Jing Li

Postdoctoral Scholar

Department of Environmental Health Sciences, Fielding School of Public Health

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EDUCATION

2013.09-2018.07 *Ph. D.* in Environmental Science, **Peking University**, with Prof. Maosheng Yao
Dissertation topic: *Microbial Contents and Toxicity of Airborne Particulate Matter on a Global Scale*

2009.09-2013.06 *B.S.* in Environmental Engineering, **University of Science & Technology, Beijing**
Thesis topic: *Characterization of Biological Aerosol Exposure Risks from Automobile Air Conditioning System*

POSTDOCTORAL TRAINING

2022.09- **University of California Los Angeles**, with Prof. Yifang Zhu

2018.09-2022.09 **California Institute of Technology**, with Prof. Michael R. Hoffmann

RESEARCH INTERESTS

Environmental microbiology, bioaerosols, antibiotic resistance genes (ARGs), air pollution, airborne particulate toxicity, microbial analysis of water quality, nucleic acid amplification analysis, biosensor, lab-on-a-chip

AWARDS AND HONORS

Sheldon K. Friedlander Award, American Association for Aerosol Research (2019)
CEMI Training and Travel Grants, California Institute of Technology (2019)
Exceptional Award for Academic Innovation, Peking University (2016)
Gao Tingyao Scholarship for National Outstanding PhD student Award, Tongji University (2016)
Presidential Scholarship, Peking University (2016)
Special Scholarship for PhD Students, Peking University (2015, 2014)
Outstanding Student Award, Peking University (2015, 2014)
Tang Xiaoyan Environmental Science and Innovation Scholarships, Peking University (2015)
National Scholarship for PhD Students, the Chinese Ministries of Education and Finance (2014)
Beijing Outstanding Graduates, Beijing Municipal Commission of Education (2013)
National Scholarship for Undergraduates, the Chinese Ministries of Education and Finance (2012)

GRANTS

1. Bill & Melinda Gates Foundation, Global Growth and Opportunity 2021.04-2021.09
   COVID-19: mgLAMP for SARS-CoV-2 Phase 2 - Transition and Field-Testing, **postdoctoral researcher** (PI: Michael R. Hoffmann), 600k.
2. Bill & Melinda Gates Foundation, Global Growth and Opportunity 2020.06-2020.10
   To develop an assay that could be used to enable rapid quantification of SARS-CoV-2 pathogens in wastewater, **postdoctoral researcher** (PI: Michael R. Hoffmann), 389k.
3. Bill & Melinda Gates Foundation, Global Growth and Opportunity 2018.09-2020.06
   Field-scale Evaluation of Portable Microbial Pathogen Detection Systems in Low-Resource Settings,

postdoctoral researcher (PI: Michael R. Hoffmann), 1M.

PUBLICATIONS

Google Scholar Page: https://scholar.google.com/citations?user=C3ykF0AAAAAJ&hl=en

First/Corresponding author:

