Nanyang Technological University Summer Research Internship 2014
Yonsei International Summer School Scholastic Scholarship 2013

JOURNAL PUBLICATIONS

- J1 **D. Lee**, R. Su, Y. Dai, H.-I. Son, K. Kim, X. Chen, A. Chilkoti, and L. You, "Biomolecular phase separation suppresses gene expression in bacteria," *In Preparation*.
- J2 H. Cho, A. Kudva, P. Shah, **D. Lee**, and J. S. Kwon, "Dictionary-based weak-form training for noise-robust series hybrid models with multiplicative unknowns," *AIChE J*, *Submitted*.
- J3 A. Kudva, H. Cho, P. Shah, **D. Lee**, and J. S. Kwon, "Tip your HATS to hidden dynamics: Attribution-guided symbolic enhancements of known physics with applications to complex biological and engineering systems," *Chemical Engineering Journal*, *Submitted*.

- J4 E. Şimsek, C. Villalobos, K. Sahu, Z. Zhou, N. Luo, **D. Lee**, H.M. Ma, D.J. Anderson, C.T. Lee, L. You, “Keystone engineering enables collective range expansion in microbial communities,” *Nature Communications*, *In Press*.
- J5 Z. Holmes, A. Hoffman, K. Duncker, H. Ma, **D. Lee**, R. Maddamsetti, K. Kim, E. Şimsek, G. Hamrick, C. Villalobos, J. Lu, Y. Ha, Z. Yao, S. Liu, F. Wu, S. Wang, M. Lynch, Al. Lopatkin, L. David, E. Chory, L. You, “A Foundation model for microbial growth dynamics,” *bioRxiv*.
- J6 Y. Ha, R. Maddamsetti, X. Chen, E. Şimsek, **D. Lee**, H.-I. Son, L. You, “Nested-MGEs enable rapid population response in fluctuating environments,” *bioRxiv*.
- J7 **D. Lee***, M.T. Walls*, Y. Dai, K. Xu, C.P. Brangwynne, A. Chilkoti, J.L. Avalos, and L. You, “Principles of metabolic pathway control by biomolecular condensates in cells,” *Nature Chemical Engineering*, 2025, 2, 198–208. (*co-first author)
- J8 E. Şimsek, Y. Yao, **D. Lee**, and L. You, “Toward predictive engineering of gene circuits,” *Trends in Biotechnology*, 2023, 41(6), 760-768.
- J9 Y. Dai, M. Farag, **D. Lee**, X. Zeng, K. Kim, H. Son, X. Guo, M. Ney, D.M. Shapiro, R.V. Pappu, A. Chilkoti, and L. You, “Programmable synthetic biomolecular condensates for cellular control,” *Nature Chemical Biology*, 2023, 19, 518–528.
- J10 **D. Lee**, A. Green, H.-J. Wu, and J. S. Kwon, “Hybrid PDE-kMC modeling approach to simulate multivalent lectin-glycan binding process,” *AIChE Journal*, 2021, 67(12), e17453.
- J11 **D. Lee**, A. Jayaraman, and J. S. Kwon, “Development of a hybrid model for a partially known intracellular signaling pathway through correction term estimation and neural network modeling,” *PLOS Computational Biology*, 2020, 16(12), e1008472.
- J12 P. Kumari, **D. Lee**, Q. Wang, M. Karim, and J. S. Kwon, “Root cause analysis of key process variable deviation for rare event in chemical process industry,” *Industrial & Engineering Chemistry Research*, 2020, 59(23), 10987-10999.
- J13 **D. Lee**, A. Jayaraman, and J. S. Kwon, “Identification of Cell-to-cell Heterogeneity through systems engineering approaches,” *AIChE Journal*, 2019, 66(5), e16925. (**Editor’s Choice Article**)
- J14 H.-K. Choi, **D. Lee**, A. Singla, H.-J. Wu, and J. S. Kwon, “The influence of heteromultivalency on lectin-glycan binding behavior,” *Glycobiology*, 2019, 29(5), 397-408. (**Editor’s Choice Article**)
- J15 **D. Lee**, A. Jayaraman, and J. S. Kwon, “Identification of a time-varying intracellular signaling model through data clustering and parameter selection: application to NF κ B signaling pathway induced by LPS in the presence of BFA,” *IET Systems Biology*, 2019, 13, 169-179. (**2021 IET Systems Biology Premium Award**)
- J16 **D. Lee**, A. Mohr, J. S. Kwon, and H.-J. Wu, “Kinetic Monte Carlo modeling of multivalent binding of CTB proteins with GM1 receptors,” *Computers & Chemical Engineering*, 2018, 118, 283-295.
- J17 N.C. Worstell, A. Singla, P. Saenkham, T. Galbadage, P. Sule, **D. Lee**, A. Mohr, J. S. Kwon, J. D. Cirillo, and H.-J. Wu, “Hetero-multivalency of *Pseudomonas aeruginosa* lectin LecA binding to model membranes,” *Scientific Reports*, 2018, 8(1), 8419.
- J18 **D. Lee**, A. Singla, H.-J. Wu, and J. S. Kwon, “An Integrated numerical and experimental framework for modeling of CTB and GD1b ganglioside binding kinetics,” *AIChE Journal*,

