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## Kiseok Lee

Incoming Assistant professor at Yonsei University, Department of Systems Biology (Mar 2027)  
Postdoctoral researcher, Department of Chemical & Biomolecular Engineering,  
University of Delaware, Newark, DE, USA  
Advisor: Aditya Kunjapur, Co-advisor: Jacques Ravel (University of Maryland, Baltimore)

### One-line description:

Microbial ecologist understanding & designing robust microbiome functions.

### Education

- 2025 – 2027 Postdoctoral researcher, University of Delaware, Newark, DE, USA  
Aditya Kunjapur, Co-advisor: Jacques Ravel (University of Maryland, Baltimore)
- 2020 – 2025 PhD – Ecology & Evolution, The University of Chicago, Chicago, IL, USA.  
Advisor: Dr. Seppe Kuehn, Co-advisor: Madhav Mani (Northwestern)
- 2020 – 2023 Master's – Ecology & Evolution, The University of Chicago / Advisor: Dr. Seppe Kuehn
- 2018 – 2020 Graduate researcher – Plant Microbiology, Seoul National University (SNU), South Korea.  
Advisor: Dr. Yong-Hwan Lee
- 2018 BS – College of Liberal Studies – Biological Sciences (summa cum laude), Economics (summa cum laude), Seoul National University (SNU), Seoul, South Korea.
- 2010 Posung High School (ranked 1<sup>st</sup> in ~500 graduating cohort), Seoul, South Korea.

### Selected Publications (full list: [Google scholar](#))

- Lee, K. K., Liu S., Crocker, K., Wang, J., Huggins, D.R., Tikhonov, M., Mani, M., Kuehn, S. (2025). Functional regimes define soil microbiome response to environmental change. *Nature*, 644, 1028-1038 <https://doi.org/10.1038/s41586-025-09264-9>
- Schmitt, M. S., Lee, K. K. (co-first author), Landsittel, J. A., Bunbury, F., Vitelli, V., and Kuehn, S. (2026). Learning functional groups in complex microbiomes. [bioRxiv](#) (under revision at *Cell Systems*).
- Landsittel, J., Howe, A., Mani, M., Lee, K. K. (co-corresponding author), and Kuehn, S. Enzyme variants shape metabolic activity in microbial communities (in prep.).
- Yousef, M., Lee, K. K., Tang, J., Charisopoulos, V., Willett, R., & Kuehn, S. (2026). Epistatic interactions inform rational design of synthetic microbial communities for bioremediation. *Nature Microbiology*, 11, 1995-2007.
- Crocker, K., Lee, K. K., Chakraverti-Wuerthwein, M., Li, Z., Tikhonov, M., Mani, M., Gowda, K., Kuehn S. (2024). Environmentally dependent interactions shape patterns in gene content across natural microbiomes. *Nature Microbiology*, 9, 2022-2037.
- Oliveira, R., Pandey, B., Lee, K. K., Yousef, M., ..., Kuehn, S., Raman, A. (2024). Statistical design of a synthetic microbiome that clears a multi-drug resistant gut pathogen. [bioRxiv](#).
- Lee, K. K., Park, Y., & Kuehn, S. (2023). Robustness of microbiome function. *Current Opinion in Systems Biology*, 36, 100479.
- Kim, H., Jeon, J., Lee, K. K., & Lee, Y. H. (2022). Longitudinal transmission of bacterial and fungal communities from seed to seed in rice. *Communications Biology*, 5(1), 772.
- Lee, K. K., Kim, H., & Lee, Y. H. (2022). Cross-kingdom co-occurrence networks in the plant microbiome: Importance and ecological interpretations. *Frontiers in Microbiology*, 13, 953300.
- Kim, H., Lee, K. K. (co-first author), Jeon, J., Harris, W. A., & Lee, Y. H. (2020). Domestication of *Oryza* species eco-evolutionarily shapes bacterial and fungal communities in rice seed. *Microbiome*, 8, 1-17.

