

LAIBIN HUANG

Assistant Professor (2023.8-)
Microbial Ecology/ Microbiology
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RESEARCH INTERESTS

- **Microbiome in controlling soil fertility and health in agroecosystem**—Microbial controls on soil nitrogen and carbon cycling, greenhouse gas emissions.
- **Impacts of global change on microbiome** -- Microbiome assembly and their resistance/resilience in the changing world

EDUCATION

2013-2017	Ph.D. in Microbial Ecology	University of Florida, USA <i>Advisor: Prof. Andrew Ogram</i>
2009-2012	M.S. in Environmental Ecology	Beijing Normal University, China <i>Advisor: Prof. Junhong Bai</i>
2005-2009	B.S. in Ecology	University of Science and Technology Beijing, China

PROFESSIONAL EXPERIENCE

2020.01-2023.07	Postdoc	University of California, Davis <i>Advisor: Prof. Jorge Rodrigues</i>
2019.01-2020.01	Postdoc	University of Illinois Urbana, Champaign <i>Advisor: Prof. Maria Bonita Villamil</i>
2017.10-2019.01	Postdoc	University of Florida <i>Advisor: Assist. Prof. Willm Martens-Habbena</i>

FELLOWSHIPS AND AWARDS

2023	Young Scientist Award	Association of Chinese Soil and Plant Scientists in North America	
2020-2021	PSA Travel Award	University of California, Davis	\$400
2013-2017	Water Institute Graduate Fellowship	University of Florida	\$100,000/4 yrs
2015-2016	Best Poster Awards	University of Florida	\$500
2011-2012	Excellent Graduate Student Scholarship	Beijing Normal University	\$500
2009-2011	First-Class Entrance Scholarship	Beijing Normal University	\$3,000/2 yrs
2005-2006	Posco Scholarship	University of Science and Technology Beijing	\$1,000

GRANTS AND PROPOSAL WRITING

Ungranted

- ❖ **2022 [USDA-NIFA]** --\$649,962/3 yrs: *Optimizing Nitrogen Management Using Real-Time Data from Novel Affordable Sensor Arrays and Predictive Modeling*. Dahlke Helen [PI], Rodrigues Jorge L. Mazza, Daniel Geisseler, Isaya Kisekka, Levintal Elad, **Laibin Huang [Co-PI]**

Granted

- ❖ **2005-2009: [National Undergraduate Innovation Project]** --\$3,000/2 yrs: Cuiliang Cheng [PI], **Laibin Huang [Co-PI]**.
- ❖ **2023-2026: [California Air Resources Board of the California Environmental Protection]** --\$600,000/3 yrs: *Quantifying and Identifying the Potential Causes of Nitrous Oxide Emissions in California Soils under Fumigation*. Jorge L. Mazza Rodrigues [PI], **Laibin Huang [Co-PI/Project Manager]** William R. Horwath, Helen Dahlke, and Xia Zhu-Barker (University of Wisconsin-Madison)
- ❖ **2023-2024 Stolle Fund --\$2000: College of Arts & Sciences, Saint Louis University**

RESEARCH PROJECTS

Microbial controls on nitrogen/carbon cycling in Agricultural soil ecosystems

- ❖ **2020-present:** Understanding managed aquifer recharge effects on soil N cycling and health in the agricultural ecosystems, California [University of California, Davis; Gordon and Betty Moore Foundation] --*Research leader*
- ❖ **2020-present:** Plant and Microbial Indicators of Soil Health: The effects of nitrogen fertilization on rhizosphere and soil microbiomes [University of California, Davis; USDA-NIFA-AFRI] --*Collaboration*
- ❖ **2020-present:** Bio-stimulants and specialty nutrients for use in agriculture applications- Tomato field test [University of California, Davis; Valagro USA] --*Collaboration*
- ❖ **2019-2020:** Understanding shifts in the microbial N cycle with the inclusion of cover crops into long-term agricultural experiments and their links to soil health and productivity in the agricultural area, Illinois [University of Illinois at Urbana-Champaign; USDA-NIFA-AG 2018-67019-27807] --*Research leader*
- ❖ **2017-2019:** Microbial N/C cycles link to soil fertility in Everglades agricultural soil, Florida [University of Florida; USDA-NIFA- 2022-67019-36501] --*Research leader*

