Jingqiu **Liao**

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Current Position

Postdoctoral Research Scientist *2020-Current*

Columbia University *New York, NY, US*

- Advisor: Tal Korem, Department of Systems Biology

Education

Ph.D., Microbiology *2015-2020*

Cornell University *Ithaca, NY, US*

- Major advisor: Martin Wiedmann, Department of Food Science
- Minor advisors: Michael Stanhope (Genomics); Daniel Buckley (Soil Science)

Ph.D. Exchange Student, Microbiology *Fall 2019*

Massachusetts Institute of Technology *Cambridge, MA, US*

- Advisor: Otto Cordero, Department of Civil and Environmental Engineering

M.S., Environmental Science *2011-2014*

Peking University *Beijing, China*

- Advisor: Yi Huang, Department of Environmental Sciences

B.S., Ecology *2007-2011*

University of Science & Technology Beijing *Beijing, China*

Research Interests

Microbial evolution / Microbial ecology / Environmental microbiology / Microbial genomics and genetics / Microbial biogeography / Human microbiome / Foodborne pathogens

Research Experience

Postdoctoral Research Scientist *2020-Current*

Department of systems biology, Columbia University *New York, NY, US*

- Mining metagenomic data of human microbiome

Graduate Research Associate *2016-2020*

Field of Microbiology, Cornell University *Ithaca, NY, US*

- Led the soil sampling across the US and the enrichment and isolation of thousands of *Listeria* isolates from soil
- Performed molecular characterization of *Listeria* isolates using Sanger sequencing and whole genome sequencing (WGS)
- Performed DNA extraction for 16s rRNA amplicon sequencing of hundreds of soil samples
- Analyzed *Listeria* WGS data and environmental data to understand microbial biogeography at a nationwide scale
- Analyzed WGS data of *Listeria* from different environments to understand niche differentiation
- Analyzed 16s rRNA amplicon data of soil bacterial communities to identify potential *Listeria*-bacteria interaction
- Analyzed WGS data of different *Salmonella* serotypes to understand the environment-associated population structure
- Analyzed *E. coli* multilocus sequencing data and environmental data to understand the role of landscape on bacterial distribution

Graduate Research Fellow *2015*

Field of Microbiology, Cornell University *Ithaca, NY, US*

- Isolated and characterized *Streptomycetes* isolates from soil
- Analyzed *sigB* sequences of diverse *Listeria* strains to understand micro-evolution of gene
- Performed dissection of *Drosophila melanogaster* and measured colony-forming unit of microbes in gut

Research Associate *2014-2015*

Department of Environmental Sciences, Peking University *Beijing, China*

- Analyzed 16s rRNA data of freshwater bacterial communities and environmental data to understand microbial assembly.

Graduate Research Assistant *2011-2014*

Department of Environmental Sciences, Peking University *Beijing, China*

- Conducted water sampling in Dianchi Lakes, China
- Measured petroleum hydrocarbon concentration using GC-MS
- Measured microbial activity using Biolog EcoPlates
- Analyzed 16s rRNA data of bacterial communities from oil-contaminated soil and environmental data to understand the influence of oil contamination on the bacterial communities
- Contributed to the writing of Global Environment Outlook 5
- Designed an index system of biological integrity to assess the health of aquatic ecosystem health

Publications

Preprint

[1] **Liao J**, Bergholz P, Wiedmann M. 2020. Terrestrial landscape impacts the biogeographic pattern of soil *Escherichia coli* via altering the strength of environmental selection and dispersal. bioRxiv doi:10.1101/2020.06.30.181495

Peer-reviewed

[1] Meeske AJ, Jia N, Cassel AK, Kozlova A, **Liao J**, Wiedmann M, Patel DJ, Marraffini LA. 2020. A phage-encoded anti-CRISPR enables complete evasion of type VI-A CRISPR-Cas immunity. Science 369:54-59

[2] **Liao J**, Orsi RH, Carroll LM, Wiedmann M. 2020. Comparative genomics reveals different population structures associated with host and geographic origin in antimicrobial-resistant *Salmonella enterica*. Environ Microbiol 22:2811-2828

[3] **Liao J**, Orsi RH, Carroll LM, Kovac J, Ou H, Zhang H, Wiedmann M. 2019. Serotype-specific evolutionary patterns of antimicrobial-resistant *Salmonella enterica*. BMC Evol Biol 19:132

[4] Huang Y, Wang J, Chen H, **Liao J**, Huang M. 2018. Oil contamination and toxicity assessment of soil in main oil fields in China. Science Press, Beijing, China. (Book in Chinese)

