

Jingqiu Liao

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Current Position

Postdoctoral Research Scientist

COLUMBIA UNIVERSITY

- Advisor: Tal Korem, Department of Systems Biology

2020-Current

New York, NY, US

Education

Ph.D., Microbiology

CORNELL UNIVERSITY

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

2015-2020

Ithaca, NY, US

Ph.D. Exchange Student, Microbiology

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

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

Fall 2019

Cambridge, MA, US

M.S., Environmental Science

PEKING UNIVERSITY

- Advisor: Yi Huang, Department of Environmental Sciences

2011-2014

Beijing, China

B.S., Ecology

UNIVERSITY OF SCIENCE & TECHNOLOGY BEIJING

2007-2011

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

DEPARTMENT OF SYSTEMS BIOLOGY, COLUMBIA UNIVERSITY

- Mining metagenomic data of human microbiome

2020-Current

New York, NY, US

Graduate Research Associate

FIELD OF MICROBIOLOGY, CORNELL UNIVERSITY

- 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 PCR and whole genome sequencing (WGS)
- Discovered a number of new *Listeria* species
- 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 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

2016-2020

Ithaca, NY, US

Graduate Research Fellow

FIELD OF MICROBIOLOGY, CORNELL UNIVERSITY

- Isolated and characterized *Streptomyces* 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 in gut

2015

Ithaca, NY, US

Research Associate

DEPARTMENT OF ENVIRONMENTAL SCIENCES, PEKING UNIVERSITY

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

2014-2015

Beijing, China

Graduate Research Assistant

DEPARTMENT OF ENVIRONMENTAL SCIENCES, PEKING UNIVERSITY

2011-2014

Beijing, China

- Conducted water sampling in Dianchi Lakes, China
- Measured petroleum hydrocarbon concentration using GC-MS
- Measured microbial activity using Biolog EcoPlates
- Analyzed 16s amplicon data of bacterial communities from oil-contaminated soil and environmental data to understand the influence of oil contamination on the structure and function of bacterial communities
- Contributed to the writing of Global Environment Outlook 5
- Designed indices 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 Toxicol* 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 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 Catharine Carlin; Cornell University

2019-2020

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