# 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

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

## PROFESSIONAL EXPERIENCE

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

## FELLOWSHIPS AND AWARDS

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| **2023** | **Young Scientist Award** | Association of Chinese Soil and Plant Scientists in North America |
| **2020-2021:** | **PSA Travel Award**<br>*University of California, Davis* | $400 |
| **2013-2017:** | **Water Institute Graduate Fellowship**<br>*University of Florida* | $100,000/4 yrs |
| **2015-2016:** | **Best Poster Awards**<br>*University of Florida* | $500 |
| **2011-2012:** | **Excellent Graduate Student Scholarship**<br>*Beijing Normal University* | $500 |
| **2009-2011:** | **First-Class Entrance Scholarship**<br>*Beijing Normal University* | $3,000/2 yrs |
| **2005-2006:** | **Posco Scholarship**<br>*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 filed 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., 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.
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.,** Brookesa P., Rodriguesc 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
- **S**oil 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)