## Experience

**Postdoc at University of Delaware (PI: Aditya Kunjapur):** June 2025 – Present

- Devising synthetic biology solutions to treat recurrent bacterial vaginosis in the vaginal microbiome (co-advisor: Jacques Ravel, University of Maryland, Baltimore)



**PhD candidate at University of Chicago (PI: Dr. Seppe Kuehn):** Sep 2020 – May 2025

- Investigating the robustness of metabolic activity of soil microbiome in N cycling.
- Excellence: grant writing, project management/leading, collaboration/communication
- Expertise: quantitative thinking, big data analysis (R, Python), ecological modeling, machine learning, sequencing data processing, library prep & operating sequencers, high-throughput microcosm experiments/metabolite measurements, anaerobic cultures.



**Research team leader of SymBiome:** Jun 2019 – Dec 2019

- Led a research team to optimize the plant microbiome in hydroponics systems to promote romaine growth by securing funding from [CJ Blossom Idea Lab](#) (100M won ~\$80K/year).



**Researcher at SNU (PI: Dr. Yong-Hwan Lee):** Sep 2018 – May 2020

- Led a project and published a [paper](#) (>150 citations) on the effect of crop domestication on seed microbiomes with seeds of 43 wild and domesticated rice varieties.



## Grants & Honors

- 2026, Nominated for the BSD Best Dissertation Award at the University of Chicago
- 2026, Awarded E&E Dissertation Award at the University of Chicago
- 2025, Elected full member, Sigma Xi
- 2023, Initiated, crafted, and received [Community Science Program \(CSP FY24\)](#) of Joint Genome Institute (JGI) funded by the Department of Energy (DOE) (10 Tb of sequencing, PI: Seppe Kuehn)
- 2025, Awarded 2025 BSD Conference Awards (\$500)
- 2023, Awarded 2023 Donald Steiner Awards (\$2,000)
- 2022, Awarded KASF (Korean American Scholarship Foundation) scholarship (\$2,000)
- 2022, Awarded Hinds research fund @UChicago Committee of Evolutionary Biology (\$2,500)
- 2022, Awarded KSEA (Korean Scientist Engineer Association)-KUSCO scholarship (\$2,000)
- 2020, Awarded Overseas PhD Scholarship, Korea Foundation for Advanced Studies (KFAS)
- 2019, Awarded CJ Blossom Idea lab open innovation grant (\$252,738/3-year; terminated in 6 months)
- 2016 – 2017, Undergraduate student scholarship, Korea Foundation for Advanced Studies (KFAS)
- 2016 – 2017, Dean's List / Full tuition scholarship, Eminence Scholarship in SNU

## Talks

- 2026 Sep 9, Invited talk – Fermentation Club seminar series, Department of Biochemistry and Microbiology, Rutgers, NJ, USA
- 2026 Apr 16, Invited talk – Department of Chemical Engineering at Ewha Womans University, Korea
- 2026 Apr 15, Invited talk – Department of Chemical and Biological Engineering at SNU, Korea
- 2026 Apr 9, Talk – 2026 KSBB Spring Meeting and International Symposium, Yeosu, Korea
- 2026 Apr 2, Invited talk – Engineering Biology departmental seminar at KAIST, Korea
- 2025 Aug 29, Invited talk – Biology department seminar at **University of Pennsylvania**, USA
- 2025 July 5, Talk – **Gordon Research Seminar**: Microbial Population Biology, Andover, NH, USA
- 2025 May 12, Invited talk – Online [seminar](#) at Modeling Ecology Evolution (host: Hye Jin Park)
- 2025 May 9, Invited talk – Biological sciences department seminar at Sookmyung University, Korea
- 2025 Apr 30, Invited talk – Biology & Microbiology dept. at Changwon National University, Korea
- 2025 Apr 29, Invited talk – Plant Microbiology Seminar at Seoul National University, Korea
- 2025 Apr 29, Invited talk – Microbiology department seminar at Chungbuk University, Korea
- 2025 Apr 24, Talk – [RECOMB](#)-microbiome conference in Seoul, Korea
- 2025 Apr 23, Invited talk – Biological sciences dept. at Seoul National University, Korea
- 2025 Apr 18, Invited talk – Biology department seminar at Inha University, Korea