Microbial controls on nitrogen cycling in coastal water ecosystems

- ❖ **2013-2017:** Coastal SEES (Track 1): Planning for hydrologic and ecological impacts of sea-level rise on the sustainability of coastal water resources [University of Florida; US National Science Foundation-OCE-1325227] --*Research leader*

Microbial assembly/coexistence, resistance/resilience in coastal ecosystems

- ❖ **2010-2020:** Wetland soil degradation and restoration in the Yellow River and Pearl River Estuaries, China [Beijing Normal University; National Science Foundation of China-51379012 and 51639001] --*Research leader*

SELECTED PUBLICATIONS (Selected)

First Author

1. **Huang, L.**, Soares, R.A., Wright, A., Corrêa, R.S., Silva, L., Rodrigues, J.L.M. (2023). Regeneration of the soil microbiome is directly associated with carbon accumulation in a biodiversity hotspot. (Under review).
2. **Huang, L.**, Levintal, E., Christian, B.E., **Coyotl, A.(Undergraduate Trainee)**, 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.(Graduate Trainee)**, 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.**, 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.
5. **Huang L.**, Chakrabarti, S., Cooper, J., **Perez, A.(Undergraduate Trainee)**, 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.
6. **Huang, L.**, **Zhang, G.(Graduate Trainee)**, 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.(Graduate Trainee)**, **Zhang, G.(Graduate Trainee)**, 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.
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. Zhao J., **Huang L.**, Chakrabarti S., Cooper J., Choi E., Ganon 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.
15. 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.
16. **Zhang, G.(Graduate Trainee)**, 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.
17. **Zhang, G.(Graduate Trainee)**, 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.
18. **Yu L.(Graduate Trainee)**, 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.
19. **Zhang G.(Graduate Trainee)**, 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*, 31:4478-4494.
20. **Yu M.(Graduate Trainee)**, 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.
21. **Zhang, G.(Graduate Trainee)**, 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.
22. **Wang L.(Graduate Trainee)**, 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.
23. **Behnke, G.D.(Graduate Trainee)**, 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.
24. 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.
 25. 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.
 26. 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.
 27. Bai J., **Huang L.**, Gao H., Zhang G. (2017). Wetland biogeochemistry and ecological risk assessment. *Physics and Chemistry of the Earth*, 97, 1-2.
 28. 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.
 29. 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.
 30. 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.
 31. 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.
 32. 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.
 33. 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.
 34. Bai, J., Ouyang, H., Xiao, R., Gao, J., Gao, H., Cui, B., **Huang, L.** (2010). Spatial variability of soil carbon, nitrogen, and phosphorus content and storage in an alpine wetland in the Qinghai–Tibet Plateau, China. *Soil Research*, 48(8), pp.730-736.

SELECTED PRESENTATIONS

Invited speaker/Seminar

1. **Laibin Huang (2023)**. Microbial Adaptation and Nitrogen Controls in Wetland Restoration. 2023 The International Symposium on Coastal Wetland Ecological Conservation and Restoration” |Aug. 18-20| Dongying city, Shangdong Province, China.
2. **Laibin Huang (2023)**. Exploring Microbial Nitrogen and Carbon Cycling through Bioinformatics. BCB 5810 Bioinformatics Colloquium, |Sep. 8| Saint Louis University, Sanit Louis, MO, USA

Oral presentations

3. **Laibin Huang et al. (2021)**. Soil microbial community and their controls on nitrogen transformation following groundwater recharge in California vineyards. 2021 ASA-CSSA-SSSA International Annual Meeting | Nov. 7-10 | Salt Lake City, Utah, USA.
4. **Laibin Huang et al. (2019)**. 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.
5. **Laibin Huang et al. (2016)**. Analysis of microbial communities associated with groundwater discharge in the Yucatan Peninsula. 2016 AWRA Annual Water Resources Conference, | Nov. 9-12 | Orlando, USA.
6. **Laibin Huang et al. (2011)**. 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 presentation