2018, 64(11), 3882-3893.

J19 **D. Lee**, Y. Ding, A. Jayaraman, and J. S. Kwon, "Mathematical modeling and parameter estimation of intracellular signaling pathway: Application to LPS-induced NF κ B activation and TNF α production in macrophages," *Processes*, 2018, 6(3), 21.

J20 B.K. Chethana, **D. Lee**, and S. H. Mushrif, "First principles investigation into the metal catalysed 1, 2 carbon shift reaction for the epimerization of sugars," *Journal of Molecular Catalysis A: Chemical*, 2015, 410, 66-73.

PEER-REVIEWED CONFERENCE PROCEEDINGS

C1 **D. Lee**, A. Jayaraman, and J. S. Kwon, "A Hybrid Mechanistic Data-driven Approach for Modeling Uncertain Intracellular Signaling Pathways," *Proceedings of 2021 American Control Conference*, New Orleans, Louisiana, 2021.

C2 **D. Lee**, A. Jayaraman, and J. S. Kwon, "Derivation of a Dynamic Model for Palmitate-induced NF κ B Signaling Pathway through Systems Biology Approach," *Proceedings of 2020 American Control Conference*, Denver, CO, 2020.

C3 **D. Lee**, A. Jayaraman, and J. S. Kwon, "Identification of Heterogeneous Parameters in an Intracellular Reaction Network from Population Snapshot Measurements through Sensitivity Analysis and Neural Network," *8th IFAC Conference on Foundations of Systems Biology in Engineering*, Valencia, Spain, 2019.

C4 **D. Lee**, Y. Ding, A. Jayaraman, and J. S. Kwon, "Integrative Approach to Extract the Single-cell Dynamics of LPS-induced NF κ B Signal Pathway through Flow Cytometry Measurements and Parameter Estimation," *Proceedings of 2018 American Control Conference*, Milwaukee, WI, 2018.

C5 **D. Lee**, A. Singla, H.-J. Wu, and J. S. Kwon, "Dynamic Modeling of Binding Kinetics Between GD1b Ganglioside and Cholera Toxin Subunit B," *Proceedings of 2018 American Control Conference*, Milwaukee, WI, 2018.

C6 **D. Lee**, A. Mohr, J. S. Kwon, H.-J. Wu, and A. Singla, "Stochastic Modelling of CTB-receptor Binding Kinetics," *Proceedings of 13th International Symposium on Process Systems Engineering - PSE 2018*, San Diego, CA, 2018.

*Note each paper has an associated presentation

INVITED & REFERRED PRESENTATIONS

(Presenting authors are underlined)

Oral Presentations

O1 **D. Lee**, "Principles of Phase Separation in Regulating Biochemical Reactions in Living Cells," Analytical Chemistry Colloquium, Florida State University, Tallahassee, FL, 2026 [**Invited**]

O2 **D. Lee**, "Principles of Phase Separation in Regulating Biochemical Reactions in Living Cells," Frontiers in Quantitative Biodesign Seminar, Duke University, Durham, NC, 2026 [**Invited**]

O3 **D. Lee**, E. Simsek, L. You, "Transfer Learning from Large Language Models for Biology Predicts an Antibiotic Resistance Phenotype from Genotype," 2025 AIChE Annual Meeting, Boston, MA.