[5] **Liao J**, Wiedmann M, Kovac J. 2017. Genetic stability and evolution of the *sigB* allele, used for *Listeria sensu stricto* subtyping and phylogenetic inference. Appl Environ Microbiol 83:e00306-17

[6] **Liao J**, Cao X, Wang J, Zhao L, Sun J, Jiang D, Huang Y. 2017. Similar community assembly mechanisms underlie similar biogeography of rare and abundant bacteria in lakes on Yungui Plateau, China. Limnol Oceanogr 2:723-735

[7] Cao X, Wang J, **Liao J**, Gao Z, Jiang D, Sun J, Zhao L, Huang Y, Luan S. 2016. Bacterioplankton communities response to key environmental variables in plateau freshwater lake ecosystems: a structural equation modeling analysis. Sci Total Environ 580:457-467

[8] **Liao J**, Zhao L, Cao X, Sun J, Gao Z, Wang J, Jiang D, Fan H, Huang Y. 2016. *Cyanobacteria* in lakes on Yungui Plateau, China are assembled via niche processes driven by water physicochemical property, lake morphology and watershed land-use. Sci Rep 6:36357

[9] **Liao J**, Cao X, Zhao L, Wang J, Gao Z, Wang MC, Huang Y. 2016. The importance of neutral and niche processes for bacterial community assembly differs between habitat generalists and specialists. FEMS Microbiol Ecol 92:fiw174

[10] Wang J, Cao X, Chai L, **Liao J**, Huang Y, Tang X. 2016. Oxidative damage of naphthenic acids on the *Eisenia fetida* earthworm. Environ Toxico 31:1337-1343

[11] **Liao J**, Wang J, Jiang D, Wang M, Huang Y. 2015. Long-term oil contamination causes similar changes in microbial communities of two distinct soils. Appl Microbiol Biotechnol 99:10299-10310

[12] **Liao J**, Wang J, Huang Y. 2015. Bacterial community features are shaped by geographic location, physicochemical properties and oil contamination of soil in main oil fields of China. Microb Ecol 70:380-389

[13] Cao X, Wang, J, **Liao J**, Huang Y, Sun J. 2015. The threshold responses of phytoplankton community to nutrient gradient in a shallow eutrophic lake. Ecol Indic 61:258-267

[14] Wang J, Cao X, Chai L, **Liao J**, Huang Y, Tang X. 2015. Quantification and characterization of naphthenic acids from soil of oil exploring areas in China by GC/MS. Anal Methods 7:2149-2154

[15] Wang J, Cao X, **Liao J**, Huang Y, Tang X. 2015. Carcinogenic potential of PAHs in oil-contaminated soils from the main oil fields across China. Environ Sci Pollut R 22:10902-10909

[16] Yang Y, Wang J, **Liao J**, Xie S, Huang Y. 2015. Abundance and diversity of soil petroleum hydrocarbon egrading microbial

communities in oil exploring areas. Appl Microbiol Biotechnol 99:1935-1946
[17] Yang Y, Wang J, **Liao J**, Xie S, Huang Y. 2014. Distribution of naphthalene dioxygenase genes in crude oil contaminated soils. Microb Ecol 68:785-793
[18] **Liao J**, Cao X, Wang J, Huang Y. 2014. Basin-scale aquatic ecosystem health assessment with composite indices of chemistry and aquatic biota: a case study of Dianchi Lake. Acta Sci Circumst 34(7):1845-1852 (in Chinese)
[19] **Liao J**, Huang Y. 2013. Global trend in aquatic ecosystem research from 1992 to 2011. Scientometrics 98:1203-1219
[20] **Liao J**, Huang Y. 2013. Research progress on using index of biological integrity to assess aquatic ecosystem health. Chin J Appl Ecol 24(1):295-302 (in Chinese)
[21] **Liao J**, Wen H, Su Y, Cao X, Huang Y. 2012. The assessment for habitat security of aquatic ecosystem: a case study on Taizi River sub-basin, Benxi River. Ecol & Environ Sci 21(7):1277-128 (in Chinese)

Presentations

Microbial Ecology and Evolution, MEEVirtual *Aug., 2020*
Poster Presenter *Virtual*
- Genomic features decipher the niche breadth of *Listeria* populations (selected for lightning talk)

Ph.D. Dissertation Seminar, Cornell University *July, 2020*
Oral Presenter *Ithaca, NY, US*
- Exploration of ecological and evolutionary mechanisms underlying microbial biogeography and adaptation

