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RESEARCH INTERESTS

Microbial Ecology focuses on

- a) Microbial controls on N cycling, N₂O emissions, and soil health in agroecosystem
- b) Microbial assembly and their resistance/resilience to environmental changes
- c) Microbial function mining using bioinformatics and omics approaches

POSITION

2023-pres.	Assistant Professor, Department of Biology, Saint Louis University.
2020-2023	Postdoctoral Research Associate, University of California, Davis
2019-2020	Postdoctoral Research Associate, University of Illinois Urbana-Champaign
2017-2019	Postdoctoral Research Associate, University of Florida

EDUCATION

2013-2017	Ph.D. Microbial Ecology. University of Florida, USA
2009-2012	M.S. Environmental Ecology. Beijing Normal University, China
2005-2009	B.S. Ecology. University of Science and Technology Beijing, China

SCHOLARSHIP

EXTRAMURAL GRANTS

AWARDED

- 2025-2028: **The National Aeronautics and Space Administration. Consortium in Biological Sciences.** Tang [PI], 6 Co-PIs, **Huang [Co-PI]**. *An integrative anaerobic digestion and phototrophic biosystem for sustainable space habitats and life supports.* **NASA--\$2,5M [0.3 M to Dr. Huang]**
- 2023-2026: **California Air Resources Board of the California Environmental Protection.** Rodrigues [PI], **Huang [Co-PI]**, 3 Co-PIs. *Quantifying and Identifying the Potential Causes of Nitrous Oxide Emissions in California Soils under Fumigation.* --\$600,000

PENDING

- 2026-2028: **Agriculture and Food Research Initiative (AFRI) – USDA-NIFA.** Huang [PI]. *How Century-Scale Fertilization Legacies with Contrasting Phosphorus and Iron Shifts Shape Soil Nitrogen Fixation In Corn Cropping Systems.* --\$300,000.
- 2026-2028: **Agriculture and Food Research Initiative (AFRI) – USDA-NIFA.** Xin [PI], **Huang [Co-PI]**. *Century-Scale Impacts of Cropping Systems and Fertilization Regimes on Belowground Microbial Communities and Soil Health in Midwest Grain Systems.* --\$300,000.
- 2026-2029: **Agriculture and Food Research Initiative (AFRI) – USDA-NIFA.** Dahlke [PI], other Co-PIs, **Huang [Co-PI]**. *Unlocking microbial power to Smarter Fertilizer Use: Mechanisms and Drivers of Nitrogen Mineralization*

- 2026-2029: **Agriculture and Food Research Initiative (AFRI) – USDA-NIFA.** Ye [PI], 1Co-PI, **Huang [Co-PI]**. *PARTNERSHIP: Managing organic inputs from cover crops to improve sandy soils: How much is not too much?* --\$900,000.
- 2026-2029: **Agriculture and Food Research Initiative (AFRI) – USDA-NIFA.** Lin [PI], 2Co-PIs, **Huang [Co-PI]**. *PARTNERSHIP: Combining rock and compost amendment to enhance the health and carbon storage of sandy soils.* --\$900,000

INTRAMURAL GRANTS AWARDED

- 2025-2026: **Stolle Fund [Saint Louis University] Huang [PI]**. *Ecological Restoration of Forest Park: Impacts on Soil Phosphorus and Arbuscular Mycorrhizal Fungi.* ---\$1,400
- 2024-2025: **Stolle Fund [Saint Louis University] Blake [PI], Huang [Co-PI]**. *Ecological restoration of Forest Park: implications for the soil microbiome.* ---\$1,000
- 2023-2024: **Stolle Fund [Saint Louis University] Huang [PI]**. *Interactions among bison, vegetation, and the soil microbiome in tallgrass prairie.* --\$2,000