- O4 **D. Lee**, E. Simsek, L. You, “Predicting Small Molecule Enrichment in Biomolecular Condensates through Transfer Learning,” 2025 AIChE Annual Meeting, Boston, MA.
- O5 **D. Lee**, “Principles of metabolic pathway control by biomolecular condensates in cells,” Young Biophysicist Virtual Meeting 2025.
- O6 **D. Lee**, “Principles of phase-separation-mediated regulation of biochemical reactions in living cells,” Department of Brain Sciences Seminar, Daegu Gyeongbuk Institute of Science and Technology, Daegu, South Korea, 2024. [**Invited**]
- O7 **D. Lee**, Y. Dai, H.-I. Son, K. Kim, A. Chilkoti, L. You, “Biomolecular phase separation suppresses gene expression in bacteria,” *2024 AIChE Annual Meeting*, San Diego, CA 2024.
- O8 **D. Lee**, M. T. Walls, Y. Dai, K. Xu, C. P. Brangwynne, A. Chilkoti, J. Avalos, and L. You, “Principles of metabolic pathway control by biomolecular condensates in cells,” *2024 AIChE Annual Meeting*, San Diego, CA 2024.
- O9 **D. Lee**, Y. Dai, H.-I. Son, K. Kim, A. Chilkoti, L. You, “Biomolecular phase separation suppresses gene expression in bacteria,” *2024 Annual Meeting of North Carolina Branch of the American Society For Microbiology*, Wilmington, NC 2024.
- O10 **D. Lee**, M. T. Walls, Y. Dai, K. Xu, C. P. Brangwynne, A. Chilkoti, J. Avalos, and L. You, “Control of metabolic reactions by biomolecular condensates in living cells,” *US-Korea Conference (UKC) 2024*, San Francisco, CA 2024.
- O11 **D. Lee** and L. You, “Design Principles of Compartmentalization for Engineering Enzymatic Reactions,” 2021 American Institute of Chemical Engineers (AIChE) Annual Meeting, Boston, MA, 2021 (paper 9b).
- O12 **D. Lee**, A. Green, H.-J. Wu, and J. S. Kwon, “Accelerate Simulations of Multivalent Letin-Glycan Binding Process through Hybrid PDE-Kinetic Monte Carlo Model,” 2021 AIChE Annual Meeting, Boston, MA, 2021 (paper 284f).
- O13 **D. Lee**, “Hybrid Modeling Approach to Describe Dynamics of Uncertain Biological Systems,” Interdisciplinary Center for Quantitative Modeling in Biology Seminar, University California at Riverside, 2021. [**Invited**]
- O14 **D. Lee**, A. Jayaraman, and J. S. Kwon, “Hybrid Data-driven Mechanistic Modeling Approach to Describe Uncertain Intracellular Signaling Pathways,” Annual International Conference On Systems Biology of Human Disease, Virtual, 2021.
- O15 **D. Lee**, A. Jayaraman, and J. S. Kwon, “Hybrid Data-driven Mechanistic Modeling Approach to Describe Uncertain Intracellular Signaling Pathways,” 2021 SMB Annual Meeting, Virtual, 2021.
- O16 **D. Lee**, A. Jayaraman, and J. S. Kwon, “Development of a Hybrid Model to Describe the Dynamics of a Partially Known System,” 2020 AIChE Virtual Annual Meeting, paper 403d, 2020.
- O17 **D. Lee**, J. S. Kwon, and H.-J. Wu, “Investigation of Hetero-Multivalent Binding Dynamics between Cholera Toxin and Glycolipids on Membranes via Kinetic Monte Carlo Model and Nanocube-Based Measurements,” 2020 AIChE Virtual Annual Meeting, paper 667a, 2020.
- O18 **D. Lee**, A. Jayaraman, and J. S. Kwon, “Development of a Hybrid Model to Describe the Dynamics of a Partially Known System,” Applied BioMath Quantitative Systems Pharmacology (QSP) Summit, 2020.