2025 Apr 10, Invited talk – Geology Club Seminar series at **Caltech**, CA, USA  
 2025 Mar 18, Invited talk – QMicro Seminar at **Ohio State University**, USA  
 2025 Mar 1, Talk – KSEA research talk at UChicago  
 2025 Jan 13, Invited talk – Institute for Genome Sciences at University of Maryland, Baltimore, USA  
 2024 Aug 23, Talk – **ISME**, Cape Town, South Africa  
 2024, Gave 1-hour talks on [soil functional regime](#) 8 times at UChicago: Kronforst lab (Jan 31), Allesina lab (Feb 6), Coleman lab (Feb 8), Pfister/Wootton lab (Feb 9), Raman lab (Feb 15), Pincus lab (Feb 22), CLS chalk talk (Mar 29), Thornton lab (Apr 19)  
 2023 Apr 1, Talk – SICB (Society for Integrative & Comparative Biology) at UChicago  
 2023 Mar 30, Talk – TMC23: The Microbiome Center Research Symposium at UChicago  
 2023 Jan 18, Lightning talk – Space: The Final Frontier of Microbial Communities at Princeton

## Posters

2026 Jan 20, Poster – UD Synthetic Biology Symposium 2026 at University of Delaware, USA  
 2024 Apr 5, Poster – TMC24: The Microbiome Center Research Symposium at UChicago  
 2023 Dec 9, Poster – ICME23 (International Conference on Microbiome Engineering) at Berkeley

## Extracurricular activities

2026 – 2027, Co-president of Korean Graduate Student Association at University of Delaware  
 2021 – 2024, Co-Chair of Travel Award evaluation committee in *BSD Deans Council* at The University of Chicago (UChicago)  
 2023 – 2024, Planned & organized *TMC23* (2023 Mar 30) and *TMC24* (2024 Apr 5):  
[The Microbiome Center Research Symposium](#) with UChicago, MBL, Argonne National Laboratory  
 2023 Jul 26 – Aug 8, Cold Spring Harbor Synthetic Biology Course 2023 (Instructors: Vincent Noireaux, Eric Young, Chase Beisel, Christian Cuba Samaniego, Karmella Haynes)  
 2023 Jan 12, Planned & organized the first *KSEA Science Conference* at UChicago  
 2021 – 2022, President of the Korean Graduate Student Association (KGSA) at UChicago

## Teaching/Mentorship

2025, 4-hr CLS training to become a mentor: “Effective communication and aligning expectations”  
 2025, 6-hr MyChoice running a research group training: “Grants, lab management, and hiring/firing”  
 2024, TA for Theoretical ecology (Instructor: Greg Dwyer, Stefano Allesina)  
 2022, TA for Quantitative microbial ecology (Instructor: Seppe Kuehn)  
 2022 – 2023, Field trip TA for Ecology & conservation (Instructor: Cathy Pfister, Eric Larsen)  
 2026, Mentored Iris Zhang (undergraduate Summer Scholars) for vaginal microbiome engineering  
*“Kiseok made me deeply invested in our project by establishing collaboration over a traditional superior-subordinate dynamic, and gave me the confidence to deliver a poster presentation on our findings at the 2026 University of Delaware Summer Scholar Symposium. His exceptional adaptability taught me to think independently as a researcher, solidifying my determination to pursue a career in research.”* - Iris  
 2025 – 2026, Mentored Defne Elbeyli (undergraduate researcher) for ecology in hydrogel project  
 2025, Mentored Laura Kirshenbaum (rotating PhD student) for soil nutrient niche project  
*“Kiseok quickly helped me adapt to the lab and feel welcomed during my rotation. He set me up well for my project while ensuring I was involved in its design and analysis, and I learned a great deal from his guidance.”*  
 2025, Mentored Cynthia Wang (rotating PhD student) for metagenomics/DNRA project  
 2023 – 2025, Mentored Jojo Wang (undergraduate researcher) for the pH niche of denitrifiers project  
*“Throughout my undergraduate research experience Kiseok was a consistent source of support and clear communication, equipping me to advocate for my own research interests.”* - Jojo  
 2022 – 2023, Co-mentored Junivere Tang (undergraduate researcher) for the BPA degrader project  
*“Kiseok is a kind and supportive mentor who fostered my interest in research by encouraging me to take the lead in asking questions I was interested in. I could always rely on him to make time for any questions.”* - Junivere