1. Yanzhe Zhu, Xunyi Wu, Alan Gu, Leopold Dobelle, Clément A. Cid, **Jing Li***, Michael R. Hoffmann* (**2022**), Membrane-based in-gel loop-mediated isothermal amplification (mgLAMP) system for SARS-CoV-2 quantification in environmental waters, *Environmental Science & Technology*, 56 (2): 862–873. (*Selected as the Non-PCR winner in Rapid Wastewater SARS-CoV-2 Testing Challenge held by Water Environmental Foundation*)
2. **Jing Li**, Yanzhe Zhu, Xunyi Wu, Michael R Hoffmann* (**2020**), Rapid detection methods for bacterial pathogens in ambient waters at the point of sample collection: A brief review, *Clinical Infectious Diseases*, 71 (Supplement_2): S84-S90.
3. **Jing Li**, Haoxuan Chen, Xinyue Li, Minfei Wang, Xiangyu Zhang, Junji Cao*, Fangxia Shen, Yan Wu, Siyu Xu, Hanqing Fan, Guillaume Da, Rujin Huang, Jing Wang, Chak K. Chan, Alma Lorelei de Jesus, Lidia Morawska, Maosheng Yao* (**2019**), Differing toxicity of ambient particulate matter (PM) in global cities, *Atmospheric Environment*, 212, 305-315.
4. **Jing Li**, Junji Cao, Yongguan Zhu, Qinglin Chen, Fangxia Shen, Yan Wu, Siyu Xu, Hanqing Fan, Guillaume Da, Rujin Huang, Jing Wang, Alma Lorelei de Jesus, Lidia Morawska, Chak K. Chan, Jordan Peccia, Maosheng Yao* (**2018**), Global survey of antibiotic resistance genes in air, *Environmental Science and Technology*, 52: 10975-10984. (*Selected as the ES&T Cover, ES&T's Best Papers of 2018 and ACS Editors' Choice, Recommended in Faculty Opinions, Featured by ACS as an "Embargoed Press Release", AAAS EurekAlert!, China Daily, Yahoo! News, etc.*)
5. **Jing Li**, Maosheng Yao* (**2018**), State-of-the-art status on airborne antibiotic resistant bacteria and antibiotic resistance genes (in Chinese), *Chinese Journal of Preventive Medicine*, 52 (4): 440-445.
6. **Jing Li**, Liantong Zhou, Xiangyu Zhang, Caijia Xu, Liming Dong*, Maosheng Yao* (**2016**), Bioaerosol emissions and detection of airborne antibiotic resistance genes from a wastewater treatment plant, *Atmospheric Environment*, 124, 404-412.
7. **Jing Li**, Qi Chen, Xinyue Li, Maosheng Yao* (**2014**), Rapid point-of-use water purification using nanoscale zero valent iron (nZVI) particles, *Chinese Science Bulletin*, 59 (29/30): 3926-3934.
8. **Jing Li**, Mingzhen Li, Fangxia Shen, Zhuanglei Zou, Maosheng Yao*, Chang-Yu Wu (**2013**), Characterization of biological aerosol exposure risks from automobile air conditioning system, *Environmental Science and Technology*, 47: 10660-10666.

Co-author:

9. Fangxia Shen*, Mutong Niu, Haoxuan Chen, Ting Zhang, **Jing Li**, Haijie Tong, Yan Wu (**2022**), Nonlinear proinflammatory effect of short-term $PM_{2.5}$ exposure: A potential role of lipopolysaccharide, *Journal of Environmental Sciences*, In press.
10. Alan Y. Gu, Yanzhe Zhu, **Jing Li**, Michael R. Hoffmann* (**2021**), Speech-generated aerosol settling times and viral viability can improve COVID-19 transmission prediction, *Environmental Science:* Atmospheres, 2: 34-45.
11. Haijie Tong*, Fobang Liu, Alexander Filippi, Jake Wilson, Andrea M Arangio, Yun Zhang, Siyao Yue, Steven Lelieveld, Fangxia Shen, Helmi-Marja K Keskinen, **Jing Li**, Haoxuan Chen, Ting Zhang, Thorsten Hoffmann, Pingqing Fu, William H Brune, Tuukka Petäjä, Markku Kulmala, Maosheng Yao, Thomas Berkemeier, Manabu Shiraiwa, Ulrich Pöschl (**2021**), Aqueous-phase reactive species formed by fine particulate matter from remote forests and polluted urban air, *Atmospheric Chemistry and Physics*, 21: 10439–10455.
12. Yanzhe Zhu, **Jing Li**, Xingyu Lin, Xiao Huang, Michael R. Hoffmann* (**2021**). A hydrogel beads based platform for single-cell phenotypic analysis and digital molecular detection, *ACS Applied Bio Materials*, 4

(3): 2664-2674.