- O19 D. Lee, Y. Ding, A. Jayaraman, J. S. Kwon, “Integrative Analysis of Free Fatty Acid-Induced NF κ B Activation in Macrophages: A Step Towards the Quantitative Understanding of Inflammation Induced By Obesity,” *2019 AIChE Annual Meeting*, Orlando, FL, 2019 (paper 158g).
- O20 D. Lee, A. Jayaraman, J. S. Kwon, “Estimation of Probability Density Functions of Model Parameters for a Heterogeneous Population with Neural Network: Application to TNF α Signaling Pathway,” *2019 AIChE Annual Meeting*, Orlando, FL 2019 (paper 195h).
- O21 D. Lee, J.L. Dial III, J.S. Kwon, A. Singla and H. J. Wu, “Stochastic Modeling of CTB-GM1 Binding Mechanisms,” *2017 AIChE Annual Meeting*, Minneapolis, MN, 2017 (paper 254e).
- O22 D. Lee, Y. Ding, A. Jayaraman, and J. S. Kwon, “Modeling LPS-Induced TNF- α Production in Macrophages,” *2017 AIChE Annual Meeting*, Minneapolis, MN, 2017 (paper 343a).
- O23 D. Lee, A. Singla, H.-J. Wu and J. S. Kwon, “Investigating Cholera Toxin Binding Mechanism with Gangliosides Via Kinetic Modeling and Experimental Measurements,” *2017 AIChE Annual Meeting*, Minneapolis, MN, 2017 (paper 416f).
- O24 D. Lee, Y. Ding, A. Jayaraman and J.S. Kwon, “Developing a Stochastic Model of LPS-Induced TNF- α Production in Macrophages,” *2016 AIChE Annual Meeting*, San Francisco, CA, 2016 (paper 341d).

Poster Presentations

- P1 R. Su, D. Lee, L. You, “Characterization of Transcriptional Regulation by Biomolecular Condensates,” 2025 BMES Annual Meeting,” San Diego, CA.
- P2 D. Lee, Y. Dai, A. Chilkoti, and L. You, “Unraveling Quantitative Relationships Between Intracellular Phase Separation and Gene Expression Through Single-cell Analysis,” *International Soft Matter Conference 2024*, Raleigh, NC, 2024.
- P3 D. Lee, Y. Dai, A. Chilkoti, and L. You, ”Unraveling Quantitative Relationships between Intracellular Phase Separation and Gene Expression through Single-Cell Analysis,” *6th International Conference on Microbiome Engineering*, Berkeley, CA, 2023.
- P4 D. Lee, A. Jayaraman, and J. S. Kwon, “Time-Varying Model Identification of Nonlinear Systems with Partially Known Model Structure: Application to NF κ B Signaling pathway induced by LPS and BFA,” *2019 AIChE Annual Meeting*, Orlando, FL, 2019 (Paper 371p).
- P5 D. Lee, A. Jayaraman, and J. S. Kwon, “Construction of a Semi-Stochastic Intracellular Signaling Model via Global Sensitivity Analysis and Probability Density Estimation,” *2018 AIChE Annual Meeting*, Pittsburgh, PA, 2018 (paper 182i).
- P6 D. Lee, H. K. Choi, H.-J. Wu, and J. S. Kwon, “Investigating LecA Binding Mechanisms with a Cellular Membrane Containing Multiple Types of Receptors via Kinetic Monte Carlo Simulation,” *2018 AIChE Annual Meeting*, Pittsburgh, PA, 2018 (paper 182l).

PRESENTATIONS IN SYMPOSIUMS & WORKSHOPS

(Presenting authors are underlined)

- R1 R. Webster, D. Lee, “Kinetic Monte Carlo Simulation of GM1-Mediated Amyloid Beta Polymerization on Cellular Membrane,” Tri Beta Annual Poster Competition, Florida State University, 2025