FELLOWSHIPS AND AWARDS

- 2023 Young Scientist Award. *Association of Chinese Soil and Plant Scientists in North America*
- 2021 PSA Travel Award. *University of California, Davis.* \$400
- 2013 Water Institute Graduate Fellowship. *University of Florida.* \$100,000/4 yrs
- 2016 Best Poster Awards. *University of Florida.* \$500
- 2012 Excellent Graduate Student Scholarship. *Beijing Normal University.* \$500
- 2009 First-Class Entrance Scholarship. *Beijing Normal University.* \$3,000/2 yrs
- 2006 Posco Scholarship. *University of Science and Technology Beijing.* \$1,000

PUBLICATIONS (*Graduate author; **Undergraduate author)

FIRST AUTHOR

1. **Huang, L.**, Soares, R.A., Wright, A., Corrêa, R.S., Silva, L., Rodrigues, J.L.M. (2024). Microbiota recovery in a chronosequences of impoverished Cerrado soils with biosolids applications. ***Science of The Total Environment***, 931, 172958
2. **Huang, L.**, Levintal, E., Christian, B.E., **Coyotl, A., Dahlke, H.E., Horwath, W.R., Rodrigues, J.L.M. (2023). Molecular and dual-isotopic profiling of the microbial controls on nitrogen leaching in agricultural soils under managed aquifer recharge. ***Environmental Science & Technology***, 57(30), 11084-11095.
3. **Huang, L.**, Bai, J., Wang, J., *Zhang, G., Wang, W., Wang, X., Zhang, L., Wang, Y., Liu, X., Cui, B. (2022). Different stochastic processes regulate bacterial and fungal community assembly in estuarine wetland soils. ***Soil Biology and Biochemistry***, 167: 108586.
4. **Huang L.**, Chakrabarti, S., Cooper, J., **Perez, A., John, S., Daroub, S., and Martens-Habbena, W. (2021). Ammonia-oxidizing archaea are integral to nitrogen cycling in a highly fertile agricultural soil. ***ISME Communications***, 1(1), 1-12. [The best of ISME Communications in 2021 and highlighted in different local newspapers--IFAS News University of Florida; South Dade NewsLeader; Morning AgClips America's Daily Ag News Source]
5. **Huang, L.**, Bea, H., Young, C., Pain, A., Martin, J.B., Ogram, A. (2021).

Campylobacterota dominate the microbial communities in a tropical karst subterranean estuary, with implications for cycling and export of nitrogen to coastal waters. ***Environmental Microbiology***, 23(11), 6749–6763. [Highlighted in New of Science, 1222, ISSN:1944-2564, Butter®ID: 024021020]

6. **Huang, L.**, *Zhang, G., Bai, J., Xia, Z., Wang, W., Jia, J., Wang, X., Liu, X., Cui, B. (2021). Desalinization via freshwater restoration highly improved microbial diversity, co-occurrence patterns and functions in coastal wetland soils. ***Science of the Total Environment***, 765, 142769.
7. **Huang, L.**, Bai, J. *Wen, X., *Zhang, G., Zhang, C., Cui, B. and Liu, X. (2020). Microbial resistance and resilience in response to environmental changes under the higher intensity of human activities than global average level. ***Global Change Biology***, 26, 2377-2389. [Highlighted in Ecology, Environment & Conservation, 1020, ISSN: 1945-6506, BUTTER® ID: 019697378]
8. **Huang, L.**, Riggins C. W., Rodríguez-Zas S., Zabaloy M. C., Villamil M. B. (2019) Long-term N fertilization imbalances potential N acquisition and transformations by soil microbes. ***Science of the Total Environment***, 691, 562-571.
9. **Huang, L.**, Bai, J., Xiao, R., Shi, J., Gao, H. (2014). The soil nitrogen dynamics in an inland salt marsh as affected by various experimental water levels. ***Hydrological processes***, 28(17), 4708-4717.
10. **Huang, L.**, Bai, J., Gao, H., Xiao, R., Liu, P., Chen, B. (2013). Soil organic carbon content and storage of raised field wetlands in different functional zones of a typical shallow freshwater lake, China. ***Soil Research***, 50(8), 664-671.
11. **Huang, L.**, Bai, J., Xiao, R., Gao, H., Liu, P. (2012). Spatial distribution of Fe, Cu, Mn in the surface water system and their effects on wetland vegetation in the Pearl River Estuary of China. ***CLEAN–Soil, Air, Water***, 40(10), 1085-1092.
12. **Huang, L.**, Bai, J., Chen, B., Zhang, K., Huang, C., Liu, P. (2012). Two-decade wetland cultivation and its effects on soil properties in salt marshes in the Yellow River Delta, China. ***Ecological Informatics***, 10, 49-55.
13. **Huang, L.**, Bai, J., Yan, D., Chen, B., Xiao, R., Gao, H. (2012). Changes of wetland landscape patterns in Dadu River catchment from 1985 to 2000, China. ***Frontiers of Earth Science***, 1-13.

