

Liyuan He

Ph.D.

Postdoctoral fellow

Oak Ridge National Laboratory

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EDUCATION

2017.8-2022.5	Doctor of Philosophy in Ecology	University of California at Davis (UCD) & San Diego State University (SDSU)
2014.9-2017.6	Master of Science in Ecology	Institute of Geographic Sciences and Natural Resources Research (IGSNRR), CAS
2010.9-2014.7	Bachelor of Agronomy in Forestry	Northeast Forestry University (NEFU)

PROFESSIONAL EXPERIENCE

2024.4-	Postdoctoral fellow, Oak Ridge National Laboratory (ORNL)
2022.5-2024.4	Postdoctoral fellow, SDSU
2021.6-2021.8	Research assistant, SDSU
2019.6-2019.8	Research assistant, SDSU
2018.6-2018.8	Research assistant, SDSU
2014.9-2017.6	Research assistant, IGSNRR, CAS

PUBLICATION

1. **He, L.**, J. L. M. Rodrigues, M. A. Mayes, C. T. Lai, D. A. Lipson, and X. Xu. 2024. Modeling microbial carbon fluxes and stocks in global soils from 1901 to 2016. *Biogeosciences* **2023**:1-53.
2. Wang, J., **L. He**, J. Wang, Y. Liu, C. Ren, J. Wang, Y. Guo, N. Wang, W. Wang, and F. Zhao. 2024. Contrasting potential impact patterns of unique and shared microbial species on nitrous oxide emissions in grassland soil on the Tibetan Plateau. *Applied Soil Ecology* **195**:105246.
3. Guo, Z., Y. Wang, J. Liu, **L. He**, X. Zhu, Y. Zuo, N. Wang, F. Yuan, Y. Sun, L. Zhang, Y. Song, C. Song, and X. Xu. 2024. Mapping turnover of dissolved organic carbon in global topsoil. *Science of The Total Environment* **906**:167621.
4. Wang, J., X. Xu, Y. Liu, W. Wang, C. Ren, Y. Guo, J. Wang, N. Wang, **L. He***, and F. Zhao. 2024. Unknown bacterial species lead to soil CO₂ emission reduction by promoting lactic fermentation in alpine meadow on the Qinghai-Tibetan Plateau. *Science of The Total Environment* **906**:167610. (co-corresponding author)
5. Zhang, L., L. Jia, **L. He**, D. A. Lipson, Y. Wang, S. Wang, and X. Xu. 2023. Homeostatic evidence of management-induced phosphorus decoupling from soil microbial carbon and nitrogen metabolism. *Journal of Plant Ecology*:rtad035.