- R2 **D. Lee**, Y. Dai, A. Chilkoti, L. You, “Single-cell Analysis of Gene Expression Modulation through Phase Separation,” Duke Center for Quantitative Biodesign Symposium, Duke University, 2022.
- R3 **D. Lee**, A. Jayaraman, J. S. Kwon, “Hybrid Data-driven Mechanistic Modeling Approach to Describe Uncertain Intracellular Signaling Pathways,” 2021 Korean American Society in Biotech and Pharmaceuticals Spring Symposium, virtual, 2021. [Poster Presentation]
- R4 **D. Lee**, A. Jayaraman, J. S. Kwon, “Estimation of Parameter Distributions for A Single-cell Level Signaling Pathway Model,” 1st Annual Gulf Coast Consortia Single Cell Omics Symposium, Houston, Texas, 2020.
- R5 **D. Lee**, Y. Ding, A. Jayaraman, J. S. Kwon, “Integrative Analysis of Free Fatty Acid-Induced NF κ B Activation in Macrophages,” *Texas A&M University Annual Chemical Engineering Graduate Student Association (ChEGSA) Research Symposium*, College Station, TX, 2020.
- R6 **D. Lee**, “Quantitative Analysis of Immune Responses: A Systems Engineering Approach,” Korean-American Scientists and Engineers Association (KSEA) Scientists and Engineers Early Career Development Workshop, Washington, D.C., 2019.
- R7 **D. Lee**, A. Jayaraman, and J. S. Kwon, “Estimation of Probability Density Functions of Model Parameters for a Heterogeneous Population with Neural Network,” *Texas A&M University Conference on Energy*, 2019.
- R8 **D. Lee**, A. Jayaraman, and J. S. Kwon, ”Construction of a Semi-Stochastic Intracellular Signaling Model via Global Sensitivity Analysis and Probability Density Estimation,” *Texas A&M University Student Research Week*, 2019.
- R9 **D. Lee**, A. Jayaraman, and J. S. Kwon, “Construction of a Semi-Stochastic Intracellular Signaling Model via Global Sensitivity Analysis and Probability Density Estimation,” *Annual ChEGSA Research Symposium*, 2019.
- R10 **D. Lee**, A. Mohr, H.-J. Wu and J. S. Kwon, ”Stochastic Modeling of CTB-GM1 Binding Kinetics,” *Annual ChEGSA Research Symposium*, 2018.
- R11 **D. Lee** Y. Ding, A. Jayaraman, and J. S. Kwon, “Integrative Approach to Model Average Single-cell Dynamics of LPS-induced TNF- α in Macrophages,” *KSEA West Gulf Coast Regional Conference*, Houston, TX, 2017.
- R12 **D. Lee** Y. Ding, A. Jayaraman, and J. S. Kwon, “Modeling LPS-induced TNF- α Production in Macrophages,” *Texas A&M University National Labs Day*, 2017. [Poster Presentation]
- R13 **D. Lee** Y. Ding, A. Jayaraman, and J. S. Kwon, “Modeling LPS-induced TNF- α Production in Macrophages,” *Texas Systems Day*, College Station, TX, 2017.
- R14 **D. Lee**, Y. Ding, A. Jayaraman and J. S. Kwon, “Modeling LPS-induced TNF production in macrophages,” 2017 Texas A&M University ENG-LIFE Workshop, 2017.
- R15 **D. Lee** Y. Ding, A. Jayaraman, and J. S. Kwon, “Integrative Approach to Model Average Single-cell Dynamics of LPS-induced TNF- α in Macrophages,” *KSEA West Gulf Coast Regional Conference*, Houston, TX, 2016.
- R16 **D. Lee** Y. Ding, A. Jayaraman, and J. S. Kwon, “Integrative Approach to Model Average Single-cell Dynamics of LPS-induced TNF- α in Macrophages,” *Annual ChEGSA Research Symposium*, 2016.

TEACHING & MENTORING

Courses:

BME 4332 : Cell & Tissue Engineering, FAMU-FSU College of Engineering	2025
BME 4332L : Cell & Tissue Engineering Laboratory, FAMU-FSU College of Engineering	2025

STUDENT SUPERVISED

As PI at FAMU-FSU College of Engineering:

Current Ph.D. Student:

1. Somtochukwu Nnajide, Chemical Engineering	2026-Present
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Current Master Student:

1. Andrew Stombaugh, Biomedical Engineering (BME)	2026-Present
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Current Undergraduate Researchers:

1. Ryan Webster, BME	2025-Present
2. Bashair Binmahfooz, BME	2026-Present
3. Joshitha Vakiti, BME	2026-Present

Member of the PhD Dissertation Committee:

1. Jeeban Bhattacharai, BME	2025-Present
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Member of Undergraduate Honors Committee:

1. Connor Blan, B.S. BME	2025-Present
2. Erica Hamel, B.S. BME	2025-Present
3. Maeve Storm, B.S. Civil & Environmental Engineering	2025-Present

As Graduate Student/Postdoctoral Researcher:

Previous Undergraduate Researchers:

1. Ryan Su, Duke University BME	2024-2025
2. Aaron Green, Texas A&M University Chemical Engineering	2019-2020
3. Alec Mohr, Texas A&M University Chemical Engineering	2017-2018
4. John L. Dial, Texas A&M University Chemical Engineering	2016-2017

SERVICE

Chairs in Conferences & Symposium:

1. AIChE Annual Meeting, Microbiome and Microbial Consortia in Food, Health, and Bioprocessing	2026
2. AIChE Annual Meeting, Applied Math for Biological and Biomedical Systems	2025-2026
3. SMB Annual Meeting, Multiscale Modeling in Physiology and Biophysics	2021
4. ChEGSA Annual Research Symposium, Texas A&M University	2019
5. American Control Conference, Systems Biology	2018