CO-AUTHOR

14. Brandão, G.J., **Huang, L.**, Levintal, E., Prieto G.C., Erikson, C.B., **Coyotl, A., ... & Mazza Rodrigues, J. L. (2025). Depth-dependent Metagenome-assembled Genomes of agricultural Soils under Managed aquifer Recharge. ***Scientific data***, 12(1), 858.
15. *Klein, M. L., Erikson, C. B., McCabe, C. J., **Huang, L.**, Rodrigues, J. L., & Mitloehner, F. M. (2025). Limited Effects of Tannin Supplementation on the Dairy Cattle Fecal Microbiome with Modulation of Metabolites. ***Frontiers in Microbiology***, 16, 1570127.
16. **Nguyen, T. T., Altman, A., **Huang, L.**, Rodrigues, J. L. M., Dahlke, H. E., Kamennaya, N. A., & Levintal, E. (2025). A portable low-cost incubation chamber for real-time characterization of soil respiration. ***Soil Science Society of America Journal***, 89(1), e20800.
17. *Silva, D. F., Rodrigues, J. L. M., Erikson, C., Silva, A. M., **Huang, L.**, Araujo, V. L., ... & Cardoso, E. J. (2024). Grazing exclusion-induced changes in soil fungal communities in a highly desertified Brazilian dryland. ***Microbiological Research***, 285,

18. *Silva, DF., Cardoso, E., **Huang, L.**, Erikson, C., Silva, A., Araujo, V., Silva, D., Melo, V., Ferreira, A., Pereira, A., Rodrigues J. (2024). Functional genes related to N and P cycling in degraded and restored areas from Brazilian drylands. **Applied Soil Ecology** 196, 105316.
19. Zhao J., **Huang L.**, Chakrabarti S., Cooper J., Choi E., Ganan C., Tochinsky B., Triplett E., Daroub S.H., Martens-Habbena W. (2023). Nutrient acquisition strategies drive coexistence patterns among globally predominant archaeal lineages in soil. **ISME J.** 1-12.
20. Levintal, E., **Huang, L.**, García, C. P., **Coyotl, A., Fidelibus, M. W., Horwath, W. R., ... & Dahlke, H. E. (2023). Nitrogen fate during agricultural managed aquifer recharge: Linking plant response, hydrologic, and geochemical processes. **Science of The Total Environment**, 161206.
21. *Zhang, G., Bai, J., Tebbe, C.C., **Huang, L.**, Jia, J., Wang, W., Wang, X., Zhao, Q., Wen, L., Kong, F., Xi, M., (2022). Habitat-specific responses of soil organic matter decomposition to *Spartina alterniflora* invasion along China's coast. **Ecological Applications**, e2741.
22. *Zhang, G., Bai, J., Tebbe, C.C., **Huang, L.**, Jia, J., Wang, W., Wang, X., Yu, L., Zhao, Q., (2022). Plant invasion reconstructs soil microbial assembly and functionality in coastal salt marshes. **Molecular Ecology**, 31(17), 4478-4494.
23. *Yu L., Bai J., **Huang L.**, Zhang G., Wang W., Wang X., Yu Z. (2022). Carbon-rich substrates altered microbial communities with indication of carbon metabolism functional shifting in a degraded salt marsh of the Yellow River Delta, China. **Journal of Cleaner Production**, 331, 129898.
24. *Yu M., Su W., **Huang L.**, Parikh S.J., Tang C., Dahlgren R.A., Xu J. (2021) Bacterial community structure and putative nitrogen-cycling functional traits along a charosphere gradient under waterlogged conditions. **Soil Biology and Biochemistry**, 162, 108420.
25. *Zhang, G., Bai, J., Tebbe, C.C., **Huang, L.**, Jia, J., Wang, W., Wang, X., Yu, L. and Zhao, Q., (2021). *Spartina alterniflora* invasions reduce soil fungal diversity and simplify co-occurrence networks in a salt marsh ecosystem. **Science of The Total Environment**, 758, 143667.
26. *Wang L., Chen H., Wu J., **Huang L.**, Brookes P., Rodrigues J., Xu J., Liu X. (2021) Effects of magnetic biochar-microbe composite on Cd remediation and microbial responses in paddy soil. **Journal of hazardous materials**, 44, 125494.
27. *Behnke, G.D., Zabaloy, M.C., Riggins, C.W., Rodriguez-Zas, S., **Huang, L.**, Villamil, M. B. (2020). Acidification in corn monocultures favor fungi, ammonia oxidizing bacteria, and nirK-denitrifier groups. **Science of the Total Environment**, 720, 137514.
28. Pain A., Martin J.B., Young C.R., **Huang L.**, Valle-Levison A. (2019). Organic carbon quantity and quality across salinity gradients in conduit-versus diffuse flow-dominated subterranean estuaries. **Limnology & Oceanography**, 64(3), 1368-1402.
29. Bae H., **Huang L.**, White J., Wang J., Delaune R., Ogram A. (2018). Response of microbial populations regulating nutrient biogeochemical cycles to oiling of coastal saltmarshes from the Deepwater Horizon oil spill. **Environmental pollution**, 241, 136-147.
30. Henson W., **Huang L.**, Graham W., Ogram A. (2017). Nitrate reduction mechanisms