6. Chen, L., J. Wang, **L. He**, X. Xu, J. Wang, C. Ren, Y. Guo, and F. Zhao. 2023. Metagenomic highlight contrasting elevational pattern of bacteria- and fungi-derived compound decompositions in forest soils. *Plant and Soil*.
7. Qiu, T., J. Yu, **L. He**, J. Liu, Q. Cui, Y. Cui, C. Duan, S. Zhao, Y. Wang, and L. Fang. 2023. Slope position mediates the co-utilization of phosphorus by plants and microbes through rhizosphere processes in a phosphorus-limited forest. *CATENA* **222**:106808.
8. Zhao, F., **L. He***, B. Bond-Lamberty, I. A. Janssens, J. Wang, G. Pang, Y. Wu, and X. Xu. 2022. Latitudinal shifts of soil microbial biomass seasonality. *PNAS Nexus* **1**:pgac254. (co-first author & co-corresponding author)
9. Zhou, S., Y. Li, J. Wang, **L. He**, J. Wang, Y. Guo, and F. Zhao. 2022. Contrasting Soil Microbial Functional Potential for Phosphorus Cycling in Subtropical and Temperate Forests. *Forests* **13**:2002.
10. **He, L.** 2022. Multi-Scale Modeling of Soil Microbial Control on Terrestrial Carbon Cycle. Ph.D. University of California, Davis, United States -- California.
11. Wang, J., **L. He**, X. Xu, C. Ren, J. Wang, Y. Guo, and F. Zhao. 2022. Linkage between microbial functional genes and net N mineralisation in forest soils along an elevational gradient. *European Journal of Soil Science* **73**:e13276.
12. Li, Y., J. Wang, **L. He**, X. Xu, J. Wang, C. Ren, Y. Guo, and F. Zhao. 2022. Different mechanisms driving increasing abundance of microbial phosphorus cycling gene groups along an elevational gradient. *iScience*:105170.
13. Li, D., **L. He***, J. Qu, and X. Xu. 2022. Spatial evolution of cultivated land in the Heilongjiang Province in China from 1980 to 2015. *Environmental Monitoring and Assessment* **194**:444. (corresponding author)
14. Wang, Y., F. Yuan, K. A. Arndt, J. Liu, **L. He**, Y. Zuo, D. Zona, D. A. Lipson, W. C. Oechel, D. M. Ricciuto, S. D. Wullschleger, P. E. Thornton, and X. Xu. 2022. Upscaling Methane Flux From Plot Level to Eddy Covariance Tower Domains in Five Alaskan Tundra Ecosystems. *Frontiers in Environmental Science* **10**.
15. Zhang, J., Y. Zhang, W. Fan, **L. He**, Y. Yu, and X. Mao. 2022. A Modified Two-Steps Three-Stage Inversion Algorithm for Forest Height Inversion Using Single-Baseline L-Band PolInSAR Data. *Remote Sensing* **14**:1986.
16. Zhou, S., L. Chen, J. Wang, **L. He**, J. Wang, C. Ren, Y. Guo, and F. Zhao. 2022. Stronger microbial decay of recalcitrant carbon in tropical forests than in subtropical and temperate forest ecosystems in China. *CATENA* **215**:106351.
17. Zhu, X., F. Yuan, **L. He**, Z. Guo, N. Wang, Y. Zuo, J. Liu, K. Li, Y. Wang, Y. Sun, L. Zhang, C. Song, Y. Song, C. Gong, Y. Son, D. Guo, and X. Xu. 2022. Wetland conversion to cropland alters the microbes along soil profiles and over seasons. *CATENA* **214**:106282.
18. Zuo, Y., Y. Wang, **L. He**, N. Wang, J. Liu, F. Yuan, K. Li, Z. Guo, Y. Sun, X. Zhu, L. Zhang, C. Song, L. Sun, and X. Xu. 2022. Modeling methane dynamics in three wetlands in Northeastern China by using the CLM-Microbe model. *Ecosystem Health and Sustainability* **8**:2074895.
19. Zhao, F., J. Wang, Y. Li, X. Xu, **L. He**, J. Wang, C. Ren, and Y. Guo. 2022. Microbial functional genes driving the positive priming effect in forest soils along an elevation gradient. *Soil Biology and Biochemistry* **165**:108498.
20. Hu, H., **L. He***, H. Ma, J. Wang, Y. Li, J. Wang, Y. Guo, C. Ren, H. Bai, and F. Zhao. 2022. Responses of AM fungal abundance to the drivers of global climate change: A meta-analysis. *Science of The Total Environment* **805**:150362. (co-first author)