13. Siwen Wang, Yanzhe Zhu, Yang Yang, **Jing Li**, Michael R. Hoffmann* (**2020**), Electrochemical cell lysis of gram-positive and gram-negative bacteria: DNA extraction from environmental water samples, *Electrochimica Acta*, 135864.
14. Xunyi Wu, Xiao Huang, Yanzhe Zhu, **Jing Li**, Michael R. Hoffmann* (**2020**), Synthesis and Application of Superabsorbent Polymer Microspheres for Rapid Concentration and Quantification of Microbial Pathogens in Ambient Water, *Separation and Purification Technology*, 116540.
15. Haoxuan Chen, Xiangyu Zhang, Ting Zhang, Xinyue Li, **Jing Li**, Yang Yue, Minfei Wang, Yunhao Zheng, Hanqing Fan, Jing Wang, and Maosheng Yao* (**2020**), Ambient PM Toxicity Is Correlated with Expression Levels of Specific MicroRNAs, *Environmental Science & Technology*, 54 (16): 10227-10236.
16. Haoxuan Chen, **Jing Li**, Xiangyu Zhang, Xinyue Li, Maosheng Yao*, Gengfeng Zheng* (**2018**), Automated *in vivo* nano-sensing of breath-borne protein biomarkers, *Nano Letters*, 18: 4716-4726.
17. Yunhao Zheng, **Jing Li**, Haoxuan Chen, Ting Zhang, Xinyue Li, Minfei Wang, Maosheng Yao* (**2018**), Bioaerosol research: Yesterday, today and tomorrow (in Chinese), *Chinese Science Bulletin*, 63: 878-894.
18. Yang Yue, Haoxuan Chen, Ari Setyan, Miriam Elser, Maria Dietrich, **Jing Li**, Ting Zhang, Xiangyu Zhang, Yunhao Zheng, Jing Wang*, Maosheng Yao* (**2018**), Size-resolved endotoxin and oxidizing potential of ambient particles in Beijing and Switzerland, *Environmental Science and Technology*, 52 (12): 6816-6824.
19. Kai Wei, Zhuanglei Zou, Yunhao Zheng, **Jing Li**, Fangxia Shen, Changyu Wu, Yan Wu, Min Hu, Maosheng Yao* (**2016**), Ambient bioaerosol particle dynamics observed during haze and sunny days in Beijing, *Science of the Total Environment*, 15 (550): 751-759.
20. Kai Wei#, Yunhao Zheng#, **Jing Li#**, Fangxia Shen, Zhuanglei Zou, Hanqing Fan, Xinyue Li, Chang-yu Wu, Maosheng Yao* (**2015**), Microbial aerosol characteristics in highly polluted and near pristine environments featuring different climatic conditions, *Science Bulletin*, 60 (16):1439-1447. (#*Authors contribute equally*)
21. Pengpeng Huang, Zhengfang Ye, Wuming Xie, Qi Chen, **Jing Li**, Zhencheng Xu, Maosheng Yao* (**2013**), Rapid magnetic removal of aqueous heavy metals and their relevant mechanisms using nanoscale zero valent iron (nZVI) particles, *Water Research*, 47: 4050-4058.
22. Qi Chen#, **Jing Li#**, Yan Wu, Fangxia Shen, Maosheng Yao* (**2013**), Biological responses of Gram-positive and Gram-negative bacteria to nZVI (Fe^0), Fe^{2+} and Fe^{3+}, *RSC Advances*, 3: 13835-13842. (#*Authors contribute equally*)
23. Qi Chen, Min Gao, **Jing Li**, Fangxia Shen, Yan Wu, Zhenqiang Xu, Maosheng Yao* (**2012**), Inactivation and magnetic separation of bacteria from liquid suspensions using electrosprayed and nonelectrosprayed nZVI particles: Observations and mechanisms, *Environmental Science and Technology*, 46 (4): 2360-2367.

PATENTS

1. Membrane-Based in-Gel Loop-Mediated Isothermal Amplification (mgLAMP) System Enables Rapid Quantification of SARS-CoV-2 in Large-Volume Environmental Waters (**2021**). Michael R. Hoffmann, **Jing Li**, Yanzhe Zhu, Xunyi Wu, Alan Gu, Léopold Dobelle, Clément A. Cid. *US Patent Number US20220162686A1. International Patent Number WO2022115187A1*.

INVITED TALKS

1. Risk Assessment and Monitoring of Environmental Microbes: from multi-country study to digital detection tools, *Caltech Division of Geological and Planetary Sciences*, Yuk Lunch Seminar, Host: Prof. Yuk L. Yung, Januar 2023.
2. Risk Assessment and Monitoring of Environmental Microbes: from multi-country study to digital detection tools, *UCLA Fielding School of Public Health*, EHS 411: Environmental Health Sciences Seminar Series, Host: Prof. Rachael Jones, October 2022
3. Risk Assessment and Monitoring of Environmental Microbes: from Rapid Detection Method to Multi-Country Study, *Rutgers University School of Environmental and Biological Sciences*, Host: Prof.