Microbiology Graduate Seminar, Cornell University *Feb., 2020*
Oral Presenter *Ithaca, NY, US*
- Biogeography of edaphic *Listeria* across the United States

Microbiome, Cold Spring Harbor Laboratory Meeting *Jul., 2019*
Poster Presenter *Cold Spring Harbor, NY, US*
- Comparative genomics reveals different population structures associated with host and geographic origin in antimicrobial-resistant *Salmonella enterica*

Microbiology Graduate Seminar, Cornell University *Mar., 2019*
Oral Presenter *Ithaca, NY, US*
- Nationwide distribution of *Listeria* in soil from natural environment

Biology of Genomes, Cold Spring Harbor Laboratory Meeting *May, 2018*
Poster Presenter *Cold Spring Harbor, NY, US*
- Serotype-specific evolutionary pattern of antimicrobial-resistant *Salmonella enterica*.

Microbiology Graduate Seminar, Cornell University *Apr., 2018*
Oral Presenter *Ithaca, NY, US*
- Serotype-specific evolutionary pattern of antimicrobial-resistant *Salmonella enterica*

Cornell University - Nestle Whole Genome Sequencing Training, Cornell University *Oct., 2017*
Oral Presenter *Ithaca, NY, US*
- Phylogenetic tree reconstruction.

Ecological & Evolutionary Genomics, Gordon Research Conference *Jul., 2017*
Poster Presenter *Biddeford, ME, US*
- Genetic stability and evolution of the *sigB* allele used for *Listeria* subtyping and phylogenetic inference

Microbiology Graduate Seminar, Cornell University *Mar., 2017*
Oral Presenter *Ithaca, NY, US*
- Genetic stability and evolution of *sigB* allele of *Listeria sensu stricto*

M.S. Dissertation Seminar, Peking University *Jun., 2014*
Oral Presenter *Beijing, China*
- The physicochemical property and microbial structure of oil contaminated soils

The 6th SNU-PKU-KU Environmental Workshop, Seoul National University *Jul., 2012*
Oral Presenter *Seoul, South Korea*
- Conservation of Chinese ecosystems: strategy and challenge

The 6th TU-USTB Joint Meeting on Sciences & Engineering Design, Tohoku University *Jul., 2010*
Oral Presenter *Sendai, Japan*
- The influence of climate change on human ecology

Professional Activities

Journal reviewer *Int Biodeterior Biodegradation* / *Scientometrics* / *Fund Appl Limnol* / *Ecotox Environ Safe* / *Mar Pollut Bull*
Topic editor *Frontiers in Water* (in progress)

Teaching and Mentoring Experience

Mentor Muke Huang, Peking University *2018-2019*
Teaching assistant BioMi2900 General Microbiology, Cornell University *Spring 2018*
Mentor Yaoqian Hu, Peking University *2014-2015*
Teaching assistant Environmental ecology, Peking University *Fall 2012*

Skills

Biology Microbial isolation and culture / Molecular biology (DNA) / High-throughput sequencing / Field sampling
Bioinformatics Programming (Python, R) / Computational biology / Biostatistics
Languages English (fluent), Chinese (native)

Leadership & Outreach

Social chair Field of Microbiology Students (FoMS), Cornell University *2017-2018*
Volunteer 3M environmental sampling workshop, Cornell University *2016-2018*
Student representative The 13th Annual Retreat of the Center for Infection & Pathobiology, Cornell University *Apr. 2017*
Vice-captain PKUI Team, Solar Decathlon China *2012-2013*
Vice-president College Student Union, Peking University *2012-2013*
Vice-president College Student Union, University of Science & Technology Beijing *2009-2010*
Volunteer Beijing Olympic Games *Summer 2008*

Honors & Awards

Graduate Research Assistantship Cornell University *2016-2020*
Conference & Research Travel Grants Cornell University *2017-2019*
Cornell Graduate Fellowship Cornell University *2015-2016*
Graduate Research Assistantship Peking University *2011-2014*
Sander Scholarship Peking University *2013*
Academic Innovation Award Peking University *2013*
Honor Student for Excellent Academic Records Peking University *2012*
The 2nd Prize of Academic Innovation Contest Peking University *2012*
National Scholarship China *2010*
National Inspiration Scholarship China *2009*
Freshmen Scholarship University of Science & Technology Beijing *2008*
Student Innovation Program Scholarship University of Science & Technology Beijing *2008*