21. **He, L.**, and X. Xu. 2021. Mapping soil microbial residence time at the global scale. *Global Change Biology* **27**:6484-6497.
22. **He, L.**, C. T. Lai, M. A. Mayes, S. Murayama, and X. Xu. 2021. Microbial seasonality promotes soil respiratory carbon emission in natural ecosystems: A modeling study. *Global Change Biology* **27**:3035-3051.
23. **He, L.**, D. A. Lipson, J. L. Mazza Rodrigues, M. Mayes, R. G. Björk, B. Glaser, P. Thornton, and X. Xu. 2021. Dynamics of Fungal and Bacterial Biomass Carbon in Natural Ecosystems: Site-Level Applications of the CLM-Microbe Model. *Journal of Advances in Modeling Earth Systems* **13**:e2020MS002283.
24. Zhu, X., L. Zhang, Y. Zuo, J. Liu, J. Yu, F. Yuan, N. Wang, **L. He**, Y. Wang, and Z. Guo. 2021. Wetland reclamation homogenizes microbial properties along soil profiles. *Geoderma* **395**:115075.
25. Guo, Z., Y. Wang, Z. Wan, Y. Zuo, **L. He**, D. Li, F. Yuan, N. Wang, J. Liu, and Y. Song. 2020. Soil dissolved organic carbon in terrestrial ecosystems: Global budget, spatial distribution and controls. *Global Ecology and Biogeography* **29**:2159-2175.
26. **He, L.**, J. L. M. Rodrigues, N. A. Soudzilovskaia, M. Barceló, P. A. Olsson, C. Song, L. Tedersoo, F. Yuan, F. Yuan, and D. A. Lipson. 2020. Global biogeography of fungal and bacterial biomass carbon in topsoil. *Soil Biology and Biochemistry* **151**:108024.
27. Ma, J., H. Duan, **L. He**, M. Tiffany, Z. Cao, T. Qi, M. Shen, T. Biggs, and X. Xu. 2020. Spatiotemporal pattern of gypsum blooms in the Salton Sea, California, during 2000-2018. *International Journal of Applied Earth Observation and Geoinformation* **89**:102090.
28. Xu, X., N. Wang, D. Lipson, R. Sinsabaugh, J. Schimel, **L. He**, N. A. Soudzilovskaia, and L. Tedersoo. 2020. Microbial macroecology: In search of mechanisms governing microbial biogeographic patterns. *Global Ecology and Biogeography* **29**:1870-1886.
29. Gao, L., B. Tao, Y. Miao, L. Zhang, X. Song, W. Ren, **L. He**, and X. Xu. 2019. A global data set for economic losses of extreme hydrological events during 1960-2014. *Water Resources Research* **55**:5165-5175.
30. Wang, Y., F. Yuan, F. Yuan, B. Gu, M. S. Hahn, M. S. Torn, D. M. Ricciuto, J. Kumar, **L. He**, and D. Zona. 2019. Mechanistic modeling of microtopographic impacts on CO₂ and CH₄ fluxes in an alaskan tundra ecosystem using the CLM-microbe model. *Journal of Advances in Modeling Earth Systems* **11**:4288-4304.
31. Bo, Z., C. You, Z. Hu, Q. Guo, **L. He**, Y. Du, S. Li, and Y. Gan. 2017. Influence of nitrogen and water addition on the biomass in Inner Mongolia temperate steppe, China. *Chinese Journal of Applied & Environmental Biology* **23**:658-664.
32. **He, L.**, Z. Hu, Q. Guo, S. Li, W. Bai, and L. Li. 2015. Influence of nitrogen and phosphorus addition on the aboveground biomass in Inner Mongolia temperate steppe, China. *Chinese Journal of Applied Ecology* **26**.

HONORS & AWARDS

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| 2022.6 | Chinese government award for outstanding self-financed students abroad, China Scholarship Council, Ministry of Education |
| 2022.6 | Distinguished Graduate Student Research Award, UCD |
| 2021.9 | YANG HANXI Best Student Paper Award, SINO-ECO |
| 2020.12 | Travel grant to attend AGU Fall Meeting 2021, California State University (CSU) |