Service for Professional Organizations:

1. Co-chair of KSEA Affiliated Professional Society Committee Member	2025 - Present
2. KSEA Scholarship Committee Member	2022 - 2025

Reviewers for Journals:

Nature Communications; Journal of Process Control; Industrial & Engineering Chemistry Research; Journal of Biological Engineering; IET Systems Biology; International Journal of Control, Automation and Systems; Computational and Structural Biotechnology; Digital Chemical Engineering; Cell Biochemistry and Biophysics; AIP Advances; PLoS ONE; PLoS Computational Biology; Frontiers in Genetics; Frontiers in Chemical Engineering; ISA Transactions; Processes; Cells; International Journal of Molecular Sciences; American Control Conference; Conference on Decision & Control

Reviewers for Funding Agencies:

1. Chan-Zuckerberg Initiative, Implementation of Synthetic Biology Principles in Immunology 2025

Local/University Service:

1. Graduate Committee, Department of Chemical and Biomedical Engineering 2025-Present
2. Poster Judge, Tri Beta Poster Presentation, Florida State University 2025
3. Poster Session Judge, 2024 AIChE Annual Meeting 2024
4. Poster Session Judge, 2023 Kewaunee Symposium, Duke University 2023
5. Presentation Judge, ChEGSA Research Symposium, Texas A&M University 2019,2020

GRANT PROPOSALS

1. "Kinetic Monte Carlo Simulation of Amyloid- β Deposition on Cellular Membranes Mediated by Gangliosides," NIH R03, 2026 (role: PI; co-I: Ayyalusamy Ramamoorthy) [Under Review].
2. "Kinetic Monte Carlo Simulation of Amyloid- β Deposition on Cellular Membranes Mediated by Gangliosides," Duke University Center for Multiscale Immune Systems Modeling, 2026 (role: PI; co-PI: Ayyalusamy Ramamoorthy) [Under Review].
3. "Predictive Engineering of Enzymes and Biomolecular Condensates: Overcoming Kinetic Barriers in Probiotic Therapies," American Heart Association Innovative Project Award, 2026 (role: PI) [Under Review]
4. "Unraveling Molecular Mechanisms of Gene Repression by Biomolecular Condensates in Bacteria," ORAU Ralph E. Powe Junior Faculty Enhancement Award, 2025 (role: PI) [Under Review].
5. "Unraveling Molecular Mechanisms of Gene Repression by Biomolecular Condensates in Bacteria," Florida State University, First-year Assistant Professor Award, 2026 (role: PI) [**Funded**: \$20,000].
6. "Development and Evaluation of a Therapeutic for Trimethylaminuria based on an Engineered Cell with a Genome Integrated Engineered Gene," Florida Institute for Pediatric Rare Diseases Research Program, Florida State University, 2025 (role: co-I) [Not Funded].
7. "Development of IDP-aware protein language model for the prediction of enzyme kinetic parameters," FSU-AWS Research Acceleration Fund, 2026 (rol: PI) [Not Funded].
8. "Engineering Biomolecular Condensates to Enhance Microbial Utilization of Unconventional Substrates," Sun Grant Program - Southeastern Region, 2026 (role: PI) [Not Funded].
9. "Functional landscape of biomolecular condensates in controlling gene expression in living cells," NIH NIBIB R01, 2024 (role: Main Contributor; PI: Ashutosh Chilkoti, Lingchong You) [Not Funded].

10. "Elucidation of roles of biomolecular phase separation in regulating gene expression," Multi-disciplinary K12 Urologic Research Career Development Program from Duke University School of Medicine, 2024 (role: PI) [Not Funded].
11. "Engineering Synthetic Membraneless Organelles For Resveratrol Biosynthesis in E. Coli," AHA Postdoctoral Fellowship, 2022 (role: PI) [Not funded].
12. "A new tool for the analysis of glycan recognition by lectin," NSF CHE, 2019 (role: Contributor) [**Funded:** \$450,000; PIs: Hung-Jen Wu, Joseph S. Kwon].
13. "A Computationally Efficient Kinetic Monte Carlo Simulation for CTB Binding with Multiple Types of Receptors," Army's Research Laboratory Young Investigator Program, 2018 (role: Contributor; PI: Joseph S. Kwon) [Not funded]