and rates in an unconfined eogenetic karst aquifer in two sites with different redox potential. *Journal of Geophysical Research: Biogeosciences*, 122, 1062-1077.

31. Bai J., **Huang L.**, Gao H., Zhang G. (2017). Wetland biogeochemistry and ecological risk assessment. *Physics and Chemistry of the Earth*, 97, 1-2.
32. Zhao, Q., Bai, J., **Huang, L.**, Gu, B., Lu, Q. and Gao, Z., 2016. A review of methodologies and success indicators for coastal wetland restoration. *Ecological Indicators*, 60, 442-452.
33. Bai, J., **Huang, L.**, Gao, Z., Lu, Q., Wang, J., Zhao, Q. (2014). Soil seed banks and their germination responses to cadmium and salinity stresses in coastal wetlands affected by reclamation and urbanization based on indoor and outdoor experiments. *Journal of Hazardous Materials*, 280, 295-303.
34. Gao, H., Bai, J., Xiao, R., Yan, D., **Huang, L.**, Huang, C. (2012). Soil net nitrogen mineralization in salt marshes with different flooding periods in the Yellow River Delta, China. *CLEAN–Soil, Air, Water*, 40(10), pp.1111-1117.
35. Gao, H.F., Bai, J.H., **Huang, L.**, Wang, G.P., Huang, C., Liu, P.P. (2012). Ammonia volatilization from marsh soils of typical floodplains with different flooding frequencies. *Acta Prataculturae Sinica*, 21(5), 331.
36. Huang, C., Bai, J., Shao, H., Gao, H., Xiao, R., **Huang, L.**, Liu, P. (2012). Changes in soil properties before and after wetland degradation in the Yellow River Delta, China. *CLEAN–Soil, Air, Water*, 40(10), 1125-1130.
37. Wang, Q., Bai, J., **Huang, L.**, Deng, W., Xiao, R., Zhang, K. (2011). Soil nutrient distribution in two typical paddy terrace wetlands along an elevation gradient during the fallow period. *Journal of Mountain Science*, 8, 476-483.