- 2019.8 Travel funding to attend CESM (Community Earth System Model) Tutorial Workshop, National Center for Atmospheric Research
- 2016.12 Second Class Scholarship for Outstanding Students, University of Chinese Academy of Sciences (UCAS)
- 2015.12 Second Class Scholarship for Outstanding Students, UCAS
- 2014.12 First Class Scholarship for Outstanding Students, UCAS
- 2014.7 Outstanding Graduate Awards, NEFU
- 2013.12 Certification of Student Research Training Program, NEFU
- 2013.12 First Class Scholarship for Outstanding Students, NEFU
- 2013.7 First Class Scholarship for Outstanding Students, NEFU
- 2013.6 Outstanding Students in Summer Program, Sun Yat-sen University
- 2012.12 Outstanding Students in Summer Program, Institute of Atmospheric Physics, CAS
- 2012.12 National Scholarship, Ministry of Education of China
- 2012.7 First Class Scholarship for Outstanding Students, NEFU
- 2011.12 First Class Scholarship for Outstanding Students, NEFU
- 2011.12 National Scholarship for Encouragement, Ministry of Education of China
- 2011.7 Second Class Scholarship for Outstanding Students, NEFU
- 2010.12 First Class Scholarship for Outstanding Students, NEFU

PRESENTATION & POSTER

1. **Liyuan He**, Xiaofeng Xu. Growing fungal and bacterial biomass carbon in North America during 1901-2016 as simulated by CLM-Microbe. AGU Fall Meeting. Dec 11-15, 2023. San Francisco, California.
2. **Liyuan He**, Xiaofeng Xu. Global patterns and controls of fungal and bacterial biomass historical dynamics during 1901-2016 as simulated by the CLM-Microbe model. ESA annual Meeting. Aug 6-11, 2023. Portland, Oregon.
3. **Liyuan He**, Jorge L. Mazza Rodrigues, Melanie Mayes, Chun-Ta Lai, David A. Lipson, Xiaofeng Xu. Historical dynamics of terrestrial carbon during 1901-2016 as simulated by the CLM-Microbe model. AGU Fall Meeting. December 12-16, 2022. Chicago, Illinois.
4. **Liyuan He**, Nicolas Viovy, Xiaofeng Xu. Macroecology of soil fungi and bacteria in the United States using a data-model integration approach. AGU Fall Meeting. December 13-17, 2021. New Orleans, LA.
5. **Liyuan He**, Victoria Broadnax, Xiaofeng Xu. Global biogeography of microbial residence time. Student Research Symposium, CSU. March 19-20, 2021. Online.
6. **Liyuan He**, David Lipson, Jorge L Mazza Rodrigues, Melanie A Mayes, Robert G Bjork, Bruno Glaser, Peter E Thornton, Xiaofeng Xu. Dynamics of Fungal and Bacterial Biomass Carbon in Natural Ecosystems: Site-level Applications of the CLM-Microbe Model. AGU Fall Meeting. December 1-17, 2020. Online.
7. Olivia Yang, **Liyuan He**, Xiaofeng Xu. Soil Microbial Community Shift and its Edaphic Control Across the US. The Ecological Society of America. August 2-7, 2020. Online.
8. Wang, Y., F. Yuan, F. Yuan, B. Gu, M. S. Hahn, M. S. Torn, D. M. Ricciuto, J. Kumar, **L. He**, and D. Zona. Mechanistic modeling of microtopographic impacts on CO₂ and CH₄ fluxes in an alaskan tundra ecosystem using the CLM-microbe model. The Ecological Society of America. August 11-16, 2019. Salt Lake, US.

9. Jinge Ma, Hongtao Duan, **Liyuan He**, Mary Tiffany, Zhigang Cao, Tianci Qi, Ming Shen, Stuart Hurlbert, Trent Biggs, Xiaofeng Xu. Spatiotemporal Pattern of Gypsum Blooms in the Salton Sea, California, during 2000-2018. Salton Sea Summit, October 17-18, 2019. UC Riverside/Palm Desert Campus, US
10. **Liyuan He**. Difference in relationship between vegetation, soil C:N ratio and productivity at site and regional scales. 14th Ecology Conference of China. September 23-25, 2015. Chengdu, China.