1. **Huang, L., ..., Rodrigues Jorge L. Mazza. (2022)**. Molecular and isotopic profiling of soil microbial controls on nitrate leaching under Managed Aquifer Recharge. ISME18, Lausanne, Switzerland from 14-19 August 2022.
2. **Laibin Huang, ..., Willm Martens-Habbena et al. (2018)**. Biogeochemistry of carbon and nitrogen cycling in subsiding subtropical soils. 13th Annual DOE Joint Genome Institute Genomics of Energy& Environmental meeting.
3. **Laibin Huang, ..., Andrew Ogram et al. (2016)**. 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.
4. **Laibin Huang, ..., Andrew Ogram et al. (2016)**. The responses of key nitrogen cycling genes to seasonal and tidal variations in a tropical estuary. Water Institute Symposium, University of Florida, USA.
5. **Laibin Huang, ..., Andrew Ogram et al. (2015)**. 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.
6. **Laibin Huang, ..., Andrew Ogram et al. (2014)**. The effects of sea-level rise on the microbial ecology of nitrogen cycling in subterranean estuaries. Water Institute Symposium, University of Florida, USA.
7. **Laibin Huang, ..., Junhong Bai et al. (2012)**. 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.

TEACHING AND MENTORING EXPERIENCE

Classroom

- ❖ **2023-present [Saint Louis University]:** General Microbiology-BIOL4640
- ❖ **2015-2017 [University of Florida]:** (1) *Soil Microbial Ecology*; (2) *Soil Mycorrhizae*
- ❖ **2010-2012 [Beijing Normal University]:** (1) *Environmental Ecology*; (2) *Wetland Ecology*
- ❖ **2016-2021:** Bioinformatics (QIIME2; R programming; Python; snakemake; HPC)

Lab

- ❖ Soil/water sampling for microbial studies, field greenhouse gas setting and collection
- ❖ Soil DNA and RNA extraction, qPCR, clone library, sequencing and nitrification and denitrification incubation, greenhouse gas measurement.

Students mentoring

- ❖ **2020-2022 [University of California, Davis]:** Ph.D.--Lu (Lucus) Wang, Gabrielle Rossidivito, Imane Slimani; M.S.--Joseph Student, Danilo Ferreira Silva; B.S.--Grace Cheng, Eno Taniguchi
- ❖ **2019-2020 [University of Illinois at Urbana-Champaign]:** M.S.--Nakian Kim; Ph.D.--Gevan D. Behnke
- ❖ **2014-2019 [University of Florida]:** B.S.-Cheng Song, Sana Chaudhry; Ph.D.-Mark Gorelik

SERVICE

- ❖ **Reviewer:** Microbiome; Environmental Microbiology; mSphere; Microbial Ecology; Science of the Total Environment; Journal of Hazardous Materials; GCB Bioenergy, Geoderma; Environmental Pollution; Chemosphere; Ecological Indicators; Wetlands; Journal of Soils and Sediment.
- ❖ **Guest editor (2016-2023):** Science of the Total Environment; Frontiers in Soil Science; Water; Physics and Chemistry of the Earth; Ecohydrology & Hydrobiology.
- ❖ **Symposia organizer (2011):** The 18th Biennial ISEM conference-Ecological Modeling for Global Change and Couple Human and Natural Systems Beijing, China.
- ❖ **Student president (2007-2009):** The club of environment and ecology, University of Science and Technology Beijing, China.

MEMBERSHIP IN PROFESSIONAL SOCIETIES

- ❖ American Society for Microbiology (ASM)
- ❖ Crop Science Society of America (CSSA)
- ❖ American Society of Agronomy (ASA)
- ❖ Soil Science Society of America (SSSA)