Check the full publication list:

<https://scholar.google.com/citations?user=qurlCzcAAAJ&hl=en>

TEACHING AND MENTORING

COURSES TAUGHT [Saint Louis University]

- 2023-pres.
- (i) BIOL4640-**General Microbiology (3 credits; Fall)**. Core course for Biology and Pre-Med majors that cover cell, genetic, genome, evolution, metabolism, diversity, microbial symbiosis and disease. full course design, lecture, and lab development.
 - (ii) BIOL 4160 – **Microbial Ecology and Molecular Evolution (4 credits; Spring)**. Core undergraduate/graduate course emphasizing microbial interactions and evolution in natural and agricultural systems.
 - (iii) BIOL4970- **Library Project (1 credit)**. Individual undergraduate research projects for Biology and Pre-Med students.
 - (iv) BCB 5810-**Bioinformatics Colloquium (1 credit)**- Guest lectures linking microbial ecology and bioinformatics.
 - (v) BIOL5980-**Graduate Reading Course (1 credit)**. Research for graduate students from Biology, Pre-Med, and Bioinformatics Majors.

UNDERGRADUATE ACADEMIC MENTORSHIP

Undergraduate study mentoring: Currently, I serve as the academic mentor for 6 undergraduate students majoring/minoring in Biology. These students include

Anderson, Kaitlyn Isabella; Chokshi, Amisha S; Kalavagunta, Anushka; Kelly, Hannah; Koshimizu, Rikita; Taaj, Maleka

Undergraduate research mentoring:

2024 –pres. Birch Fabregas, Yasmin Mohammad, Tamish Sapkota [biology major]

GRADUATE/POSTDOCTORAL STUDENT MENTORSHIP

(i) Graduate students

2025– pres. Maxon Gao, Ph.D.

2024 – pres. Nikky Omole-Ohonsi, Ph.D.

2024 –2025 Deepak Sunkavalli, M.S.

2024 –2025 Muni Sai Ganesh Perala, M.S.

(ii) Post-doctoral scholars

2025 – pres. Zhine Wang; Ph.D.

2024 –2025 Sabita Ghimire; Ph.D.

(iii) Graduate student committee member

Dissertation Committees (3 total)

2025-pres. Sapana Parajuli, PhD Student, Rongzhong Ye's Lab [[University of Clemson](#)]

2023-pres. Fabio Giacomelli, PhD Student, Stephen Blake's Lab [[Saint Louis University](#)]

2023-pres. Kenneth Okonkwo, PhD Student, Allison Miller's Lab [[Saint Louis University](#)]

2023-pres. Kyle Curran, PhD Student, Cristy Portales's Lab [[Saint Louis University](#)]

Preliminary Exam Committees (2 total)

Spring, 2024 Fabio Giacomelli, PhD Student, Stephen Blake's Lab [[Saint Louis University](#)]

Spring, 2024 Jinhui Li, PhD Student, Dapeng Zhang's Lab [[Saint Louis University](#)]

PRESENTATIONS

INVITED ORAL PRESENTATIONS

2024 **Huang.L.** Soil microbiota recovery related to C accumulation in the second largest biome in Brazil grassland. 2024 Ecological Society of America Annual Meeting" |Aug. 4-9| Long Beach, CA, USA.

2023 **Huang.L.** Microbial Adaptation and N Controls in Wetland Restoration. 2023 The International Symposium on Coastal Wetland Ecological Conservation and Restoration" |Aug. 18-20| Dongying city, Shangdong Province, China.

2023 **Huang.L.** Exploring Microbial N and C Cycling through Bioinformatics. BCB 5810 Bioinformatics Colloquium, |Sep. 8| Saint Louis University, MO, USA

OTHER ORAL PRESENTATIONS

2021 **Huang et al.** Soil microbial community and their controls on N transformation following groundwater recharge in California vineyards. 2021 ASA-CSSA-SSSA International Annual Meeting | Nov. 7-10 | Salt Lake City, Utah, USA.