REVIEWER FOR PAPERS

Global Ecology and Biogeography, International Journal of Applied Earth Observation and Geoinformation, Journal of Advances in Modeling Earth Systems, Soil Biology and Biochemistry, Geoderma, Global Change Biology, Water Resources Research, Science of the Total Environment, European Journal of Soil Science, Environmental Microbiology, ISME journal, PNAS, NASA Postdoctoral Program.

PARTICIPATED PROJECTS

1. RAPID: Interactive effects of wildfire and severe drought on plants, soil microbes and C storage in a semiarid shrubland ecosystem (PI: Dr. David Lipson, SDSU)
2. Integrating a Microbial Data System with an Earth System Model for Evaluating Microbial Biogeochemistry (PI: Dr. Xiaofeng Xu, SDSU)
3. Modeling microbial processes at multiple scales (PI: Dr. Xiaofeng Xu, SDSU)
4. An Earth System Modeling Framework for Microbial Community Structure on Litter Decomposition (PI: Dr. Xiaofeng Xu, SDSU)
5. Methane at the zero curtain (Co-PI: Dr. Xiaofeng Xu, SDSU)
6. Spruce and peatland responses under climatic and environmental change (SPRUCE) (Co-PI: Dr. Xiaofeng Xu, SDSU)
7. Next generation ecosystem environment at Arctic (NGEE-Arctic) (Co-PI: Dr. Xiaofeng Xu, SDSU)
8. The relationship of terrestrial ecosystem carbon, nitrogen, and water flux and the environmental mechanisms in China (PI: Dr. Zhongmin Hu, IGSNRR, CAS)
9. Response of grassland ecosystem water use efficiency to altered precipitation regime (PI: Dr. Zhongmin Hu, IGSNRR, CAS)
10. Allopathy and its mechanisms of extract solution of *Pinus koraiensis* on *Betula platyphylla* (PI: Dr. Lixin Chen, NEFU)

CONFERENCE CONVENING

1. Virginia Rich, **Liyuan He**, Debjani Sihi, Xiaofeng Xu, Cheng Shi. Uncovering novel microbial mechanisms and integrating them into ecosystem models. AGU Fall Meeting. Dec 11-15, 2023. San Francisco, California.

TEACHING EXPERIENCE

1. BIO215 Biostatistics (Fall 2023) (guest lecture for Dr. Xiaofeng Xu at SDSU)
2. BIO215 Biostatistics (Fall 2022) (guest lecture for Dr. Xiaofeng Xu at SDSU)
3. BIOL 354 - Ecology and the Environment (Fall 2022) (guest lecture for Dr. Xiaofeng Xu at SDSU)
4. BIOL 354 - Ecology and the Environment (Spring 2022) (guest lecture for Dr. Xiaofeng Xu at SDSU)
5. BIOL 354 - Ecology and the Environment (Spring 2021) (Lab TA for Dr. Matt Edwards at SDSU)

FELLOWSHIP & GRANT WRITING EXPERIENCE

1. NOAA Climate & Global Change (C&GC) Postdoctoral Program Fellowship (National Oceanic and Atmospheric Administration; 2022)
2. Student travel grant program (California State University Program for Education and Research in Biotechnology; 2020 Fall)

OUTREACH & VOLUNTEER ACTIVITIES

1. Mentor, Annual two-day summer tutorial workshops on CLM-Microbe setup and simulations, August 14-15, 2023, online & on site (SDSU)
 2. Mentor, Annual two-day summer tutorial workshops on CLM-Microbe setup and simulations, August 25-26, 2022, online & on site (SDSU)
 3. Volunteer, Skype a Scientist, Video Demonstration Online (<https://www.skypeascientist.com>)
 4. Volunteer, Graduate Group of Ecology Exhibition on Picnic Day, April 13, 2019, UCD
 5. Volunteer, Demonstration of How to Make Cheese at Smythe Academy Science night for elementary school students, October 15, 2018, Sacramento, CA
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