Benjamin Lintner, April 2022

4. Development of Portable Bacterial and Viral Pathogen Detection Systems for Low-Resource Settings, *Georgia Institute of Technology School of Civil and Environmental Engineering*, Host: Prof. Xing Xie, August 2021

CONFERENCE PRESENTATIONS

Oral Presentations:

1. Membrane-Based In-Gel Loop-Mediated Isothermal Amplification (mgLAMP) System for SARS-CoV-2 Quantification in Environmental Waters, *NSF Research Coordination Network Workshop: Wastewater surveillance methods for new and emerging pathogens*, December 2022, Virtual
2. Development of Portable Bacterial and Viral Pathogen Detection Systems for Low-Resource Settings, *Global Summit on European Healthcare & Hospital Management*, May 2022, Virtual (*Keynote presentation*)
3. Rapid and Inexpensive Point-of-Use (POU) Testing for SARS-CoV-2 Quantification with Membrane-Based in-Gel Loop-Mediated Isothermal Amplification (mgLAMP) System, #M4.328, *TechConnect World Innovation Conference and Expo*, October 2021, Washington DC, USA
4. Rapid and Inexpensive Point-of-Use (POU) Testing for SARS-CoV-2 Quantification with Membrane-Based in-Gel Loop-Mediated Isothermal Amplification (mgLAMP) System, #3596806, *ACS Fall 2021*, August 2021, Atlanta, USA
5. Rapid and Inexpensive Point-of-Use (POU) Testing for Bacterial and Viral Quantification with Membrane-Based in-Gel Loop-Mediated Isothermal Amplification (mgLAMP) System, *DEVCOM Soldier Center Water Sensor Symposium*, March 2021, Virtual
6. Differing toxicity of ambient particulate matter (PM) in global cities, #21-O20, *10th National Conference on Environmental Chemistry*, August 2019, Tianjin, China
7. Digital Detection of *Salmonella* typhi in large-volume environmental water samples using an asymmetric membrane, #596, *TechConnect World Innovation Conference and Expo*, June 2019, Boston, USA
8. Digital Detection of *Salmonella* typhi in large-volume environmental water samples using an asymmetric membrane, *Chinese Environmental Scholars Forum 2019*, June 2019, Houston, USA
9. Antibiotic-resistant bacteria (ARB) and antibiotic resistance genes (ARGs) in air media, #14.BA.3, *International Aerosol Conference*, September 2018, St. Louis, USA
10. Investigation of bioaerosol characterization in world cities using automobile air conditioning filter, #Ps0189, *Asian Aerosol Conference*, July 2017, Jeju, Korea
11. Investigation of bioaerosol characterization in world cities using automobile air conditioning filter, *Chinese Society of Particuology 9th Annual Conference*, August 2016, Chengdu, China

Posters:

1. Digital Detection of *Salmonella* typhi in large-volume environmental water samples using an asymmetric membrane, #D38, *10th National Conference on Environmental Chemistry*, August 2019, Tianjin, China
2. Digital Detection of *Salmonella* typhi in large-volume environmental water samples using an asymmetric membrane, #83, *11th International Conference on Typhoid and Other Invasive Salmonelloses*, March 2019, Hanoi, Vietnam
3. Use of automobile filter samples for profiling global bioaerosols, #2.BA.15, *AAAR 36th Annual Conference*, October 2017, Raleigh, USA
4. Investigation of bioaerosol characterization on a global scale using automobile air conditioning filter, #T402N4a9, *European Aerosol Conference*, August 2017, Zurich, Switzerland
5. Investigation of bioaerosol characterization in world cities using automobile air conditioning filter, #S7-0004, *World Life Science Conference*, November 2016, Beijing, China
6. Investigation of bioaerosol characterization in world cities using automobile air conditioning filter, *European*

Aerosol Conference, September 2016, Tours, France

7. Bioaerosol emissions and detection of airborne antibiotic resistance genes from a wastewater treatment plant, #H-52, *AEESP Research and Education Conference*, June 2015, New Haven, USA
8. Bioaerosol emissions and detection of airborne antibiotic resistance genes from a wastewater treatment plant, #P1-067, *Asian Aerosol Conference*, June 2015, Kanazawa, Japan
9. Bioaerosol emissions and detection of airborne antibiotic resistance genes from a wastewater treatment plant, #AF0601, *International Aerosol Conference*, September 2014, Busan, Korea