2021 **Huang et al.** Soil microbial community and their controls on N transformation following groundwater recharge in California vineyards. 2021 ASA-CSSA-SSSA International Annual Meeting | Nov. 7-10 | Salt Lake City, Utah, USA.

2019 **Huang et al.** Long-term N fertilization imbalances potential N acquisition and transformations by soil microbes. 2019 ASA-CSSA-SSSA International Annual Meeting | Nov. 10-13 | San Antonio, Texas, USA.

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- 2016** **Huang et al.** Analysis of microbial communities associated with groundwater discharge in the Yucatan Peninsula. 2016 AWRA Annual Water Resources Conference, | Nov. 9-12 | Orlando, USA.
- 2011** **Huang et al.** Simulation of changes in some soil properties as affected by water level fluctuation in an inland salt marsh. The 18th Biennial ISEM conference- Ecological Modeling for Global Change and Couple Human and Natural Systems, | Sep. 20-23 | Beijing, China.

POSTER PRESENTATIONS

- 2022** **Huang et al.** Molecular and isotopic profiling of microbial controls NO₃ leaching under Managed Aquifer Recharge. ISME18, Lausanne, Switzerland from 14-19 August 2022.
- 2018** **Huang et al.** Biogeochemistry of carbon and N cycling in subsiding subtropical soils. 13th Annual DOE Joint Genome Institute Genomics of Energy& Environmental meeting.
- 2016** **Huang et al.** Analysis of microbial communities and N cycling associated with groundwater discharge in the Yucatan Peninsula. Soil and Water Science Department Research Forum, University of Florida, USA.
- 2016** **Huang et al.** The responses of key nitrogen cycling genes to seasonal and tidal variations in a tropical estuary. Water Institute Symposium, University of Florida, USA.
- 2015** **Huang et al.** The response of key nitrogen cycling genes to seasonal and tidal variations in a tropical estuary. Annual Meeting Florida Branch of the American Society for Microbiology, USA.
- 2014** **Huang et al.** The effects of sea-level rise on the microbial ecology of nitrogen cycling in subterranean estuaries. Water Institute Symposium, University of Florida, USA.
- 2012** **Huang et al.** The indoor and outdoor germination experiments of soil seed-spore bank from Pearl River Delta, China. The 9th INTECOL International Wetlands Conference, Orlando, FL, USA.

SERVICE

PROFESSIONAL SERVICE

(i) Grant panelist, proposal review, fellowship review

2023-pres. Review panel for USDA-NIFA: Plant Production and Protection-Biology Grant Program.

(ii) Peer Journal Reviewer:

Peer reviewer for more than 50 manuscripts in 22 journals: ISME J, PNAS, Microbiome; Environmental Microbiology; mSphere; Microbial Ecology; Frontiers in Microbiology; Communications Biology; Science of the Total Environment; Journal of Hazardous Materials; GCB Bioenergy; Geoderma; Environmental Pollution; Chemosphere; Ecological Indicators; Journal of Contaminant Hydrology; Journal of Cleaner Production; Wetlands; Journal of Soils and Sediment; Physics and Chemistry of the Earth; CLEAN–Soil, Air, Water; Scientific Report.

(iii) Guest editor:

2016-2023 Science of the Total Environment; Frontiers in Soil Science; Water; Physics and Chemistry of the Earth; Ecohydrology & Hydrobiology.

(iv) Symposia organizer:

2011 The 18th Biennial ISEM conference-Ecological Modeling for Global Change and Couple Human and Natural Systems Beijing, China.

UNIVERSITY SERVICE

(i) University-level – Saint Louis University:

2023 Judge. Sigma Xi Research Symposium

(ii) College-level – Saint Louis University College of Arts & Sciences:

2023 Judge. Graduate Student Association Symposium

(iii) Department-level – Saint Louis University, Department of Biology:

2023-pres. Graduate Curriculum Review Committee

2023-pres. Judge. Grad/UG Research Collaboration Award

MEMBERSHIP IN PROFESSIONAL SOCIETIES

Ecological Society of America (ESA)

Soil Science Society of America (SSSA)

American Society for Microbiology (ASM)