## Academic services: referee for 10+ papers

2026, Invited as a referee at *Environmental Science & Technology*, etc.

2025, Invited as a referee at *Proceedings B, Mycobiology, Biodegradation, BMC genomics*, etc.  
 2025, Invited as a referee at *Microbiome* journal by the editor (Lynn Schriml)  
 2024, Invited as a referee at *Nature Communications* by the editor (Cesar Sanchez)  
 2024, Invited as a referee at *eLife* by the editor (Anne-Florence Bitbol)  
 2023, Invited as a referee at *Nature Ecology & Evolution* by the editor (Simon Harold)

## News outlet

Functional Regimes Shape Soil Microbiome Response–ScienMag, 7/17/2025  
 Simple rules govern soil microbiome responses to environmental change–The Microbiologist, 7/16/2025  
 Soil Microbiome Shifts Guided by Basic Environmental Rules–Mirage News, 7/17/2025  
 Simple Models Reveal Soil’s Complex Microbial Conversations–Azo Life Sciences, 7/18/2025  
 Simple Rules Govern Soil Microbiome Responses to Environmental Change–UChicago News Biological Sciences Division, 7/16/2025  
 Simple Rules Govern Soil Microbiome Responses to Environmental Change–Northwestern McCormick School of Engineering News, 7/20/2025  
 単純なルールは、環境の変化に対する土壌微生物叢の反応を支配します–Nipponese news, 7/25/2025  
 Simple Rules Govern Soil Microbiome Responses to Environmental Change–Newswise, 7/25/2025  
 A Simple Model Describes How the Soil Microbiome Responds to Environmental Change–Technology Networks, 7/31/2025

## References

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|-------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|-------------------------|
| Dr. Aditya Kunjapur (Postdoc PI)                                                                | University of Delaware, Associate Professor of Chemical & Biomolecular Engineering                        | kunjapur@udel.edu       |
| Dr. Jacques Ravel (Postdoc co-PI)                                                               | University of Maryland, Baltimore, John L. Whitehurst Professor of Medicine, Microbiology, and Immunology | javel@som.umaryland.edu |
| Dr. Seppe Kuehn (PhD PI)                                                                        | The University of Chicago, Associate Professor of Ecology and Evolution                                   | seppe.kuehn@gmail.com   |
| “Kiseok (as a grad student) operates at the level of a postdoc.” – words from Seppe             |                                                                                                           |                         |
| Dr. Madhav Mani (PhD co-PI)                                                                     | Northwestern University, Associate Professor of Engineering Sciences and Applied Mathematics              | madhav.mani@gmail.com   |
| “The project we did together is by far the best one I’ve done in my career” – words from Madhav |                                                                                                           |                         |
| Dr. Mikhail Tikhonov (Project co-PI)                                                            | Washington University in St. Louis, Associate Professor of Physics                                        | tikhonov@wustl.edu      |
| Dr. Cathy Pfister (PhD committee chair)                                                         | The University of Chicago, Professor of Ecology and Evolution                                             | cpfister@uchicago.edu   |
| Dr. Karna Gowda (Lab alumni)                                                                    | The Ohio State University, Assistant Professor of Microbiology                                            | karna.gowda@gmail.com   |
| Dr. Yong-Hwan Lee                                                                               | Seoul National University, Professor of Agricultural Biotechnology                                        | yonglee@snu.ac.kr       |