TEACHING EXPERIENCE

March 2019 Guest Lecturer
Development of Portable Microbial Pathogen Detection Systems for Low-Resource Settings, *Loyola Marymount University Seaver College of Science and Engineering*

Spring 2014 Teaching assistant
Bioaerosol 12710921, *Peking University College of Environmental Sciences and Engineering*

Spring 2014 Teaching assistant
Principles and applications of instrumental analysis in environmental and health 12700895, *Peking University College of Environmental Sciences and Engineering*

MENTORING EXPERIENCE

Dr. Yanzhe Zhu (PhD student, Caltech, 2018.09-2020.06)

Dr. Xunyi Wu (PhD student, Caltech, 2018.09-2021.06)

Dr. Siwen Wang (PhD student, Caltech, 2018.09-2019.06)

Dr. Alan Y. Gu (PhD student, Caltech, 2020.03-2022.04)

Stephanie O'Gara (PhD student, Caltech, 2019.09-2019.10)

Dr. John-Alexander Preuß (Visiting PhD student, Leibniz Universität Hannover, 2021.09-2021.12)

PROFESSIONAL ACTIVITIES

Memberships: American Association for Aerosol Research (AAAR)

Journal Reviewer: *Environmental International*, *Frontiers of Environmental Science & Engineering*

RESEARCH SKILLS

Microbiological and biochemical methods:

- bacteria, fungi and bacteriophage MS2 culturing,
- DNA and RNA extraction, PCR, (RT-) qPCR, EMA-qPCR, (RT-) dPCR, (RT-) LAMP, (RT-) dLAMP,
- agarose gel electrophoresis and denaturing gradient gel electrophoresis (DGGE),
- PCR- and LAMP- based primers and probes as well as QUASR and molecular beacon design,
- 16S rDNA clone library construction, sequencing and sequence analysis,
- enzyme linked immunosorbent assay (ELISA), Endotoxin and (1→3)-ß-D-glucan detection,
- fluorescence probe H_2DCF-DA assay, fluorimetric hydrogen peroxide assay,
- LIVE/DEAD BacLight method with fluorescent microscope observation.

Sampling techniques and instruments:

- aerosolization technique,
- various bioaerosol sampling techniques,
- aerosol monitoring instruments, such as OPC, UV-APS, WIBS, etc.,
- electrospray technique, atmospheric pressure cold plasma generation technique.

Chemical methods:

- plasma enhanced chemical vapor deposition (PECVD),
- nanoscale zero-valent iron (nZVI) particles and Ag nanoparticles (AgNPs) preparation,
- dithiothreitol (DTT) assay.

Others:

- SEM (scanning electron microscope);
- Zeiss LSM 980 (inverted laser scanning confocal microscope);
- circular dishroism spectrophotometer;
- freeze-drying/ lyophilization.

REFERENCES

Prof. Yifang Zhu, yifang@ucla.edu

Fielding School of Public Health, University of California Los Angeles

Professor

Prof. Michael R. Hoffmann, mrh@caltech.edu

Ronald and Maxine Linde Center for Global Environmental Science, California Institute of Technology

John S. and Sherry Chen Professor

Member of the U.S. National Academy of Engineering

Member of the Chinese Academy of Engineering

Honorary Professor of Tsinghua University

Prof. Maosheng Yao, yao@pku.edu.cn

College of Environmental Sciences and Engineering, Peking University

Boya Distinguished Professor

Prof. Brian R. Stoner, stoner@duke.edu

Pratt School of Engineering, Duke University

Director, Center for WaSH-AID (Water, Sanitation, Hygiene and Infectious Disease)

Research Professor, Department of Electrical and Computer Engineering

Prof. Yong-guan Zhu, ygzhu@rcees.ac.cn; ygzhu@iue.ac.cn

Science Director, Institute of Urban Environment, Chinese Academy of Sciences

Professor, Research Center for Eco-Environmental Sciences, Chinese Academy of Sciences

Member of the Chinese Academy of Sciences